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FELLOWSHIP OF MAKERS AND RESEARCHERS OF HISTORICAL INSTRUMENTS

Hon. Sec. J. Montagu, c/o Faculty of Music, St. Aldate’s, Oxford OX1 1DB, U.K.
YOUR SUBSCRIPTIONS ARE DUE FOR 1986. There's the usual invoice with this Q. Do please return it as soon as you can (eg tomorrow). Try to remember that Maggie and I do all this in our spare time and it makes our lives much easier if we don't have renewals trickling in during the spring and summer of next year. So if you can get them in to Maggie before Christmas, she'll be very grateful. Rates are the same: £5.50 surface & £8.00 airmail.

She says "Can you persuade as many people as possible to pay directly into the Giro account - they then send me the relevant counterfoil so I know who's paid." There is one snag about this: You MUST include your name and address on the payment form and MAKE SURE that this info will reach us with your payment. We had problems a couple of years ago of payments appearing in the account with no idea whatever of who had sent them. Remember that if we do not know that YOU have sent your subscription, YOU won't get your FoMRHIQ.

She also points out that there is no real need to send you a receipt; the fact that you do get the January Q is receipt enough if you only want to know that your payment has arrived. However, if you need a receipt for tax purposes or whatever, then please say so (I'll put a box to tick on the renewal form if you want one), and you'll get one.

One further request from her: Please don't send your letters by registered post unless it's absolutely necessary because of your post office (ours is just as likely to lose a registered letter as an unregistered one). Apparently the postmen in St.Albans don't knock on the door when they've got something to sign for; they make her trek down to Post Office and collect it, and that takes time and is a nuisance.

LOST MEMBER: Does anyone know what's happened to Ramón Comas of Barcelona? His April Q came back here with something illegible for the reason on the back.

Also a batch of Qs which Maggie had sent to Lynda Hunter came back from the USA with no reason at all. Anyone know if she is still in South Conifer, Colorado?

ENCLOSURE: Grove have asked us whether we would insert their leaflet on the Dictionary of Musical Instruments. We don't usually do this, as you know, but as it's a book that we have, and are, reviewing favourably, we've said yes (assuming that they get them up to Djilda in time for stuffing). We've never taken advertising, chiefly because it's not in the character of FoMRHIQ and none of us have the time to act as an advertising manager. Anything that comes in that I think it's to your advantage to know about gets into the Bulletin.

APOLOGY: I've been getting letters from Sverre Kolberg complaining, not surprisingly, at having his Comms chopped about by Eph and stuck into odd places. Eph thought, apparently, that they were spoof articles, written by somebody else, which is why he treated them like that. He was influenced by the style of writing and by the fact that Mr.Kolberg was not on our List of Members. I have written to him to apologise, and have asked Eph to do so, too, and I want to repeat the apology here. Whatever we are sent, and whoever sends it, member or not, it should not
have been treated like that. I have, incidentally, said the same to Bob Marvin and others who have written in protest at such treatment. So, our apologies to Mr. Kolberg, and I hope that he will, as I have suggested, join us in the future.

We are, normally (I hope that in future we shall remain normal in this respect), grateful for all Comms whether or not they are written in 'correct' English. So long as they are comprehensible, we print them; if they are in such poor English that they cannot be understood, then we do have to send them back, but never before, and I hope never again, will we or have we treated anything in non-standard English as a joke. We are grateful to our overseas friends and colleagues for taking the trouble to write in English as best they can; we would have lost much valuable information if they had stuck to their native Russian, Norwegian, Swedish, Portuguese and Dutch, just to take some that I remember as examples.

OUR BIRTHDAY: This Q celebrates our tenth anniversary. As Cary Karp says in a Comm herewith, none of us, when we started FoMRHI at the Early Musical Instrument Exhibition in 1975, would have believed that we would last so long. We have lasted, we have even kept some (not all) of the members who joined that first day, so obviously we are doing some things right, and we are still providing some things that you want. Help us to go on doing so, both by sending us Comms and things for the Bulletin and also by making suggestions, as Cary does in his Comm, for the ways in which we might change and improve. When we do something you don't like, don't hesitate to say so; if there's a reason for it, we'll tell you why we did it, and if there isn't, we'll try not to do it again. But we won't go up-market (many of you have said 'keep as we are') and we won't get any more 'respectable' than we are now, and these Bulletins won't get any more formal, at least not as long as I'm doing them.

FURTHER TO: Comm.620: (and see the Apology above): Eric Chapman wrote to Kolberg, with a copy to me, saying that Theo Wyatt has been using such a device and providing a recorder testing and tuning service for some years. I thought that I remembered telling you about it, but I've looked back quickly through some Bulletins and can't find it; I may have decided that FoMRHI members weren't likely to want to have their recorders tuned by somebody else. I also had the reservation that if an instrument was going to be tuned, what was it going to be tuned to? Very little music, in our area (Schönberg et alii are another matter), is at a fixed pitch, and I'd have thought that we were changing our tuning all the time we were playing. For that matter, one of our better known recorder players (no, I'm not going to tell you who it was) complained that our ex-Hunt Bressan treble was out of tune, and it was when she played it. I'm afraid that I told her that it wasn't the recorder that was out of tune; tact has never been my strong point!

Comm.634: David Crookes: "A fascinating article for which I'm very grateful."

Comm.637: David again: "I fear that I have been excessively rude, and so — especially in view of Eph Segerman's urbane rejoinder — I repent."

Comm.642: Well after the last Q had gone to the printer I received
a letter from Heinrich Thein saying that "meanwhile there is a little difficulty: the copy of a letter of Mr. Bourhis to Monsieur Rémy Gug in french language. This letter is not allowed to be published. So I ask you to separate it from the publication and send it back to me." Well, I'm sorry, but it was much too late. We don't operate on the usual time scale for some quarterlies I know, with stuff sitting in the editor's cupboard for a year or two. If you're lucky (unlucky in this case), your Comm will be in print within a month, and four at the outside (what arrives here next week goes in to the January Q).

You must remember, all of you, not just Heinrich, that what you send, we print, and we print it as you send it (except for poor Sverre Kolberg), so if there's anything wrong with it, it's you that'll have to apologise to whomever is concerned.

FoMRHI FORMAT: Which reminds me that we haven't printed the guide to authors since the Index (I think it was assumed that all new members would want the Index of the first 500 Comms and therefore would have seen it) where it's on the back cover. However, one Comm came here this quarter in time to send it back for retyping. Can I remind you that all Comm's must be single-spaced, not double, on A4 (the size of an opened-up copy of FoMRHIQ - we are going to reduce to half size and print two pages on one) with a 1 inch (25mm) margin all round (please note that I'm being good about this too after Eph's remarks about my Bulletins). Those are the most important details; the rest are on the back of the Index and will be printed again whenever there's a blank space the right size. If we remember, I'll ask Eph to put it on the back of the List of Members whenever there's room as there was this year. The other basic point that all save new members know is that what you send we print; there's no retyping done here or in Manchester, so misprints etc are your worry (apologies for the fact that there are no doubtless some of mine here and elsewhere in this Q), and so also that we need good black copy, if possible done with carbon ribbon; not to be confused with carbon copies, which are unprintable.

REQUESTS: David Crookes asks if we could have some elementary Comms on wire drawing?

MUSEUMS: Cathy Folkers tells me that she has left the Dayton Miller Collection at the Library of Congress, and that they will soon be advertising for her successor. Meanwhile, please try to postpone any requests to get at instruments there; they will do their best to help absolutely urgent requests, but obviously it is not going to be easy until there is a new curator. Cathy's and Ardal's new address is in the Members List Supplement here-with.

Phil and Pam Fluke have set up a Museum of Victorian Reed Organs and Harmoniums in the Victoria Hall, Saltaire, Shipley. Open daily except Mondays, 11am to 4pm, with recitals most Sunday afternoons. Further information from them. There is a catalogue and I've asked for a review copy.

I was fortunate in getting round several Italian and one Swiss museum this summer, and there's a lengthy Comm herewith with details (surprisingly lengthy considering that it was a three day tour — I had a lot of help).
I mentioned last time the Handel Exhibition at the National Portrait Gallery, which will have most of the Hellier instruments from Warwick, all six of the surviving Sharp Family instruments (the Gallery already has the Zoffany picture showing them), a fully representative selection of Stanesby Junior woodwind, and a fair number of other instruments. Also portraits, music, etc etc. It'll cost £2 to get in (unless you're over or under age, in which case it's £1) and I don't yet know what the Catalogue will cost as it's not out yet. It's on from November 8th to February 23rd.

John Hanchet has told me of another temporary exhibition of about 100 Spanish instruments gathered from museums and collections in Spain, UK, France, Holland, USA and elsewhere, which should be pretty glossy, as should the catalogue. It will be in the exhibition hall of the Generale Bank, Ravensteinstraat 29, in Brussels, and runs from 17th October to 18th December. The instruments will be winds, keyboards and strings and "certainly will include some Renaissance and Baroque items of the most extreme importance indeed and not seen outside Spain before".

EXHIBITIONS: You all know about the Horticultural Hall in November (8, 9 and 10). I hope that you'll get this before then, so that you can give Maggie your renewals there (on the Graham Lyndon-Jones stand, of course). You'll find me there, too, and I look forward to seeing many of you.

The Crafts Council has decided to devote its second Open Exhibition to musical instruments and is looking for instrument makers of all sorts and periods of instruments who would like to show their wares. All items have to be submitted to a jury (it's not like the Horticultural Hall) and the judges include Ian Harwood (bowed strings), Guy Oldham (keyboards), Bernard Thomas (wind), James Tyler (plucked strings), and me (brass and percussion). Entrants (!) must be professional makers (what their definition of professional is, is not stated; presumably you have to make for sale) living and working in England, Scotland and Wales (why they exclude Northern Ireland I don't know, but it's up to you to complain if it affects you). Being the Crafts Council, their leaflet is un reproduceable, since there is a big coloured streak over half of it, but you can get copies from them at 12 Waterloo Place, London SW1Y 4AU. Forms have to be back by 6th December and have to be accompanied by a cheque for £4 as a handling fee. The exhibition itself will be open from 4th June to 31st August and any instruments submitted have to be ready by 12th March. The exhibition will include instruments from David Munrow's collection.

COURSES: The Scuola di Liuteria in Milan (Via Campo Lodigiano 4) runs full-time courses in Restoration, Reconstruction (ie copying), Conservation and Making In think instruments of all sorts, certainly of strings and keyboards. Teaching, of course, is in Italian. Our contact there is the Director, Marco Tiella. What the course costs, and whether they take in foreigners, I don't know, but if interested, you could write.

MATERIALS: A new member (in the Supplement herewith) is Myles Gilmer, who runs a wood company. His list of timbers you'll also find somewhere in this Q if Eph has room for it, but in
Folkers and Powell are using another material for imitating ivory which they find very successful; it's called Vigopas and is apparently difficult to work with but gives good results, sufficiently good that what was designed as a practice flute is proving good enough in sound (comparable they say with ivory instruments) for serious use, especially for those players who live in climates inimical to wood and ivory. It wouldn't be kind to deluge Cathy and Ardal with enquiries about it, but they are making instruments and if you bump into them, they'll probably tell you how it's working out; maybe they'll even write us a Comm on it.

EARLY MUSIC FORUMS: Members in this country should know that the country is divided up into a series of areas with an Early Music Forum in each. I was interested in the map of the country showing the coverage of each forum in the NEMA Education Report (of which there is a review in this Q) and I've pirated the map here:

I've done this because there are two obvious gaps; one is Scotland, where there seems to be nothing north of the Cheviots, and one is right in the middle of the country, with Oxford slap in the middle of it. But I'm not volunteering; I've got too much on my plate already. However, there should be someone else in this area who would be interested and willing to start organising something. It seems daft to have a blank in the middle, even though an obvious problem is that many of our local early music players are temporary, being students. There is also a blank in Eire, but it's possible that they left out that country because they are NEMA (they left out Belfast, too, but I wrote that in).

DEADLINE FOR NEXT Q: I think we'll say Thursday January 2nd, though I may be away on holiday then, in which case we will be late out. I did get a couple of weeks this summer between conferences but I'll be ready for some...
more by then. I hope that the amount I've been away on conferences (four so far this year and one more to come this week, one on Conservation in Venice which I'll report on next time) hasn't inconvenienced any of you who have tried to get at the Bate.

RENEWALS: Please remember your renewal; remember that the subscription is £5.50 with, if you live abroad and want to get it quickly, £2.50 supplement for airmail postage, making a total of £8.00.

Remember, too, if you're feeling generous that we have a number of members in countries which forbid the export of money who are paid for by the extra donations of many of you; they are very grateful for getting FoMRHIQ and we welcome your help in this. We also welcome more names for this, wherever possible the sort of people who would be willing to pass their copy round their friends and colleagues.

That's it for now, though as usual I'll hold this open while I do the Members Supplement and the Grove review in case there are any last minute bits.

Nothing has arrived in the last couple of days — well, plenty has, but nothing for FoMRHI — so that is the lot. I shall see some of you in Venice next week, some more of you at the Bate Recorder Weekend, and even more of you, I hope at the Horticultural Hall. To all, well over any festivities in which you indulge at the end of the year.

Jeremy Montagu
Hon. Sec. FoMRHI

NOTES FOR CONTRIBUTORS - CHECKLIST

Communications are reproduced photographically direct from your typescript, so please send them as far as possible laid out as follows:-

1. Preferred size of paper is A4, that is 210 x 297 mm or 8.25 x 11.75 inches.
2. On A4 paper we need a margin of 25mm or 1 inch all round. But whatever size of paper you use, the typing should just fill a space measuring 185 x 273 mm or 7.25 x 10.75 inches.
3. Type single-spaced, with a minimum of extra space between paragraphs etc.
4. Copy must be strong, clear and black. Use a new ribbon or plastic ribbon. A photocopy can often be better than the original in terms of black-white contrast.
5. If you wish, use a typing agency. The editor can organize this for you.
6. Diagrams must be black on white! India ink or black fibre-tip pen works well.
7. All of the photos we have printed in recent years have not had special processing, and so have involved no extra cost. The quality has been poor but just about adequate for the purpose. If better quality is required, please send photos to the editor (not to the Hon. Sec.) well ahead of time for an estimate of cost from the printers.
8. Please send Comms. flat or rolled. Folded Comms. are more trouble for the printers.
9. The preferred format is: left corner: FoMRHI Comm. (for the editor to add the number), right corner: Author's name, then centre-justified title just beneath, followed by the text.
10. Send to Jeremy Montagu, c/o Faculty of Music, St. Aldate's Oxford OX1 1DB, U.K. The deadline is the beginning of the 0 publication month. It is given specifically at the end of the Bulletin of the previous 0. Late contributions can be sent to the editor, who is Ephraim Segerman, NRI, 6 Needham Avenue, Chorlton, Manchester M21 2AA, U.K.
11. In the interest of speedy communication we do not undertake always to observe normal editorial etiquette, unless you specifically request it with your communication.
When you are supposed to write about an anniversary, you are expected to survey the past and predict the future. FoMRHIO’s strength in the past has been its diversity, including Comms from the very practical to the very theoretical, from the very ephemeral to the important contribution that will be referred to for a long time, from the laughable to the profound. Its strength has also been in the knowledgability of its contributors, which has tended to be remarkably high. The informal style, though irksome to some, is another important ingredient of our success.

As for the future, I can think only of more of the same, with perhaps more recognition of our importance in the field. Some libraries are binding their copies of FoMRHIO. Jeremy, who promotes the ephemeral side, might be unhappy about this, but I welcome it. Much more of the stuff we publish in the Quarterly is of lasting importance than we ever intended it to be. (It is remarkable how much of what appears in the formal journals is not of lasting value.) We shouldn’t worry about the ephemeral stuff being bound in too. Future historians trying to understand what we have been on about will thank us for it. Wouldn’t we jump for joy if we discovered a set of copies of a several-hundred-years-old equivalent of FoMRHIO? The ephemera would be the most interesting historically.

I’m sure that Jeremy’s leg is being pulled in the Sverre Kohlberg affair. If apologies are in order, they should be to Jeremy. The complaint is concerning my editorial practice, which I will continue as before - in such a case, the criterion for inclusion is a minimum of two smiles per page. And I’ll stop printing his papers backwards only when that trick becomes boring.

In a letter, Cary Karp has raised the issue of conservateur-vetting of articles involving conservation issues. Our policy is that any doubtful Comm is sent to Stockholm for a checkout before publication. Neither Jeremy or me have had the opportunity to do this yet. Jeremy rejected Comm 639 in its original form without the need for a checkout. Both of us considered it acceptable in the printed version. The question of what is doubtful is a matter of the judgement of Jeremy and me. We welcome criticism if that judgement seems inadequate.

This reminds me that we haven’t received any articles on restoration for some time now. If that means that fewer restorations are being done, this might be good from the point of view of future research. But I’m afraid that it might rather mean that since restoration is not universally applauded as it used to be, it has become an underground activity and restorers are less inclined than ever to expose themselves to criticism by sharing what they’ve found out. Players are just as anxious as ever to play on ‘original’ instruments, so they are still buying what they can and getting them restored. And if a competent specialist refuses to do it, he is not only inviting starvation, but he can also justly fear that the job will then go to a less competent repairer who cares less about instrument research and will do more damage. Is there anything that can be done about this sad situation?

With Comms 501 and 624 as examples, it is clear that there are rather conflicting attitudes about authenticity around. I expect that the musicians mostly favour philosophies that they believe give them the greatest scope for musical expression, while the listening audience mostly just believes that it is getting the historical replica that it expects. Many will argue with me on this. I wonder if anyone has the guts and resources (NEMA?) to survey the musicians and audience. We may then find out how much people are kidding themselves and others.

John Dick phoned when I wasn’t in. The message reads that David Crookes would be interested in a duplex Bohemian lyre sported by angels in the Aachen museum.
Two recent catalogues that you ought to know about:

Tony Bingham, Catalogue no.12: New Books on Old Instruments, with an up-to-date Supplement. The best list I've seen in years of books on all aspects of instruments, with 216 books listed. Copies are available from Tony and his address is in the List of Members.

London Pro Musica Edition, 15 Rock Street, Brighton BN2 1NF, Catalogue 1985-6. I would hope that you all know Bernard Thomas's black books,* the best and cleanest editions of a vast amount of early music. If you don't, and if you play anything pre about 1700, write at once for a copy of the catalogue. Most of the music is published in score (usually sold as 4 scores for the price of 3) because that's the best way to play most of the music.

Both are likely to have stands at the Horticultural Hall; how many books Tony will have there, I don't know (but he might well bring one that you want in the next day); Bernard usually has a good deal of stock there.

* He has gone in for coloured covers recently, but the inside is still just as good. I have an almost complete set here, incidentally, if anyone wants to see them.

Le Mostre della CASSA DI RISPARMIO 37, Il Legno si fa Musica. This booklet, produced to accompany an exhibition of instrument making in the Sala Maffeiana del Teatro Filarmonico in Verona, would normally have been reviewed with other books here, but I have not done so because I have already described it pretty fully in my Comm. in this Q on A Flying Visit to Italy. I will send a copy to Eph to review in due course if he feels like it. No price is stated, but copies are presumably available from the Cassa di Risparmio, Verona; it's a pretty big bank so that address should suffice.
I'm breaking my own rules; this was sent to me, not for review but because I'm a member of NEMA. However, I think that you ought to know about it, both the majority (just) of our members who live in the UK and those of you who don't because if you have not got a NEMA or its equivalent in your own country, you should have.

The booklet is a report by NEMA's Education Sub-Committee of the present position of Early Music in education of all sorts, primary, secondary, tertiary (which covers all sorts of further education) and whatever term one uses for the part-time classes available to the interested of all ages. All in all it's a pretty gloomy report, and most gloomy at the secondary stage, where we really need to get at the older children, a considerable minority of whom have had contact with Early Music in primary schools and whom we need to keep interested if they are to maintain such interest into adulthood and, let us be mercenary, become our customers. Particularly perturbing is the lack of interest in Early Music, even to the extent of not knowing whether anybody is playing or teaching any in their schools, on the part of the local authority music advisers. Since such officers are, in Britain, part of the local government structure, there is nothing to stop those of us who have the energy and the time from making strong representations to our town halls and county halls and making it quite plain that this aspect of education, as much as any other, can be influenced by the normal democratic procedures of pressure groups and votes.

We have less control at tertiary level, particularly with the universities, and it is here that I wonder whether this Report is wholly accurate. Certainly in the case of the university where I work, it is not as accurate as it should be. There is a great deal more teaching going on here in the Early Music area than is suggested; the fact that something is not among the compulsory papers at Finals does not mean that students have not been exposed to it at any time during their three years. Nor, for that matter, are examinations the be-all and end-all. There is a vast amount of Early Music playing going on here, and it's by no means confined to music students. What's more, the fact that we are not a conservatoire doesn't mean that instrumental playing does not get taught here. The authors don't allow here, certainly, and in other universities and colleges probably, for the amount of informal (ie not part of the syllabus) playing and teaching.

Also apparent is their lack of familiarity with current literature, in particular of FoMRHIQ, particularly apparent in their complaints of the lack of information available to instrument makers. It's here to be read. They complain, too, of the lack of plans available for makers. The Bate produces a good number and so do other museums in this country. They complain, too, of the lack of reasonably priced music for EM ensembles; surely the London Pro Musica Edition (see Book & Music News in this Q) can't be too expensive for them - or do the schools still expect to be able to pirate it for nothing on their photocopiers?
Thus the Report does to some extent reflect the modern attitude that people expect to be spoon-fed, but this is only a minor aspect of it. On the whole it deserves reading, it deserves discussion, and it deserves action.

It will receive discussion at the Horticultural Hall on the first day of the Exhibition, Friday November 8th (I doubt whether you will have this by then, but you might), and it would be worth any of us who are there attending this meeting if we can. I hope that it will be followed by action, too. It was presented to various people at its launching at the House of Commons; NEMA had one session at the recent AGM of the Incorporated Society of Musicians, which was well reported in the ISM's monthly Music Journal, which goes to a good many music teachers, certainly to all the most professional ones. And, as I've suggested above, there could be action at grass-roots level: if your local schools don't have any regard for Early Music, why not get on to the town and/or county hall and ask 'why not?'

Finally, for those of you outside Britain who are still with me, do you have any equivalent of NEMA in your country? And if you don't, why not start one? I presume that you read FoMRH? because you either make or play (or both) the instruments used in Early Music. Unless this is a secret vice of yours, it seems natural to want to persuade other people of its beauties and pleasures, or at least to see that it is available to them. You can do this with your friends, of course, but that's a one generation thing. If you want it to continue and spread, it's got to get into the schools, and that seems to be the area in which NEMA is working most effectively. NEMA has an Information Officer, Robin Atter (39 Capel Road, Forest Gate, London E7 OJP) and an Administrator who is also the Treasurer, Gavin McGuire, whose address is at the head of this review. Either could help with further information.

FoMRHI Comm. 644

Jeremy Montagu


The Eddy Collection is a private one, kept in Ruth and Norman Eddy's house in Cambridge, Mass. Whether it is accessible by appointment, I don't know and the Checklist doesn't tell us; I would presume that it is - there is little other point in producing such a Checklist. The collection is smallish, about 300 instruments, with its main strengths in flutes, brass and pianos. The cornets are particularly strong, with a very good range, as are the brass mouthpieces, including a couple of glass and silver trumpet mouthpieces by Breton, a new one on me (Breton was the other man besides Laurent who made glass flutes in Paris). The Checklist is adequate (a full catalogue is in preparation) save for a few details: the use of fipple flute for duct flute (see my entry under the former name in the New Grove Dictionary of Musical Instruments and never use fipple again!); the statement that the usual 5th key on the flute was a long C to "lower the bottom pitch" - it wasn't, it was the upper C key;
confusion with the 6-key flutes so that we can't tell whether any listed instrument is a 4-key flute plus long F and upper C or a 4-key flute plus C foot; no separation of orchestral or band flutes so that B-flat piccolo probably means a fife-size with keys but might not; the statement that mellophones (English tenor cor) are "distinguished from French horns .... by piston valves and tone quality"—true, of course, but a more important distinction is that they are only six feet long (when in F) whereas horns are twelve feet long; and that the serpent "is the bass of the cornetts", which is no more true than that the bassoon is the bass of the oboes.

Apart from these mostly minor points, it's a useful checklist of an interesting collection which, if there isn't anything of major importance in it, nevertheless has a good general range of instruments with, as one might expect, good representation of American, especially Boston, makers. There is an index of makers both alphabetically and under cities.

FoMRHI Comm. 645

Jeremy Montagu

Review of: Catalogue III: Bowed Stringed-Instruments
Catalogue IV : Plucked Stringed-Instruments with Neck
Catalogue V : Harp ; Lyre
Kunitachi College of Music Research Institute, 5-5-1 Kashiwa, Tachikawa, 190-Tokyo, Japan, 60, 94 & 104 pp, illus, tables.

I wish I read Japanese. The only words I can read in these are the Roman numerals and the subject (the word Catalogue is my guess), a few plate captions and most of the entries in the bibliographies. However, they are clearly very much more than just catalogues. They are copiously illustrated with not only pictures of the instruments in, I presume, the College's collection, but cognate instruments from all over the world. There are good distribution maps, good pictures showing how the instruments are held (ie there must be ergonomic studies in the text), full historical studies judging from the pictures from archaeology and antiquity down through medieval and later times. Catalogue III has very full illustrated tables of bow types and how they are/were held in different places and times; Catalogue IV has similar tables of resonator shapes and neck types; Catalogue V of the various harp types and also a map showing the distribution of the various types with distribution arrows. To my mind, they are well worth having even if, like me, you don't read a word of Japanese. They'd be even more worth having, I suspect, if they'd do an English edition, and this is one reason why I've written this review of something that was sent to me as a gift — to encourage them to do so. The other reason lies in the previous sentence — if you can get hold of them, do.
New Grove DoMI; JM 2; further detailed comments

Comm 604 knocked off the As; now for the Bs.

You will probably remember from last time my various bêtes-noir; the use of stop for a finger hole, the use of keys on xylophones and sansas (or mbiras), and the tautologous use of conch-shell. Well, we start with the first one:

Bagara: with a stop in the tip.

Bag-hornpipe: I don't see why this is called a 'simple form of bagpipe.' It may or may not have a drone, it is certainly made of more than one part (i.e., it is technologically complex) and it's no more simple to play than any other.

Bagpipe: Only one minor comment really: does the player of a bellows bagpipe have the 'bellows strapped to his arm'? I thought the strap went round his waist and the arm passed through a loop. Obviously both have the bell attached; the arm and the waist, but I had thought of it as that way round. On the whole, as you'd expect, it's a first-rate article.

Bala(ii): Which drum is the male and which the female? It is an interesting point that in some cultures the low one is a male and in some it's a female (the male being the higher and the more piercing in sound, sometimes; in other cases, the female is the dominant sound and this tells us something about the culture).

Balaban: I find it difficult to believe that it gives 'the scale of E♭ with an A natural.' Equal tempered? Mean tone? Or does he mean, as I suspect, that the lowest note is usually in the region of E♭ and that whatever the other steps may be, the step from 3rd tone to 4th is wider than one might expect if one were an European listener?

Balingbing: As far as I know, one does not strike the lower part of the tube against the other hand, but the lower part of the area which is not a tube because it has been cut away to make a fork; this is how my examples work, also the Celebes rere, and is anyway clearly shown in the picture.

Ballad horn: I think it is a pity to show a photo of a Rudall, Rose, Carte Vocal horn in this article; agreed that this was one of a number of instruments designed to evade Distin's patent, and one which played the same musical rôle; nevertheless, it would have been kinder, after Distin had to suffer so much piracy, to show one of his instruments.

Balo: A xylophone with keys.

Banam: Why is this fiddle said to be 'inverted'? Is the violin or the mediaeval fiddle considered to be inverted? Or, for that matter, if playing with body uppermost is taken to be the norm with the violin, is the cello inverted? Inverted suggests against the norm, and in this particular cultural area, playing with the body upwards obviously is the norm.

Band: In the Berlioz Grande messe des morts, there are four bands, not two.

It is misleading to refer, without further explanation, to oboes and bassoons in the 1643 Mousquetaire bands. I also find it difficult to believe that oboists were appointed to Guards under Charles II. Should we agree on hautboy or something, or should we disagree and refer to showmen even when the original text says...
Bando: Said to be similar to the damaru, but said to have a handle, which the damaru does not have. It is also said to have a single ball on a cord, whereas the damaru has two balls or pellets, and it is also said that a cord connects the ball to the handle, which I've not seen on any drum; the cords are usually attached either to the shell of the drum (particularly on those drums which do have handles, such as the Chinese etc) or to a strap etc round the waist, as on the damaru.

Banga (i): I don't believe that the Kissi of Guinea use minor thirds, major seconds or perfect fifths on their pluriarc. It is extraordinary how people do not seem to realise that these are absolute terms, that to say a perfect fifth means an interval of either 700 or 702 cents, according to temporal context, and that it does not mean anything between 680 and 720.

Bangali: Another horn with a stop in the tip.

Banjo: It is most unlikely that the name comes from the Portuguese or Spanish bandore; there was a long article on this some years ago in Ethnomusicology.

Banjolin: Does not have 4 single strings, but is double coursed.

Banjo-mandolin: Does not have a banjo-type head, but a banjo-type body; the two parts are different.

Bänkia: It would be simpler to say that this trumpet was folded or S-shaped than 'bent back in a double U-shape'.

Barrel organ: Have you ever come across the term 'grinder organ' for this? The chap who played it was called an organ grinder, but I've never heard the term used for the instrument. It seems daft to illustrate the article with a photo of a barrel piano when there are plenty of barrel organs around, even some photos showing the monkey.

Bas: It's probably silly of me, but I do rather object to calling Celebes Sulawesi; I don't like Sri Lanka for Ceylon either; after all, we don't talk about Deutschland in English, do we? And for that matter, we don't worry about whether the Singalese talk about England or whether they have their own name for it. But doubtless I'll be called reactionary for such an attitude.

Bas: Is the tube bevelled internally or externally? I'll bet it is internal, and the article should say.

Bassett: Praetorius didn't call the lowest recorder a bassett; he called a GrossBassflöt.

Bassoon: The text says that no Fagotcontra, an octave below the Chorist fagott, has survived, but there is one in the plate immediately opposite.

Bassoon stop: Does not produce a 'janissary effect'; the janissary effects were the drum, cymbal and triangle; the bassoon stop was different and came from a different genre.

Battery: The term is not confined to the Baroque; Morley Pegge always referred to batteries de deuxième cor for the arpeggiated passages in Harmoniemusik, and it was a standard term for them.

Baumann: I'm not convinced that the C# key on pillars was added
to his clarinets after they were made; the key is so common on
his instruments that I'm sure it was original, and that it was
on pillars because fitting a cross-key in that position in blocks
would be very difficult to do.

Belembautuyan: I don't see why protective lead cylinders are worn
on the fingers; very little pressure is needed to stop the string.

Bell: Many other materials are used: wood, bamboo, stone, etc.
The article would read much better if the author had not kept
confusing bells with pellet bells (which are rattles and not
bells); the two don't share a common ancestry (though he suggests
that they do), nor a remotely common acoustical behaviour.
Only in English is a similar word used for both. There are a
number of dubious statements in the History section, and several
inaccuracies, among them that the Greeks (ancient) had only small
bells; he's forgotten Dodona. Were Pre-Columbian bells cast in
bronze? I didn't think that their metallurgy had reached the
smelting and alloying stage; I thought that it was chalcolithic.
The semantron was a substitute for bells, used because the Mus­
lims forbade bells after they conquered the Christian areas, not
a predecessor of the bell.

Bell: I hesitate to argue with our prime donor, but I'm not con­
vinced that the oboe d'amore or cor anglais bulb bell only af­
fects the lowest three or four notes. To my ear, the higher
notes on a cor don't sound quite like an oboe; isn't this partly
due to the bulb? Or is it all imagination?

Bellonion: How can a crescendo be obtained on two kettledrums
with a special stick?

Bendir: The snares are internal, and this should be specified.
The clay-framed variant found in Nigeria is not snared.

Béquille: Is not a hook; the mechanism is different from that of
the hook harp.

Bene:(slipped down one), a xylophone with keys. I've said xylo­
phone because the article says that the tongues or reeds are of
wood; it depends what you mean by wood and how you refer to the
body of the giant grasses.

Besson: The shape of the air-path through the valves cannot af­
te the tuning of valves used in combination; Besson's invent­
tion that did improve the tuning of combinations was the régistre.

Bia (ii): a conch-shell.

Bimbonifono: Not a trombone (the bore is conical) and it has
valves, not keys (though the valves are operated by a key-like
mechanism), and one of the valves is an ascending valve.

Bion: Another conch-shell.

Bird instruments: The bird whistle in the orchestra does not have
an"inletable mouthpiece into which water is pour eager; the mouth­
pipe is usually metal (not a balloon) and you pour the water
into the body (which is also usually metal). And a cuckoo does
not have two finger holes; I've never met a three-note cuckoo
yet (Delius would have been surprised).

Bo: Cymbals don't have a bulb (not in English, anyway); they
have a dome.

Bolu: Another horn with a stop in the tip.
Bombo (ii): Is not a frame drum (H-S 211.3 The depth of the body does not exceed the radius of the membrane...).

Bones: Are not commonly made of hardwood sticks; they are commonly made of bone (hence the name), though hardwood is sometimes used as a substitute.

Boosey & Hawkes: Was Hawkes founded as Hawkes & Co? What about Rivière & Hawkes and also Hawkes & Son?

Bordón: A stamping tube of wood? Isn't it a stamping stick of wood or a stamping tube of bamboo?

Bourdun (i): To refer to the "free vibrating strings of the larger lutes" suggests that they were designed as sympathetic strings rather than as open basses.

Bouteillophone: The shape of the bottle is also an important factor in determining the pitch.

Box zither: The piano is not a box zither (how many pianos have a closed bottom? If there isn't a bottom, it's not a box). The clavichord, strictly, is a frame zither, for it's only the soundboard that's a box; most of the string length passes over an open frame.

Buccin: Wasn't this name applied also to the dragon-headed trombones?

Bucium: It's a pity to say that there are five kinds without saying what the five are.

Buisine: Was this the name for mediaeval herald's trumpet? Why suggest that the author of Chanson de Roland was referring to only one kind of instrument when he listed cors et buisines?

Bullroarer: I know plenty that don't have a pattern carved on one surface but which work all the same. They don't have to have a curved surface either.

Bummādiya: It's confusing that the drum in the picture is resting on its head, ie upside down.

Būq: The author is confusing the būq with the shofar and is post-dating the shofar by three millenia. The Bible is a more reliable source than Al-Jahiz in this context.

Butler: The date of 1880 for a soprano trombone is sheer guesswork (it's mine) and I apologise if I have misled the author.

And that will do for another quarter; it's going to take a while to get through at this rate, but it's a long job, and I never seem to have the time to get down to it in advance of deadline; I suddenly realise it's about time for the next one; hence the hasty late-night typing.
Band II History to 1830 (by A C Baines)

In the list of instruments in court and household bands before 1500, the viol is mistakenly included.

Bandora (by I Harwood)

1. It is stated that "the bandora was played with the fingers" ignoring Roger North's report of late 17th century practice when it was "struck with a quill". A fuller quote from North than that given by Harwood illustrates how the instrument was used then:

   About the playing of two pandoras with 2 violins, a base and one loud hautbois, he wrote that "the pandoras had a better affect to fill and adorn the sound than any harpsichord I've ever heard since. For the strings are most of twisted wire, the frets mettall, the touch with a quill strong and guitarr fashion, full accords at every stroke and not a little arpeggiando, and all open and above board."

2. It is surprising for Harwood to relate the position of the third (between the 2nd and 3rd course) in the bandora's tuning to an alternative tuning of the Medieval 5-course lute. That lute had been replaced by the 6-course lute for more than half a century, with no evidence of retention in the folk hinterlands. The obviously more probable relationship is to the contemporary 4-course guitar. A hint of a possible motivation can be in Wythorne's diary where he stated that in c.1550 the cittern and 4-course guitar were both new and fashionable amongst young folks. Those two instruments are not compatible, and it is quite possible that the bandora was invented for a guitar player to play the ground to a cittern's treble. A substitution theory is supported by the rise in popularity of the bandora late in the 16th century coinciding with the loss of popularity of the 4-course guitar (see Ward in LSJ XXI).

3. Though the back is essentially flat as stated, it is likely that, in common with surviving orpharions, it was slightly domed and made of 7 or more staves.

4. The text mentions only courses, and not that there are two strings per course and that they were a unison pair in the sixteenth century, and that Talbot in the late 17th century indicated that the lower four of the seven courses were octave pairs.

5. The paragraph on the relative pitches of voice and bandora in the songs in Barley is a rather lame attempt to provide support for Harwood's theory of a 4th higher pitch standard. He relates two of the three relationships in nominal pitch to bandoras of different sizes and pitches according to the theory (with the voice pitch staying the same), and the third has the voice pitch changing to avoid a bad key for reading. It is more likely that no more than one size of bandora (whatever that was) would be expected to accompany the songs. I thought that Harwood would recognize that Ward's paper at the 1957 Paris Conference on the lute (printed in "Le Luth et sa Musique") firmly established that 16th century practice was for the voice to get its pitch from the accompanying instrument.

6. The new steel wire was essential for the open-string range of only the orpharion with more than 7 courses. Other orpharions and the bandora would need it only if tuned to particularly high pitches for their lengths.

7. One of Harwood's arguments that the Rose Helmingham instrument was a bandora is that it fits that way into the generalisation that bandoras had no more than, and orpharions no less than 7 courses. This ignores the point that orpharions were wire-strung lutes in function and in 1580, 6-course lutes were still most prevalent. Later orpharions would follow later lute fashions.

8. The point that sloping the frets and bridge makes the basses longer in the 7-course bandora and the trebles shorter in the orpharion makes no sense to me.
9. The other argument that the Rose instrument was a bandora is that its string stop is about 60 cm, two frets longer than the treble strings of the Palmer, Talbot and Praetorius instruments. Praetorius had the English wire-strung instruments (cittern, bandora and orpharion) playing in Cammerthon, a pitch approximating English wind instruments. It is likely that English violins also played at this pitch, a kind of English light-music pitch standard that the treble lute also played at. But the English also had Consort pitch, a tone lower, for the mean lute and for viols playing with other instruments. The Rose instrument could well have been a Consort-pitch orpharion then.

Harwood claims that the Rose instrument was a bandora at a pitch a minor third higher than modern (or Cammerthon). Though it is questionable whether this pitch level was common enough in concerted music to justify calling it a standard, this is clearly still a possibility. Inventories of the possessions of players never list both a bandora and orpharion. Mersenne may not have been completely wrong when he wrote that the pandora was tuned like a lute. The essential difference between these instruments if they have no more than 7 courses is a semitone in the tuning of the third course. The Derrick quote given by Harwood requesting the purchase of a bandora or orpharion demonstrated an indifference as to what it was called, while the intended player probably knew what tuning he would use. Where pitch standards didn’t matter (which could be most of the time) being ambiguous about that semitone can be very useful. As Harwood points out, the finger stretches in Holbourn’s bandora music are much more comfortable on an instrument considerably smaller than one of the size given by Praetorius or Talbot. My conclusion is that the basic bandora was the one described by Praetorius and Talbot, but smaller instruments with no more than 7 courses would be called 'bandora' or 'orpharion' mainly on the basis of whether it had guitar or lute tuning.

10. Harwood’s speculations concerning the development of the bandora start with a 5-course instrument invented by Rose in 1562. I would add that it was a cross between the cittern and guitar (with a somewhat rounded staved back like on many Italian and Spanish guitars). Since English guitars, derived from French ones, had a flat one or two-piece back, an attractive Iberian instrument name associated with a rounded back was adopted: bandurria. Barring was probably of the simple guitar or cittern type.

I agree with Harwood on the next step - the addition of a 6th course a tone lower than the 5th to get a root to the $\frac{3}{2}$ chord. Then with better twisted-wire bass strings adding 3 semitones and angling of the bridge and frets adding 2, an additional 4th of range was possible, giving an open-string total of 2 octaves and a tone with iron trebles. This is the range of both the 7-course orpharion and 7-course bandora.

With the availability of steel wire from about 1580 to 1620, much higher treble pitches were possible. While 6- and 7-course bandoras tuned like lutes were probably played before, the name orpharion was probably usually associated with a smaller instrument (with about 54 cm treble string length), but more crucially, it used steel to tune like a lute at the same octave. This left excess bass range which allowed extra bass courses to be added when lutes also did this.

The above is mostly an elaboration of what Harwood wrote, with no very serious disagreements.

Bandura (by Anon)

This Ukrainian folk instrument, with many treble strings being tuned from the edge of the belly, could easily have had as an ancestor, the 'pandora' invented by Piccinini (related to the English polyphant).

Bandurria (by J M Schlechter)

This Spanish instrument is described as having a flat back. Bermudo’s description of it is mentioned, but his statement that it had a rebec-like (ie round) back is omitted. The change to a flat back happened in the 17th century.
Banjo (by J S Odell)
The article omits the fact that fretless banjos were still being commercially manufactured in the first decade of the 20th century.

Barre (by Anon)
It is stated that the earliest reference to the barre dates from late in the 17th century. The practice can be seen on pictures of the playing of medieval instruments. The early lute tablatures require it. It is specifically described by Ganassi as a method of transposition on the viol.

Baryton (by J A Sadie)
Sadie seems to be unaware of the description in the Talbot ms, published in GSJ III (1948) and reprinted in Chelys VI 1975-6. As to the addition of non-bowed metal strings to bowed instruments, claimed by all to be an English invention, see GSJ XXXVIII (1985) p 131, where a March 1609 Court privilege given to Edney and Gill is quoted. It is for "the sole making of viols, violins and lutes with the addition of wire strings besides the ordinary strings for the bettering of the sound, being an invention of theirs not formerly practised or known."

Bass-bar (by D D Boyden)
This article repeats the standard views popular amongst violin experts. Since they consider violins with bass bars integrally carved out of the belly wood as inferior, only glued-on bass bars are mentioned. Central bars not under a bridge foot in c.1600 viols are mentioned, but the purpose given is for support. The function of the bass bar in soundboard tuning, which helps bass response, is omitted completely. The two functions stated are that it supports the pressure of one of the bridge feet and that it transmits sound vibrations to the belly. The first is peripheral and the second is meaningless. It is a pity that Boyden forgot his physics training when he concentrated on music. Besides its importance in soundboard tuning, the bass bar increases treble response. The fiddle experts ought to take out the bass bar and see what the result is, rather than just theorise.

Boyden states that "before 1800 the bass bar was shorter and slighter because there was less downward pressure exerted by the strings." The history of violin string tensions (see Comm 438 and GSJ XXXVIII (1985) p 20) shows this not to be the case.

Basse de violon (by L Robinson)
The 16th and 17th century history of this instrument (larger than the modern cello) is not mentioned. Robinson states that "it was probably never used as a solo instrument." An argument against this is that some examples had 5 strings (with a top d'), as the one shown by Praetorius. I can't imagine such a large range not being used for solos.

Bass viol (by F R Selch)
This article is about 18th and 19th century American instruments going by this name. A common structural feature given is that instead of linings between sides and back and belly, the back and belly had grooves into which the sides fitted. What is omitted is that this was also a common feature of Flemish violins.
When reaming big recorders (especially with the wooden reamers described in Comm.180), it's a help to step-bore to approximate dimensions first. Such cutters are easy to make from flat wood bits. For pilots, wood doughnuts turned on the outside and threaded on the inside can be screwed onto a piece of threaded rod soft-soldered onto the point of the bit.

Cut an inch or so of the rod and drill a hole in it on a lathe to the depth of the length of the bit's point. Then ream ream out the hole with the point. With the bit resting vertically in this reamed-out piece of threaded rod, fill up the cavity with soft solder. Screw on the pilot and grind the sides of the bit to dimension, symmetric with the pilot. The shaft of the bit can be soft-soldered into a hole in the end of a hexagonal rod for an extension.

A series can be made, each ground to the diameter of the next pilot. Use them like the reamers in Comm.180, but at higher speed (300rpm or so). Increased friction between the wrench holding the cutter and its supports will reduce the tendency of the cutter to bounce. Wrappings of friction tape and split rubber hoses powdered with rosin work well.

Larger sizes (flat bits go only until 1 1/4") can be made by wrapping tool steel slightly around a threaded rod and welding them together. Cheap, tough tool steel can be had from old circular saw blades.

Accuracy and regularity of the angle of plug chamfer can be aided by setting the plug, windway up, on a flat surface, with the chamfer end about the plug's diameter from the surface's edge. A file (or nailfile) touching both the chamfer and the edge will stay at a constant angle which can be adjusted with the distance from the chamfer end to the edge. Chamfers (and labium thicknesses) can be measured by comparing impressions in plasticine with those of steel thickness (or taper) gauges.
The limitations of a recorder's fixed voicing, its "embouchure", can be partly overcome by making some of its dimensions flexible.

The windway can be made short enough, with suitable beak geometry, to let the player's upper lip shade the window to give dynamic variation without pitch change. It's surprising how short a windway can be before the sound really suffers.

The plug can fit loosely in the bore, to be tightened with something springy. A projection through the wall could then be pressed with the teeth or lips to change the plug's position in the windway.

The top of the instrument, above the bottom of the windway, can be separated from the lower part (with edge), either completely, or with an articulation at the underside, opposite the window. A springy, spongy material between the two parts would let the player change the cutup and angle at which the airstream hits the edge.

If the roof of the windway were made of a deformable material, or sprung into the body of the head, its position could be controlled by pressure of the lips or teeth, independently of the pressure controlling the plug's position.

The whole body of the recorder could be made of a stable, resilient material, flexible enough so the fingers could deform the bore while playing. (Pressing the fingertips into the holes of a regular, big-holed recorder can change the bore enough to affect the sound.)

Any of these suggestions could be used to make a recorder more flexible. All together, their success would depend on just the right geometries and resiliencies. The result might be a large wet noodle, not much like a recorder, but it would be quite flexible to play.

Bob Marvin

Apologies to Sverre

As a FoMRHI member, I'd like to offer apologies to Sverre Kolberg for the Balkanization of his Communication 620. I hope the editors can make amends by reprinting it as an integral confederation. Sverre's indeas and techniques are among the most interesting and important in our revival of old instruments. I'd like the read his communications in future FoR's, and not by flipping backwards through the issue.

Bob Marvin

* Ed: of course, since Bob shares them - see Comm 492
Now that several recorder makers are providing "van Eyck" models for early 17th c. music, attention can turn to the late 16th c. and an instrument to play various diminutions and ricercare, the best-known perhaps being those of G. Bassano (1585). Their range, two B♭s and a note, G-aaa, might reflect normal violin or cornetto ambitus, or it might suggest a baroque flauto, similar to what's described in Comm. 226. Jambe de Fer's fingering suggests a bore well on its way to the conical baroque, and an instrument at Vienna, apparently of this time, has a gently conical bore and a pitch a 3rd or 4th below a cc "Handfluyt". The extravagances of Virgiliano, Bassano, et al. seem to partake more of the coming baroque and its supple expressivity than of the styles of the earlier 16th c. Their passaggi transcend mere diminutions of songs, becoming melodies in their own right.

With no certainty that such music wasn't performed on earlier types of recorders, I offer the possibility Handfluyt's bigger (a 4th lower), older brother, pitched in g at a411, the recorder player's cornetto. All measurements are in mm.

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windway widths</td>
<td>13.2 - 12.0</td>
</tr>
<tr>
<td>Windway length</td>
<td>48</td>
</tr>
<tr>
<td>Cutup</td>
<td>4.6</td>
</tr>
<tr>
<td>Windway roof up</td>
<td>0.81 from edge underside (step)</td>
</tr>
<tr>
<td>Chamfers</td>
<td>0.8 about 45°</td>
</tr>
<tr>
<td>Outside diameters at window</td>
<td>32.5</td>
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<tr>
<td>Fingerholes diameter</td>
<td>25.0</td>
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<tr>
<td>Fingerholes distance from plug</td>
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</tr>
<tr>
<td>6.7</td>
<td>136</td>
</tr>
<tr>
<td>6.7</td>
<td>154</td>
</tr>
<tr>
<td>7.6</td>
<td>180</td>
</tr>
<tr>
<td>7.2</td>
<td>207</td>
</tr>
<tr>
<td>6.7</td>
<td>239</td>
</tr>
<tr>
<td>7.6</td>
<td>272</td>
</tr>
<tr>
<td>9.1</td>
<td>302</td>
</tr>
<tr>
<td>6.3</td>
<td>338</td>
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<tr>
<td>Bore</td>
<td></td>
</tr>
<tr>
<td>18.9</td>
<td>0 - 98</td>
</tr>
<tr>
<td>18.4</td>
<td>129</td>
</tr>
<tr>
<td>18.1</td>
<td>139 - 207</td>
</tr>
<tr>
<td>17.9</td>
<td>231</td>
</tr>
<tr>
<td>17.0</td>
<td>281</td>
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<tr>
<td>16.0</td>
<td>321</td>
</tr>
<tr>
<td>15.8</td>
<td>331 - 406(bottom)</td>
</tr>
</tbody>
</table>

Even with less bore taper than my van Eyck, this has easier top notes and a weaker bottom note. But fortunately, its music doesn't use the lowest notes so importantly (e.g., in arpeggios or contrapuntal leaps, as in van Eyck), with more important figures using the top notes.

I wonder what other types of recorders, what other colors are needed to fill out a pre-Hotteterre spectrum. We have cylindrical flauti for mediaeval music, Ganassi's, 16th c. "choke bore" types, Bassano and van Eyck flauti, and even the Oxford double recorder all available now. Perhaps we can try the thin, flaringly conical, equal double pipes seen in S. Martini's fresco in Assisi. We have the Kynsker set and those odd flauti in Bologna that Filadelfio
Puglisi is working on, showing us early 17th c. notions of consorts. Filadelfio's copies suggest they weren't merely for quaint revivals of antique music, but might embody musical aesthetics of their day.

I'd be glad to hear from anyone with ideas of what directions recorder-making might turn to.

Bob Marvin

Tuning Recorders

Tuning is best tested by playing music. But we often blow a recorder (especially an unfamiliar one) more according to a collection of habits than the immediate demands of the musical moment. Experience with lots of music and familiarity with the instrument can point out notes which are tuning problems, but I don't trust my own development to focus that amount of experience onto a quick tuning of a new recorder by ear. So I resort to systems and mechanics.

Laukuff of Weikersheim makes small, cheap blowers, which have enough stability to be connected directly to a recorder without a regulating airchest. But a muted vacuum cleaner can be throttled down just as well. A finger-sized rubber hose seems big enough to conduct the air through an ordinary water tap to an "airtight" box.

This box can be of plywood or just a tin can, with a sheet of thin rubber ("dental dam") over one end. With the wood box, a hinged door frame can clamp the rubber tight; a tapered flange or a rubber band can stretch it over the end of the tin can. The recorder goes into a hole in the rubber sheet.

Small plastic tubing (less collapsible than rubber) goes from box to manometer. Unlike most "U-tubes", it can offer full, direct reading if one arm is of much greater diameter than the other. The level of fluid won't change much in that arm, giving full reading in the other. The fat arm is a tin can (of tomato sauce or something similarly runny) with two holes in its sides, opposite each other, one near the top, the other near the bottom. After draining, cleaning and drying the can (you'll never forget the sound the sauce makes when it's blown out), fix (solder or epoxy) a small tube in the top hole to receive the tubing from the box. In the other hole, fix a copper plumbing elbow pointing up. In that, fix a small glass tube (the thin arm) by wrapping string around its base and gluing it in with epoxy. Graph paper can be glued to a flat board (tongue depressor) which can be rubber banded to the glass tube, giving an adjustable scale. Very thin oil (parafin, kerosene) gives a neat meniscus, doesn't evaporate, and has a specific gravity about .8, with more sensitivity. Keeping the directions of air inlet, anemometer outlet, and recorder's windway all mutually skew in the box will minimize errors in pressure readings.

With the recorder resting in V-blocks (one of adjustable height to match the position of the hole in the rubber), its top four holes can be covered with plasticine, indented into the holes as much as fingerflesh would be. The lower notes can then be covered with one hand, leaving the other free to adjust pressure with the water tap and fiddle with an electronic tuner.

Stroboscopic displays are clearer and less confused by noise
and instabilities than meters with pointers. They also give rough
clues about phase relations of overtones, components of composite
sounds, and instabilities (burbles are often a switching back and
forth between two neighboring frequencies, both of which give semi-
stable patterns).

You can't tune all at once because tuning is affected by temper-
ature rise from handling (10°F is 1/6 semitone), wood chips and
dust in the bore, and bore change from enlarging fingerholes. So I
tune in 1/2 comma steps, starting by tuning all notes a comma flat
(22 cents) to the bottom note. Clean out all dust (for the bore,
large brushes from a plumbing supply, for the fingerholes, an elec-
tric razor brush) and let the temperature stabilize inbetween, per-
haps taking the opportunity to oil new instruments.

With the tuner, measure the pitches of the lowest and the IXth
notes, blowing as you'd like to play them. Then find what pressures
produce those pitches, and make a scale of pressures inbetween.
Check the Xth note (overblown IIIrd note) to see if its pressure
is in line with your choice for the IXth note, which you might
want to modify if it's not. Since the pitch of upper notes in the
first 8ve are more pressure-sensitive than the lower, the effective
pressure range can be stretched or compressed by tuning at higher
or lower pressures than used for playing.

This way of tuning only approximates actual playing. In-
stabilities react a little differently when so blown than when
played by mouth. Moisture, turbulence, and resonance of the box or
mouth are possible causes. But this method is useful to bring
instruments uniformly close to a musically desired tuning, or
to copy the tuning of an admired instrument. In the end, tuning
becomes balance, determining how hard each note is blown to
bring it in tune.

This setup can also measure relations between pressure and
pitch, between pitch and hole or bore perturbations, etc.. (see
Comm.492).

Bob Marvin
In making a baroque traverseflute or traverso the tuning is one of the most difficult parts of the work. Before I give detailed information it is important to know how to call the notes. I follow Quantz, in his book: "Versuch einer Anweisung die Flöte Traversière zu spielen".

Also: the lowest note is d₁, the next octave begins with d₂, the highest one with d₃. Commonly a₃ is the highest note on a traverso.

The list of fingering the notes; 1 means: hole 1 is closed, 2: hole 2 is closed etc to 6: hole 6 is closed but 7 means: finger on the key, so that hole 7 is open.

d₁ 1 2 3 4 5 6 7

d₁-sharp 1 2 3 4 5 6 7

e₁ 1 2 3 4 5 7

f₁ 1 2 3 4 6 7

f₁-sharp 1 2 3 4 7

g₁-flat 1 2 3 5 6 7

g₁ 1 2 3 6 7

g₁-sharp 1 2 4 5 6 7

a₁ 1 2 4 5 6 7

a₁-sharp 1 2 3 4 5 6 7

b₁ 1 2 3 4 7

c₁ 2 3 4 5 6 7

or 2 4 5 6 7

c₁-sharp 2 3 4 5 6 7

or 2 4 5 6 7

d₂ 2 3 4 5 6 7

d₂-sharp 2 3 4 5 6 7

e₂ 1 2 3 4 5 6 7

f₂ 1 2 3 4 6 7

f₂-sharp 1 2 3 4 7

g₂-flat 1 2 3 5 6 7

g₂ 1 2 3 6 7

g₂-sharp 1 2 4 5 6 7

a₂-flat 1 2 4 6 7

a₂ 1 2 4 6 7

a₂-sharp 1 2 3 6 7

b₂-flat 1 2 4 5 6 7

b₂ 1 2 3 6 7

or 1 4 5 6 7

c₂ 1 2 4 5 6 7

or 1 4 5 6 7

c₂-sharp 2 3 4 5 6 7

or 2 3 4 6 7

or 2 3 4 6 7

d₃ 2 3 4 5 6 7

or 2 3 4 (5) 6

d₃-sharp 1 2 3 5 6 7

e₃ 1 2 3 5 6 7

f₃ 1 2 3 4 6 7

f₃-sharp 1 2 3 4 5 6

or 1 2 3 4 6 7

or 1 4 5 6 7

g₃ 1 3 4 5 6 7

g₃-sharp 1 3 4 5 6 7

a₃ 2 3 4 5 6 7
The pitch of the flute and the tuning of the holes depends on:

- the length of the flute
- the smoothness of the bore
- the undercutting of the fingerholes
- the size and shape of the mouthhole.

Without fingerholes a flute sounds more sharp; making fingerholes and undercutting those holes flattens the pitch; the fingerhole space is part of the bore of the instrument. Widening or narrowing the bore of the flute will give flattening or sharpening results, depending on the presence of nodes and anti-nodes of the different tones on that place in the bore.

A rough bore flattens the pitch; ivory flutes may have a higher pitch as wooden flutes of the same length.

Loosely fitted tenons may lower the pitch.

Normally you will influence the pitch of particular notes by shaping the fingerholes lower on the flute; or you may changing the bore on some critical places, or you may shorten some of the traverso-parts. I will give you some information about changing the bore, but at first and very important is to know what to do with the fingerholes.

I always tune a flute starting on the lowest note, the d1: after that I go to e1 and d2 and e2, f1 and f2 etc to b1 and b2. I drill the fingerholes about 1 mm smaller than the (expected) size, I give a little undercutting sometimes before I start tuning.

d1-d2: there are no lower fingerholes to make larger for rising the pitch; you have to widen the bore of the foot-part, or shortening the foot-part. If you make a first copy after a drawing it could be possible you don't know the pitch of the original instrument; the d1 will give you some information. Don't try to rise the pitch too much e.g. to obtain an a-415 -traverso. A good firm d1 is the bottom of the instrument, let the pitch of the higher notes depend on that d1.

Pulling out the head-part and part 2 of the traverso lowers the d1, but it is interesting to see what happens if you pull out part 2 and 3; see and hear what happens with the d2-d1 interval. A too narrow bore on the place of the tenon of part 2 to part 3 will give you a d1 that sounds not well, too soft and unclear. The cork-position is important to give you the right octave-interval d1-d2 and d2-d3. The cork-position does not influence the pitch of d1, it influences d2 and even more d3. We use now fingering 0 for d1, 16 for d2 and 30 (not 29!) for d3. Notice that fingerholes 1 and 5 work as vent-holes, not as intonation-holes for d2 and d3. Moving the cork in direction of the mouth-hole will give you intervals more wide, moving in the other direction (to the cap) give you smaller intervals. It is hard if the d1-d2 interval is sharp, and d2-d3 is flat; you can't correct that with the cork-position, you have to change the bore somewhere. Also difficult is the situation that d1-d2 is right, e1-e2 is sharp and g1-g2 is flat. Only moving fingerholes, in the extreme fall filling up some holes and making entirely new ones doesn't work well: there is something wrong with your reamers, your drilling, your measurement-equipment or whatever.

On old flutes that are seldom played the d1 is not seldom too flat; sometimes the pitch of the d1 will rise after playing the flute regularly. Perhaps you have to correct the pitch by turning the flute outside, and blowing more strongly. That is better than the opposite: a d1 that's too sharp, turning the flute inside and blowing softly: it will give you a weak d1; and the d1 is an important note.

On some old flutes with several "corps de réchange" (interchangeable parts 2 for playing in various pitches) there is on the foot an extension-piece; you can pull out this extension-piece to obtain a lower d1, it also effects d2 and d3 and perhaps (I am not sure) some tones of the third register. J.J. Quantz does not agree with this "registerfuss" but it will help you if you are making a new flute and you are not sure what should be the length of the foot. Making such an extension-piece is not difficult if you take some labour to make a tube-drill, made from simple bicycle-quality-iron (in Holland we say: house, garden and kitchen quality).
The exact cork-position will be known after tuning all the intervals on the flute: therefore: keep in your mind after tuning d1,d2 and d3 that there may be something changed if you are tuning e.g. g1-g2-g3.

d1-sharp-d2-sharp:
Quantz makes distinction between d-sharp and e-flat. He makes distinct keys for d-sharp and e-flat and he gives different fingerings for b-flat/a-sharp etc. But: a little turning the flute, changing the wind will give you more convenient the same effect. For you it is important to know whether your note is an important one or not. The importance depends of the place of the note in the part of music you are playing, depending of the pitch of the piece (in d, in g or in a etc.): so you have something to know about music of the baroque before you are tuning a flute.

The pitch of d1-2-sharp depends of the foot-bore, but mainly on the size of hole 7. Also the key-action above hole 7 is important for the pitch. Tuning the d1-2-sharp is not difficult, but you can better wait with tuning because b-flat-2 (with 22) depends also on 7 and I like to tune at first f-sharp, g and a.

e1 and e2
The tuning-hole is 6; some Böhm-flute players make sometimes the mistake to open the key; the tone will than be too sharp and sometimes too strong. E1 and even more e2 are not easy to blow: hole 6 is small, the tone is sometimes weak and soft, in comparison with d and f-sharp. Hole 6 influences also f-sharp and not f; therefore some flute makers make too large holes 6, and therefore too sharp e1 and e2, because they like a big step between f and f-sharp. I don't like that. Hole 6 is commonly not very undercut; undercutting influences the pitch, the readiness of the tone but also the tone-quality. Undercutting can soften some cruel-sounding tones; because of the e1 and e2 are not cruel, you have not to undercut much.

All what you do with a fingerhole effects more the note of the higher-register than the note of the lower register. So: if you have drilled the hole 6 somewhat small, your e1-e2 interval will be flat; widening the hole e1 rises somewhat and e2 rises something more. Be care of a good cork-position: so don't play only e1 and e2, but play d1-e1 and d2-e2 to check the relation between the tones and also to check your mouth position and the wind.

Undercutting in direction of the foot favours the tone of the higher-register somewhat more as undercutting in direction of the mouth hole. If some tones of the third register depend of the same hole you will see that the pitch of those tones depends more on the bore-shape than on the hole-size, and also the cork-position there is very important.

The relative weakness of e1 and e2 depends mainly on the design of the bore of the instrument; with the shape of hole 6 you can correct something but it is not possible in this place to make a totally new sound.

f1 and f2, f1-sharp and f2-sharp
f and f sharp, 1 and 2 will be tuned together. The tuning-hole is 5.

On the baroque traverso (and the renaissance one) the step f-f-sharp is a little step. f is somewhat sharp, f-sharp is flat but both tones give pure thirds to the bottom-d. Hotteterre ("Principes de la Flute") give the simple information: for f-sharp moving the flute outside, for f moving the flute inside. Fingering 06 and 18 are not common on baroque traversos. G-flat is a seldom played tone. So we use 05 for the f-sharp and 04 for the f.

With the undercutting of hole 5 you can regulate something in the balance between the fork-fingering of the f and the plain-fingering of the f-sharp. Old ivory flutes are mostly thin-walled and have sometimes very undercut fingerholes. The fork-fingered tones are then somewhat sharp. It gives us this information: wall-thickness and undercutting will influence the pitch of some tones and the tone-quality.

If you tune up the f-sharp too much, the f will be too high to correct with your embouchure. Therefore: habituate you on a low f between sharp and flat in the baroque-music (about 13 cents lower as the equally-tempered: from all intervals the difference between pure and well-tempered is most distinct in the thirds). Both tones, f and f-sharp must be corrected sometimes in playing music: it depends on the capacity of the player if he or she wishes to correct more the f or the f-sharp.
The tuning hole is 4; for g1 and g2 with 07 you can use the key, or not; it will influence the pitch hardly, and perhaps the sound quality somewhat. The same for a1/a2 and b1/b2. The fingering for g1 and g2 is the same, so for a1 and a2, f1 and f2, f-1 sharp and f-2 sharp. Of course the embouchure (the way you blow) is not the same. See therefore Quantz. There are many ways to blow wrong oktaves! That will influence the intonation of your self-made traverso.

A very important tone is d3 with 29; This tone with this fingering is one of the harmonics of g1. (the serie: g1-octave-g2-fifth-d3-fourth-g3). Normally d3 with 29 has the same pitch as d3 with 30. Only on early baroque-traverseflutes (with a wide only slight conical bore-some Bressan-instruments, Haka) there are complications and different fingerings are to be used. Advice: don't begin making (or playing) those flutes.

Start with the classical 4-part traverso of the early of middle XVIII-th century.

Back to d3: 29 and 30 must give the same pitch. On this moment you can get a good idea of the cork-position: g1-g2-g3 and d1-d2-d3 must be in tune with themselves, the two d3-fingerings must sound at the same pitch. If they do, you have good luck and the other tones will not give any trouble. If they don't you have to realize something:

- is the basic pitch of the instrument o.k.? Perhaps you have tuned up the d-tones too much and according to those wrong and sharp d-tones you have got sharp e and f etc., and octaves of those tones that are too sharp.

- is hole 4 o.k.? Normally, the holes on an old traverso are in mutual balance: hole 1 and 2 are more or less of the same size, so do hole 4 and 5; hole 3 is smaller than hole 1/2 but larger than hole 6. On your flute you have to realize the same, not only for getting good intervals but also for a balanced tone quality between all the tones. If some holes are getting too large, there is something wrong on the bore of the flute or on the basic pitch. And really: it is not quite easy to obtain the same basic pitch on your copy as on the old original; do you have the same mouth hole size, the same wood, did you oil the flute etc.?

- if d3 with 29 and d3 with 30 are not the same you can do following:
  - correcting the key-action or the size of hole 7. Fingering 29 must be played with your finger on the key! Perhaps hole 1 will influence d3 with 29 more than d3 with 30. Perhaps, if d3 with 29 is flat, you have to make hole 4 as large as possible (mainly by undercutting). Perhaps g2 will be after that too sharp. You have to correct g2 with an adjustment on the bore. An indication: see what happens if you change the bore something just before or behind hole 4. You can make an artificial narrowing effect by putting a piece of paper, plastic on that place in the bore; it will give the opposite effect to widening the bore on that place. The fingerhole must stay free, of course.

- sometimes you can realize good effect if you pull out part 2 and 3; it is not always possible to tune correct various corps de réchange because the relative distance mouthhole-hole 4 will be changed more as mouthhole-hole 6, using shorter parts-2. Mostly: the longer parts-2 can be tuned better and more accurate (and with a better sound) than the shorter ones. Pulling out the joints may give a little correction. Hole 4 influences also a-2 sharp with 21; on some flutes (Stanesby, Frans Brüggen) hole 4 is so small that 21 is too flat or doesn't speak at all. On some Kirst-flutes hole 4 is drilled on an angle, direction mouthhole. It is interesting to see what Kirst does with the wall thickness on the place of hole 4, drilling the hole in the transition to the thickening of the joint.

- What I didn't tell is that you have to manage that your key closes well: the tone quality of d1, but also d3 with 30 and g3 with 37 (without finger on the key, thus the key closed) depends greatly on a good closing key.

- g3 with 37 is of the tones above e3 the most easy one to blow. Not hole 2 (vent-hole, giving a "leaking" effect on some place in the vibration), but hole 4 is the tuning-hole but more important as the size of hole 4 is the cork-position and the shape of the bore. G3 as the fourth harmonic of g1 has many nodes and anti-nodes in the flute; changing the bore is therefore not easy, but little changes on the right places will give you a good result. Normally g3 is not a problem.
and also a1-flat and a2-flat: see the remarks at d1-sharp.
With some fork-fingerings the story is that you can’t tune the tones at all.
The tuning hole is 3, and at first we tune a1 and a2 with hole 3. G1-sharp is secondary.
If g1-sharp is flat, you lift up your fingers on 6 or 7; you must have some flexibility
that not every flute has the same fingering on the sharp or flat tones; but: you have
yet some flexibility because otherwise you didn’t play a traverso at all.
G2-sharp: hole 5 is open, not covered, otherwise you will hear (with a little changing
your breath-pressure) the b2-flat with 22. That’s a good exercise: playing a2-
g2-sharp-a2-b2-flat and so on. Sometimes on g2-sharp you can use fingering 19, not
using 6 and 7. Not only hole 3, also hole 5 has effect on the pitch.
Note: the fork-fingered tones have an other sound-quality in relation with the
plain-fingered tones; mostly weaker, softer. It gives the musicpieces with many fork-
fingerings a dark character. Pieces in D are bright, (perhaps) easy to play; pieces e.g.
ing (minor) or d are different. On flutes with more keys you will not have such great
differences.
a1 and a2, b2-flat and e3, e3-flat
and now you can use your tuning-key....; don’t be afraid or too proud to use a modern
tuning-machine (Korg, or Zen On, Yamaha etc): when you are tired, your ears will be
bad organs for checking the pitch. You have to check your ears with the tuner, and after
all you have to check your flute by playing music.
a1 and a2 will be tuned together with g1-sharp and more important g2-sharp.
Again: play d1-e1-f1-sharp-g1-a1 and the same in the higher octave. Play the high notes
es well: d3, g3 and e3. E3 with 32 is derived from d3-sharp with 31, only lifting
the finger on hole 3. Therefore: hole 3 will also effect e3. E3-flat will be tuned
with 7, in combination with e1-flat, e2-flat, and b2-flat with 22.
The serie of harmonics is: e1-flat-octave-e2-flat-fifth-b2-flat-fourth-e3-flat.
This serie must sound well and in tune. A problem is if b2-flat is too sharp.
b2-flat with 22 may sound more sharp in comparison with a2-sharp with 21, but the
differences may not be too large. Widening the bore in the flute not far from the
fingerholes 2 and/or 5 may help you; but have care: also d2 will be affected.
Thus: hole 4 was an important hole, also hole 3. Make experiments with undercutting
and see and hear what happens.
a1-sharp and a2-sharp
the tuning hole is 2, and again we have to realize that b1 and b2 are more important,
they will be tuned also on hole 2. Hole 4 also effects a2-sharp (with 21)-
A2-sharp can be played also with 22, depending on the flute and the part of music you
will play. See also below.
b1 and b2
b1 is not difficult, but sometimes the octave b1-b2 is somewhat flat. (b2 with 11).
b2 can also be played with 23: mostly good in tune, and more stable.
A good check is b2 with 25, closing also hole 5.
Thus: you are tuning b1, b2 and a2-sharp together, checking with c2 with 25 and b2 with
25 closing hole 5 extra. The greatest problem is a2-sharp too flat; good undercutting
will help. And b2 with 11 might stay a little flat if the other fingerings play well.
With fingering 11 you use a short part of the flute, a relative wide bore.
c1 and c1-sharp
C1 with 12 and c1-sharp with 14 must be tuned with hole 1. C1-sharp is on some old
flutes flat in pitch (thirth a-c-sharp) therefore, don’t try it to tune c1-sharp too
sharp. C1 with 13 is uncommon; it sounds more strong, and you can play more easy the
octave with c2 using the same fingering 13.
c2
C2 can be played with various fingerings; 13 is common, the tuning-hole is 1; you can
trill with b2-flat on hole 1 (b2-flat with 22). C2 with 24 is secondary, less strong.
C2 with 25 is interesting; the tuning hole is mainly hole 2. C2 with 13 and 25 must be
in tune with each other; it is a good check.
c2-sharp

C2-sharp with 14 is commonly too flat; sometimes with 26 it is o.k., mostly a little too sharp. If 26 is in tune you can trill with d3 on hole 4.

I use 27 mostly. Tuning of c2-sharp is not easy; the tuning hole is 1, but also 2 has effect on the pitch and these 2 holes are already used intensively for other notes. But: problems on c2-sharp are seldom and you can use alternative fingerings easily or you have to change your breath what is also not difficult.

e3-flat and e3

We have told about these notes before; they are the highest notes you can play legato. Above the e3 the notes must be played staccato, using many breath-pressure.

f3.

A difficult tone; not on every flute; You can use 33, eventually also covering hole 5 for the half. It is not good possible to tune this note. A good mouthhole will help you to achieve a good f3.

f3-sharp

There are various fingerings, some (35) a little bit flat, others (34) somewhat sharp. Fingering 36 doesn't speak on some flutes; sorry, it is not your fault.

g3.

This tone was tuned together with g1 and g2 and d2.

g3-sharp and a3.

The highest notes; almost impossible to tune independent from the other lower tones. Some bore-correction may help you, but I have no experience with that.

It is not necessary that the bore of the various parts of the flute at the joints will be exactly the same; a lower part will start with a narrower bore, or a wider bore.

Many old flutes have shrunk at the joints, so that you have to correct the bore-measurements.

Seldom the bore is an straight cone; an irregular cone is common. The headpart and sometimes the footpart are cylindrical, but not always.

The renaissance-traverso is mostly cylindrical; the tuning is difficult because you have not a key for correction. Some higher octaves are always flat, you have to correct these notes with alternative fingerings, or using upper harmonics. For instance: a2 can be played as the third harmonic of d1 (all holes closed); but this tone sounds strong in comparison with g2 with 1 2 3 . . . ;

Tools for tuning the fingerholes

1- a little straight or bend file
2- sanding paper in a little roll
3- a little gouge, sharpened on the sides
4- a little replacable knife, modified for undercutting
5- a self made cutter for making inside undercutting
1 -

2 -

3-

4 -

5 -

Cutter

Sharpened here

Sharp

Stick for placing the cutter in position

Handle for turning the cutter

Flute wall

Coffer en p'sion, for project cutting
Diagram A shows the traditional depiction of a recorder's voicing showing the block, windway and edge. I wonder if this is an adequate representation of the essential features present in a recorder's voicing? According to my present theories on the subject it is not and so I would like to suggest that in old recorders the actual relationship between the windway and edge is not of prime importance and that it's relationship to the angles of the inner and outer ramps is. The inner and outer ramps are those surfaces on either side of the edge which form a wedge against which the airstream of the recorder is directed. (see Diagram B).

In most Early Baroque and Renaissance recorders, the arrangement of this wedge in relation to the angle of the windway is different from that found in later examples, thus there is a simple rule to define the two categories of recorder mentioned according to the wedge angle.

As the curvature of a recorder's edge is generally rather less than that of the curvature of the bore, material has to be removed from the sides below it so that a good clean edge is formed (see Diagram C). Sometimes material is removed also from the central part of the edge, raising it somewhat above the original bore. These details do not matter, for only at the extreme sides of the edge does the actual angle of undercutting affect the voicing.

Diagram D shows the recorder windway and also outer and inner ramps labelled as in diagram B. The additional dotted lines show the consequences of an imaginary continuation of both these angles toward the usual position of the end of the block. It will be seen that the outer ramp points below the lowest level of the windway... All recorders usually contain this feature. Similarly the inner ramp "points" above the highest level of the windway.
This diagram illustrates then, the earlier type of recorder voicing found in the instruments of Stanesby or, Gradbury, Bresan, Schuchart and others.

Diagram E shows the other voicing construction found in the later recorders by makers such as C Denner, Oberlender, Villars etc. and also Bainbridge flageolets. It also seems to have been more common at an earlier date in Europe than in England.

In this later voicing, the outer ramp angle is the same, but the inner ramp angle is shallower, pointing below the bottom of the windway too. Since the actual windway surface of the block represents the bottom of the windway, the height of the block in this particular recorder type has the same function as the top of the windway does in the other construction described.

It is amazing to find that many "copies" of old recorders are set up with an inner ramp angle which "points" to the middle of the airstream at the sides, so the advice given concerning the improvements gained by giving a recorder a high block in relation to the edge which have been advocated by makers likeaec Loreto etc. make sense as logical improvements to a recorder according to my theories too.

I think there is a general rule for the adjustment of the block in relation to the edge too. The block should point to the top of the edge at the sides and that should be its minimum height. The edge top is that part of it that joins the outer ramp and not the lower part that joins the inner ramp. Consequently, if the edge is thicker, a somewhat higher block is required or one at a greater angle.

The above mentioned structures could be applied to any recorder and possibly give better results concerning the quality of that instrument. Unfortunately modifications such as these can only have an effect reliant on other features of the voicing, so the results are very variable. Much the same as a good violin will respond to the correct setting up of it's soundpost and bridge etc. so will a good recorder. In the Royal College of Music Donaldson collection, all four recorders are of the later "shallow" inner ramp construction. Only the one by Denner has the original block, the others having been altered.

The other three have interesting characteristics and are well worth studying. Of these three, two are original baroque ones by Villars and Oberlender, the other an anonymous tenor. From comparing these three with the Denner it is possible to ascertain that the Tenor must be a 19th century "copy" made outside the tradition of baroque recorder making and not even within that of 19th century flageolet making perhaps. The other two re-voiced baroque instruments show enough good qualities to indicate that they were as good as the Denner when originally set up properly. I conclude from this that concerning the voicing of the recorder, the knowledge of adjusting the basic quality of the instrument and that of the correct setting up procedure were lost in the 19th century.
The FoMRHI Quarterly has survived for a full ten years. Those whose efforts have sustained it for so long have every reason to feel quite proud. Considering how often new periodicals appear, and how few of them present more than a small number of issues, a tenth birthday is indeed worth celebrating. I suspect, however, that I am not the only one who would admit to being surprised (albeit delightedly so) at the longevity of our publication. It is by no means to be assumed that we will survive through a second decade solely on the basis of the momentum which we thus far have gathered. Now is, therefore, a good time to examine the reasons for our success, in the hope of ensuring that nobody is surprised when we celebrate an equally happy twentieth birthday.

We've obviously been doing something very right. Since neither an elaborate production nor packaging of the Quarterly has been necessary to attract readers and contributors, this rightness must relate solely to its contents. The Quarterly was intended from its inception to serve as a medium for the rapid dissemination of information, with only secondary importance being placed on the more conventionally defined scholarly value of its contributions. There are similar publications in both our field and others. Many of them are also cut-and-pasted no-frills productions, and many are also something close to ten years old. The first publication of this type in the musical instrument field of which I am aware was, "The Catgut Acoustical Society Newsletter", (recently renamed, "The Journal of the Catgut Acoustical Society") which first appeared about twenty years ago. (Since the CAS Newsletter was familiar to at least some of the founders of FoMRHI, perhaps we might ask if it influenced the design our own publication in any way?) The FoMRHI Quarterly would in turn seem to have inspired a number of other publications, as for example, "De Bouwbrief", published by the Vereniging voor Huismuziek in Holland.

Many scientific fields have extremely professional publications which nonetheless are intended solely to provide a means for the rapid communication of material, regardless of the extent to which it has been substantiated experimentally. (This is usually done to establish precedence in an area of research, rather than in the friendly spirit which characterizes the publications mentioned here by name.) I subscribe to the "PPC Journal", which very much resembles the FoMRHI Quarterly in its cut-and-paste means of production, the fact that it is a joint effort of dedicated enthusiasts, and that its title involves an acronym which has long since lost its initial meaning. (During the dozen years since it was created PPC has had several dozen meanings. At present the organization producing the PPC Journal puts the following subtitle on each issue, "The Personal Programming Center is an international users group of People Programming Computers.") Perhaps the most intriguing publication of the F.Q variety which I have ever encountered is, "The Rats Newsletter". This is also about ten years old, and is to the world of rats research what we would like to be to the world of musical instruments. The spread-the-word-quick journal is clearly an item in demand.

During the past ten years communications technology has been developing at a brisk pace. There are new modes of communication which could easily provide an organization such as FoMRHI with the capability for substantially more rapid and effective exchange of information than is possible
with a printed journal. I am, of course, referring to the use of computers; in particular those applications which come under the heading of telecommunications. Even the very simplest so-called home computer is capable of supporting quite powerful communication with other computers via a plain everyday telephone. The potential utility of this for FoMRHI communication will, hopefully, become obvious during the following discussion.

The microcomputer (= personal computer, or home computer) is only few years older than FoMRHI. (In fact, one of the more important microcomputer journals, "BYTE", published its tenth anniversary issue last month.) One of the first things which microcomputer users started doing with their machines was to hook them up to their telephones. This enabled them to do two important things. First, they could use their microcomputers as terminals to mainframe computers (= full-sized, and very powerful, non-micro computers). Second, they could communicate directly with other microcomputer users and exchange information and programs on a machine-to-machine basis. Many people set up their computers as telephone answering machines. The computer automatically answered the telephone when it rang. If greeted by an appropriate signal from another computer, it would establish a communications link with that computer. The operator of the second computer could then proceed to type a message into the "host" computer, or could fetch a message which had previously been prepared by the host operator.

The exciting feature of this type of communication was that a number of people could exchange messages which each other via the host computer. What were called computerized bulletin board systems (CBBS) sprung, and are still springing up in astonishing numbers. The limitations of a CBBS are those of the memory capacity of the host computer, and the fact that a single microcomputer will rarely be able to deal with more than one telephone connection at any time. In other words, the users of this type of communications system are quite used to spending lots of time trying to dial through to the host computer. Despite this, many bulletin board systems have a wide variety of activities, ranging from electronic mailboxes for the individual participants, to special interest group (SIG) conferences which may or may not be open to everyone with access to the host computer.

The operators of commercial mainframe systems observed this development with great interest. Their computers were capable of providing extremely powerful and extensive BBS services for microcomputer users. Offering this type of service provided a solution to what was one of the commercial mainframe operator's greatest problems. During business hours the machines were put to profitable use, but during the evening and at night they were almost entirely idle. This problem could be avoided if the mainframes were used to host electronic conference, mail, and bulletin board activities "after dark". The fees charged for these services are substantially lower than normal commercial rates, and the advantages for microcomputer users are often regarded as great enough to serve as justification for using subscription services, as well as the free CBBS alternatives. (The mainframe will generally be accessible with no wait for a telephone connection, and will offer a variety of useful features not available on a microcomputer host.)

On the basis of all this it certainly should prove useful if FoMRHI, itself, were to open a special interest group conference on a CBBS. The question-and-answer type of communication, in particular, could be most
admirably dealt with in this fashion. Also, abstracts of Comms-to-come could be posted in advance of their actual publication. The Quarterly would thereby be freed from the extreme pressure of publication deadlines for time-value material, and might be able to pay just a shade more attention to the quality of the Comms than is presently the case.

How might we do all this in actual fact? If anyone has a computer which they would be willing to dedicate to the purpose -- great. Otherwise, if there is enough interest, I would be happy to explain in detail what would be involved in getting set up on a larger host system. Hardware details, money questions, etc. However (if ever) we do things, it is unlikely that we can get away with less than one system on each continent where we have interested members, so there is a lot more to be said. If anyone wants more info on how computerized conferences tick before deciding if they're interested, I'd be glad to provide that as well.

There is a second application of telecommunications technology which might be of use in speeding up FoMRHI communication in its present form. It is obvious that a number of contributors are using computers for the preparation of Comms. Since the Quarterly editor is one of them, there must be a computer in the editorial offices. If this computer were set up to receive information transmitted over the telephone lines, contributors would have the option of sending in material as near to the last minute deadline as is conceivably possible. The editorial nuisance of having to print out the camera-ready copy might be offset by the flexibility of being able easily to adjust the format of the material (dare one also say edit?) prior to this final printing out. I have no idea how easily this might be implemented and hope that Eph will let us know his own feelings on the matter. (Although I would suggest that it would be worth kicking into the FoMRHI extra money piggy bank if this were necessary to get the ball rolling.)

That about does it for this time out. I'll have a follow-up Comm in the next Quarterly if enough interest is expressed in the interim (letters to my home address, please). Presumably a few readers will find nothing new in all that has been said here. Others may find the whole thing very interesting, but hardly worth an effort. The rest will be anything from totally indifferent to overtly hostile. (How dare anyone sully the artistic integrity of musical instrument makers by suggesting that they become involved with as monstrous and irrelevant an activity as using computers!) In any case, the tool most often used in generating the first ten years of FoMRHI communication has been the typewriter. It is generally assumed that anyone who uses a typewriter in connection with their daily work today, will have started using a computer for the same tasks at some time during the next very few years. There is little reason to assume that this development will pass straight by the authors of FoMRHI Comms. The past ten FoMRHI years were both productive and exciting. Will we still be around to say the same thing ten years from now?
1985 FoMRHI List of Members – 2nd Supplement as at 10th October 1985

* in left-hand margin = change of address or other change.

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<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>Telephone</th>
<th>Other Information</th>
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<tbody>
<tr>
<td>Hans Ahlborg</td>
<td>Torsbygatan 20, S-123 41 Farsta, Sweden</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alfredo Bernadini</td>
<td>Bosboom Toussaintstraat 44, NL-1054 AT Amsterdam, Netherlands</td>
<td>020-188687</td>
<td>obor; M,P</td>
</tr>
<tr>
<td>Julian Cardew</td>
<td>4 Carpenter's Row, Pink Moors, St.Day, Redruth, Cornwall TR16 5NG, UK</td>
<td>0209-821509</td>
<td>early ww; M</td>
</tr>
<tr>
<td>Sergio Cattapan</td>
<td>Via Marconi 5, I-35010 Villadelconte, (Padova), Italy</td>
<td></td>
<td>(hpchd; M)</td>
</tr>
<tr>
<td>Marc Cromme</td>
<td>Polensgade 27, 2th, DK-2300 Kbh.S, Denmark</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catherine Folkers &amp; Ardal Powell</td>
<td>POBox 396, Lee, MA 01238, USA</td>
<td>(413) 243-3060</td>
<td></td>
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- **All Instruments**: T.J.D.Rees
- **Fortepiano**: Edward Swenson
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- **Lute**: Christopher Gray
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- **Fiddle**: Hendrik Hasenfuss
- **Violin Family**: Alberto Guerrero
- **Viola da Gamba**: T.J.D.Rees
- **Harp**: Hendrik Hasenfuss
- **Woodwind**: Julian Cardew
GILMER WOOD CO.
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STOCK LIST

Agba
Angico
Arariba
Ash
Basswood
Beechwood
Blackwood, African
Blackwood, Australian
Bloodwood
Bocote
Boxwood, European
Boxwood, W. Indian
Briar
Brown Ebony
Bubinga
Camphorwood
Canary Wood
Cativo
Ceanothus Burl
Cocobolo
Cocuswood
Coffeewood
Courbaril
Danta
Ebony, Gabon
Ebony, Indian
Ebony, Macassar
Eki
Fusila
Goncalo Alves
Granadillo
Greenheart
Guatambu
Holly
Impuya
Incienso
Ipe
Irko
Ironwood, Desert
Jelutong

Kingwood
Koa
Kokko
Kwila
Lacewood
Lapacho
Laurel, E. Indian
Lauro, Brazilian
Lemonwood
Lignum Vitae
Limba
Locust, Black
Logwood
Lovoa
Macawood
Madrona
Madrone
Madrone Burl
Mahogany, African
Mahogany, Honduran
Monosoria
Maple, Big Leaf, Plain
Maple Burl
Maple, Fiddleback
Maple, Quilted
Marmut
Mebau
Mesquite
Mesquite Burl
Monkeypod
Mountain Mahogany
Myrtlewood
Myrtlewood Burl
Narra
Oak, English Brown
Oak, Red and White
Oak, Japanese
Olive Wood, European
Osage Orange
Padouk, African
Padouk, Indian
Padauk
Palo Borracho
Parana
Pau D'Arco
Pau Ferro
Peñuelas, European
Peru
Pink Ivory
Pink Jatoba
Pitombas
Ply, European
Purple Heart
Putumayo
Rosewood, Amazon
Rosewood, Bolivian
Rosewood, Brazilian
Rosewood, Burmese
Rosewood, Guatemalan
Rosewood, Honduran
Rosewood, E. Indian
Rosewood, Indonesian
Rosewood, Mexican
Sapele
Shatwood, Ceylon
Shedua
Skynwood
Sucupira
Tabootie
Teak
Thuya Burl
Tulipwood
Vera Wood
Walnut Burl
Walnut, Claro
Walnut, E. Black
Walnut, S. American
Wenge
Yew
Zebrawood
Zircote

The above species are stocked in varying sizes - logs, planks, squares, cutlery blanks, musical instrument parts, etc., depending on availability.
The general store in Angmagssalik, East Greenland, contains a tiny museum of Eskimo artifacts including the frame drum depicted above. Its frame is an approximate lapped circle (maximum diameter c. 15") of drift pine c. 12" by 1", with a holding handle set over the lap; its head is made from either the stomach or the peritoneum of a polar bear, and held in place all around by a leather thong. The drum is struck on the frame's rear edge — not on the head — with a stick of drift pine c. 13" by 1" by 1/2".

David Z. Crookes
In 1978 the Paramount Workshop of Mallorca bought a harpsichord and began to play baroque music. To their great surprise the first concerts they gave filled the halls. Realising that there was a real demand for classical music, Patrick Meadows, the director of the Workshop, set about organising a music festival in and around Deya, in the north eastern part of the island, to give an opportunity to residents and visitors alike to hear music without travelling to Palma, the only city on Mallorca.

Since 1980 there has been a festival in Deya every July and August. As well as baroque and classical music one can hear a high proportion of contemporary music, and world premieres of music by composers associated with Deya, such as the American, Carl Mansker, and Robert Graves' son-in-law, Ramón Ferran. In 1985 the festival concentrated on American song. Among this year's performers were Suzanne Eradbury, the Russian cellist Mark Dobrinsky, Studium Musicum, Tafelmusik and many other artists of international standing. The festival is sponsored by the Insular Council of Mallorca and Deya Town Council and owes its continued existence in large part to the tireless energies of its director, Patrick Meadows.

Over the water in Barcelona the old musical instrument museum, which used to occupy a room in the Municipal Conservatory, has been moved to a beautiful neo-classical building designed by the Catalan architect Puig i Cadafalch at the beginning of this century, and known as La Casa de las Quadras, on Avenida Diagonal number 377. In the new museum are united a number of small collections of instruments, some of them of great value to the organologist. The majority are European. There is an interesting collection of seventeenth-century positive organs, harpsichords by Zell, Fleischer, and Silbermann, several Barak Norman viols, a Tieffenbrucker lute, an early example of a chitarrone and a number of other interesting early instruments. There is also a fine collection of seventeenth- to nineteenth-century guitars and Spanish psalteries, pianos by Clementi and Zumpe, and some eighteenth- and nineteenth-century Spanish violins and cellos.

The collections are still being reorganised and a technical catalogue is in preparation. Meanwhile the director, Romà Escalas, welcomes any organologists or builders who wish to examine the instruments. The museum comes under the auspices of the Ajuntament de Barcelona.
A Flying Visit to Italy

A few weeks ago I was invited to a conference in Trento on Alpine Folk Fiddles. Thanks to the kindness of Marco Tiella, one of our members and the Director of the Scuola di Luteria in Milan, and some of his colleagues, I was able on the same trip to visit a number of museums and exhibitions in Italy and the Italian-speaking part of Switzerland. We started in Ascona, a small town at the Swiss end of Lake Maggiore near Locarno, which has become very much an artistic centre of the Ticino. There Ambrogio Pellegriini has arranged a very interesting exhibition as a tribute to Domenico Scarlatti, perhaps the most neglected of this year's tercentenarians, in an old house, now the Cultural Centre Beato Pietro Berno where, on the top floor, there is one of the very few places in the world for learning all the traditional skills of fine bookbinding.

While there were some particularly interesting Italian instruments of the relevant period, there was also a good deal else. Keyboards included a Burkat Shudi double manual of 1771, no. 639, with the usual specification of 2 x 8 ', 1 x 4 ', lute, machine and Venetian swell. The pedals are missing and appear at some time to have been converted into knee levers, which have also vanished. The instrument belongs, I was told, to a descendant of Shudi's, who came originally from Switzerland, and so does a copy of the painting of the Shudi Family, which was recently purchased by the National Portrait Gallery and which will be in the forthcoming Handel Exhibition there; this copy was also on show. As I say, this is what I was told, with the implication that this harpsichord had descended in the family ever since Shudi's time. However, according to Boalch (2nd edition), this harpsichord was in the Broadwood Collection — i.e., it had indeed descended in the family, but in the English half, not the Swiss half. It is, according to Boalch, the one on which Hipkins and others gave the famous 19th century performances which started the Early Music revival, and presumably it is the instrument at which Hipkins is sitting on the frontispiece of the Ripin edition of Hipkins Description and History of the Pianoforte.

There was also a square piano by Gabriel Buntebart of 1781, and this has the signature of J.C. Bach on the soundboard. Marco Tiella is preparing a full study of this instrument and of its provenance, which should be of considerable interest, both for the J.C. Bach connexion and because pianos by Buntebart alone are so rare. The instrument is now in a pathetic state, unfortunately.

There were three good reproductions of Marco's, a copy of the Leipzig Domenico Pisaurenza clavichord, a copy of a 17th century Guarracino spinetto, and a copy of the 1726 Cristofori piano, also from Leipzig. All well made and, with the two original instruments mentioned above and a 1624 Florentine spinettino borrowed from a museum in Geneva, giving a good coverage of keyboards. It was noticeable, in a Scarlatti exhibition, that there were no Italian or Spanish harpsichords, but I have long had a suspicion that Scarlatti may have written his sonatas for Cristofori's piano — both the music and that instrument are known to have been popular at the Spanish court at the same period; is it not at least possible and perhaps probable that they were linked?

Woodwind included an ivory flute, a very handsome instrument covered with a decorative pattern in what appeared to be white paint or lacquer of some sort — it was worn away in two places by the player's thumbs. It had no name on it but it was attributed to Quantz because of an engraved monogram which appeared to be that of Frederick the Great. However, the fact that it had only one key makes one wondere. It's in nice condition with the original embouchure, and I have a vague memory of having seen it before;
it may have passed through the London sale rooms, but I've not had time since I got back to chase through my stock of back catalogues. There were two oboes, a 2-key by Bollech of Prague, dated 1792, and the other an anonymous instrument described as an oboe da caccia. It is curved, leather covered and made in three sections, with a very large bulb bell instead of the flared bell which one usually associates with a caccia; should this be called an oboe da caccia, or is it the mysterious taille which Bach scored for from time to time? An anonymous bassoon looked rather like a Grenser with a metal bell ring of a different pattern but similar to that on the Hare Collection August Grenser, and similar keys in wooden blocks, with a wooden boss protecting the end of the F key, which had a forked touch which again looked similar to Grenser's. There was an E flat key in a saddle above the thumb hole in the butt and two later wing keys; the F# key on the butt was not original. Two pins projected from the bottom of the butt.

There were only two brass instruments, a serpent d'église and a single coil parforce horn in the less usual key for such instruments of F.

Strings were more numerous and more varied, with a violin (in modern state), a rather unusual viola with wavy ribs, rather like a pie crust, and a viola d'amore. A guitar labelled Brata 1689 had six single strings, so something must have happened to it since that date. It came from the museum in Geneva as did a very pretty miniature theorbo or tiorbino by Heber of Padua, 1628. The most exciting plucked string instrument was a chitarrone by Matteus Buchenberg of 1682 with six courses on the fingerboard and seven basses. It was unusual in that it only had two roses, the usual central one and one above it to its left as you face it — none on the right; it looked very lop-sided! And it was the only one that I've ever seen that had its original case. Like any early lute case it is hinged across the belly and folds down from the top of the neck; an extraordinary sight for something of this size. The inside was plain wood — no paper or cloth. As with the keyboards, there were some good reproductions, among them a chitarrone based on the Royal College of Music Teiffenbrucker, and a very pretty guitar, based on one by Baschenis, by Marco's colleague at the Scuola di Liuteria and our member, Tiziano Rizzi.

Also from the Milan School was a hologram of a piccolo lute by Wendelo Venere, of which more later.

The display of instruments was complemented by an excellent tape and slide show, done with three projectors, showing portraits, music and instruments of all this year's centenarians. Very well done and well planned.

Finally, there was a series of superbly made models of theatres, reconstructed from drawings and documents of the period (copies of the relevant documents, and plans and maquettes for the models were on display downstairs). Unless one has seen one of the very few surviving theatres (I had the pleasure, earlier this summer, of visiting Drottningholm for a performance of Cosi fan Tutte, thanks to the kindness of Eric Hoeprich, and years ago I had the privilege of playing in the Rameau Princesse de Navarre in the theatre for which it was originally written, in Versailles), one has really very little idea of how opera was performed in this period. An entertaining extra was the oldest surviving opera ticket.

A full descriptive catalogue is in preparation and will appear into two versions: Italian and French, and German and English, at 45 Swiss francs if ordered before 30th October, 58 FR after that date. It's an interesting exhibition and the catalogue looks as though it'll be worth having, judging from the preliminary material. It can be ordered from the Ente Turistico, Ascona e Losone, Via B.Papio, CH-6612 Ascona. If, as is likely, you don't get this before the end of October, it could be worth writing to Mr. Luciano Bohrer,
the Director of the Ente Turistico, saying that you heard about it here and asking whether the subscription price still applies; you might be lucky.

From Ascona we went to Verona, first to the Accademia Filarmonica, whose collection is fantastic. While there we were shown the theatre, which although bombed during the war, has been rebuilt in the original style. It's interesting that the boxes, of which there are three tiers with a grand box in the centre, are all aimed at the stage; that is to say that the partitions between them are all parallel. This is markedly unlike some other opera houses that I have seen, where the partitions are all at right angles to the front rail, ie are radial. These latter were clearly designed so that the occupants could see the people in the opposite boxes, and could look sideways at the stage if they felt that they really must watch the performance. In Verona, clearly, the performance was more important than the social scene. Seating was not limited to boxes; there are also stalls and balcony for the less wealthy. Incidentally, Mozart performed in the foyer there in 1770.

In the museum, I had the inestimable privilege of blowing Bendinelli's own trumpet, made by Anton Schnitzer in Nurnberg in 1585. I don't know how many of you know Cesare Bendinelli's Tutte l'Arte della Trombetta. This a manuscript which the author presented to the Accademia, with the trumpet, in 1614, and thus presumably dates from quite a bit earlier since this was, I think, on retirement. It is the first complete and methodical trumpet tutor. Barenreiter published a facsimile of it in 1975 and Ed Tarr produced a complete English translation of the text and commentary for The Brass Press in the same year. I have taught several pupils from it, for it is still the most exciting to be allowed to blow his own trumpet. The original mouthpiece is lost, but Egger of Basle has made a copy of that belonging to the other Schnitzer in the same complexly twisted shape in Vienna (Buchner, M.I. Through the Ages, plate 166, and his more recent Musical Instruments, plate 125). With this mouthpiece, the trumpet stands approximately in modern E, presumably an E flat at the same renaissance pitch as the recorders in the same collection, though it's surprising to find an E flat trumpet as early as this; C was a more usual pitch. Unlike all modern reproductions that I've blown (though admittedly they were reproductions of baroque trumpets), the 2nd harmonic was almost in tune, less than a quarter-tone flat, and could certainly have been brought up with a little practice. This is interesting because Bendinelli uses this note a great deal in his exercises, something which had puzzled me when trying to pull it into tune on my Meinl & Lauber Haas copy. On his trumpet, it would have been easy to pull it up 30 cents or so. The 4th harmonic was E-20 cents or E exact (I got both results — I had my Korg tuner with me as well as a tape recorder), the 5th C# -15, spot-on a natural 5th harmonic for E exact; the 6th was B exact; the 8th was E exact again, drifting down to -15 or -20 but that was due to my problems of lack of recent trumpet practice and the use of a mouthpiece too big for me; the internal diameter of the rim is 22mm, which is nearer to a trombone than a trumpet in modern terms. I'm sorry now that I did not also pitch the 3rd and 7th harmonics and have a crack at the fundamental; it's difficult to remember all that one should do with other people standing round, watching and also listening to someone being obviously incompetent at playing anything above the 8th. In self defence, I should say that I'd not played trumpet for over a year.

I won't go into details of the other instruments; all can be found in the excellent Catalogue of the collection by J.H.van der Meer and Rainer Weber published by the Accademia a year or two ago. It's enough to say that this is the best and biggest collection of cornetti, traversi and flauti in existence as far as I know. I was also encouraged to try one of the bassett recorders, which produced a far bigger and rounder tone than the one in the
Bate Collection, although both have the same mark (I now want to know why) and also the smaller of the basses, which was interesting because the stretch for the lower hand (I have small hands for my size) is much less on the bass than it is on the basset. On the basset I could only sound the three-finger note; on the bass I could get down to the bottom. I didn't try one of the 6-foot great basses. Pitches for all of them are cited in the Catalogue referred to above. I have what little I got on tape if anyone wants to refer to it. I should also say that I was very generously presented with a magnificent volume on the history of the Accademia and the theatre.

From there we went to a hall at the back of the theatre, the Sala Maffeiana, where there was an exhibition of Il Legno si fa la Musica, a display of instrument making, half by Marco's school in Milan and half by the Institute of Instrument Making in Cremona; Tiziano Zanisi of the latter institute had been driving us round all this time. This exhibition had been sponsored by one of the local banks, the Cassa di Risparmio de Verona, and I only wish that some of our banks would do all that this one has done for the arts. They have produced records, four of which they gave me (details next time; there's a limit to time and space), a book on Salieri (ditto), and they have mounted many other exhibitions and published a number of handbooks connected with them. The booklet for this one contains a history of the violin, from its origin to the 18th century, well written and well illustrated; an article on violin making from the baroque to the present day; a brief note on violin playing, and three important articles on the scientific aspects of investigation for string instrument makers, with, in the article by Marco and Tiziano, X-radiographs, photographs taken through an endoscope and through a microscope, and an example of photogrammetry (a subject about which I've asked Marco to write a Comm).

The exhibition included a complete range of violins, from quarter to full size by one-eighth steps, all modern of course, but there was one baroque violin by Tiziano Zanisi himself. There were also a viola d'amore, hurdy-gurdy, guitar (with mid-19th century style body and five double courses), lira da braccio, cittern, lute with a big bass rider, theorboed lute and an ordinary lute. There were also kits, pochettes, pandurinas, rebecs and so forth, a pretty full range of string instruments made by students of the two schools. There was a good display of the full process of making a violin and there were lute moulds and so on as well. There were also examples, from the Milan School, of restorations, among them a Guadagnini guitar of 1823 (with a copy of the instrument) and full documentation of the restoration of a Testore cello, with many detail photographs of its state before, during and after the work had been done. Interesting reconstructions included several of the instruments in the Leonardo da Vinci drawings, including a keyed bass cornett, a form of Geigenwerk, and what might be called a Flötenstern — a series of duct flutes arranged like the spokes of a wheel for playing canons. There were a few keyboards, a pentagonal spinetto, a regal and portative and a small positive of Marco's, as well as his copy of the Santa Catterina violetta (see his article in Galpin Journal XXVIII), which was much smaller than I had realised.

Particularly interesting was the technological section of the exhibition, with more holograms of the Wendelo Venere piccolo lute which we'd seen one of in Ascona, which showed exactly where all the stresses are and how the belly moves. Three peaks on the belly show where the bridge affeces it — why three? Two peaks follow on into the belly from the points of the fingerboard, as one might expect. Less expected is that the back of the neck shows slight stresses — it's by no means a neutral element. Each ivory rib has its own stresses, the centre ribs with less and the side ribs with much more; should they all be the same, or should they be graded like this? As Marco said, such methods of investigation provide questions, not answers, but they do open whole new areas of research. Other techniques on display
included the use of an endoscope to examine the inside of a violin without having to open it (the probe can be passed in through one of the f-holes), X-radiographs, microscopic examination of an iron string, and computer programmes for the design and comparison of various styles of lute; it was set up for the Arnault and the Venere lutes, quite different models.

All in all, an excellent exhibition and much praise is due to the Cassa di Risparmio for sponsoring it.

Then finally to Venice. There were many instruments that I wanted to see here. Some of them wind, partly because someone fed Lyndesay Langwill inaccurate information so that he listed a lot of Venetian instruments as being in Verona, and partly because while Phil Young has many of the most important instruments in his 2500 Woodwind Instruments, he does not have full information on them. The rest strings because one of our graduate students has been working on Venetian music in the 17th century and had turned up a lot of violins and a few other strings which have not been properly studied before as far as either of us knew, many of them in original state, perhaps more than in any other one place. As you know (Eph has told you often enough in his review of my books), I'm no string expert. However, I had Marco Tiella with me, and we hope that he is going to be able to make a full study of these instruments, using some of the technological devices I have just described.

One of the problems in Venice is sorting out who is responsible for what, especially with only two days at our disposal and with a total lack of Italian on my part. My impression is that this is basically one collection now, even if it came from different sources, but that some of it is housed in the Correr Museum and their stores, and that some of it is stashed away in the Marcello Academy of Music. Certainly, of what we saw, all appears on the same inventory (of which I have three, sometimes contradictory, versions). The inventory also lists a number of instruments which we didn't see, but some of which our student, Mrs. Berdes, has seen. Since some of you may also have copies of this inventory, I will give the number with any instrument described (as Inv. xx). Incidentally, the violins seem to have been numbered three times: once on a label stuck on the back of the neck (which usually corresponds with the Inventory), once on a label stuck to the left hand upper rib as you face the instrument (which doesn't correspond with the inventory, nor did we discover what it did refer to; indicated here as rib xx), and, very recently and for only a few instruments, with a tie-on label, which I've ignored here. All the violins are full of a white, chalk-like dust which Marco thought might be DDT; this obscured some labels.

Inv.1, Violin (rib 6), inventoried as German 18th c. Probably original longish fingerboard; only slightly wedged because the neck is set a bit high.

Inv.2, Violin (rib 13), inventoried the same. Short fingerboard with a reverse wedge because the neck is spliced very clumsily and tips back. The belly is in a fairly terrible state.

Inv.3, Violin (rib 14), inventoried the same. Illegible label inside. Now in full modern state; belly shows chin wear on the 'wrong' side of the tail-piece.

Inv.4, Violin (rib 9), inventoried the same. 3/4 or piccolo (how do you distinguish them?) with very rough fingerboard and wedge, short neck; back appeared to be oak and neck beech.

Inv.5, Violin (rib 7), inventoried the same. In original state, probably original, very short fingerboard with wedge, short neck.

Inv.6, Violin (rib 6), inventoried the same. 4/5 size, very high arch, particularly on the back, roughly made.
Inv.7, Violin, inventoried as Cremona 1690, F. Ruggeri detto il Per, of which only Cremona was visible through the dust. With an attached label 'Bicentenario Stradivariano Cremona 1937'. Modern fingerboard, spliced scroll.

Inv.8, Violin, inventoried Cremona 1751, P. Guarneri. Label was illegible and there was no label on the neck; it was identified as Inv.8 from Jane Berdes's photograph. Spliced neck with a fairly short fingerboard. One of the interests of the collection is that instruments show all the stages of modernisation; some in original state, some with first stage modification to a shortish neck but longer than the original, and others in modern state.

Inv.9, Violin (rib 12) inventoried and legibly labelled Mathias Hornsteiner/ geigen macher meister in/ Mittenwald an der Jaar 1795 (the inventory does not go into as much detail; where I say 'inventoried and labelled' what I then type is what we read on the label, meaning that the inventory agrees with the basic identification). Annoyingly, I have no other notes on this instrument - sorry.

Inv.10, Violin, inventoried as Cremona, 1654(?), A. Guarneri. Renecked and certainly not a Guarneri.

Inv.11, Violin (rib 8), inventoried as Tyrol 1787. No trace of a label; neck and wedge fingerboard all heavily wormed.

Inv.12, Violin, inventoried and labelled Jacobus Stainer, abstan (sic) n 1674. Could be. Short neck, wedge fingerboard.

Inv.14, Cello, inventoried M. Goffriler, but only a restorer's label visible (Carlo di March/ restauro in Venezia anno 1968). Full modern state; belly sunk in various places.

Inv.15, Cello, inventoried and labelled Mattio Goffriler Fece in Venezia Anno 1708. Modern state and belly in same state as previous. Since nobody is using these instruments it seems a great pity that some of them have been put into a modern state, perhaps as recently as 1968. So much information will have been lost, and this is why we hope that Marco will be allowed to make a full study.

Inv.16, Viola (rib 11 crossed out and 25 written in), inventoried as German 18th c. Very high arched, wedge fingerboard, neck snapped but not actually broken off.

Inv.25, Violin, inventoried and labelled Antonius Stradivarius 1707 (the label is missing from the neck, but again it was identified from Jane Berdes photograph and by the correspondence of the inventory and the label). Original neck, wedge in rather bad repair, strong marks of bridge feet on the belly, bass bar right on the edge of the f-hole, body very badly cracked longitudinally in many places.

Inv.26, Violin (rib 2), inventoried as a Stainer but labelled 'fe! riparacione Stainger 1730'. Original neck, wedge fingerboard.

Inv.27, Violin (rib 5), inventoried as German 1674 but labelled Jacob Stainer Absan prope/ Enipontun fecit anno 1672. Modern state and bad cracks.

Inv.43, Violin, inventoried and labelled Georgius Seraphin Sancti Nepos/ fecit Venetiis Anno 1740. Original state, original neck, with wedge fingerboard. The fingerboard has an ebony veneer about 1mm thick on a maple base.

Inv.57, Violin, inventoried and labelled Nicolaus Amatus, and a repairer's label dated 1891. Modern state.

All the above were in the store of the Museo Correr; whether they had anything
At the Marcello Academy there were:

Inv.19-22, 4 Horns, inventoried and stamped Andrea Coin Ese in Calle de Fabri Venezia 1770. They were three-times coiled, looking like short-coiled trompes de chasse, without a tuning slide. The proximal end of the tubing accepts a mouthpiece (I used my own, since I was not shown the one original mouthpiece until after I'd blown them). They are not marked with the inventory numbers, so let us here call them W, X, Y & Z. W sounded A at 435 Hz; X sounded A at 434, Y I could not get my mouthpiece into, and Z leaked very badly but is at about the same pitch as W and X. There is a set of four crooks for each horn, the biggest very oddly shaped, which are so tapered that they fit into the mouthpiece socket. On horn W, the smallest gives G#, the next G, the next F and the biggest E♭; the second and fourth together (for obviously if they will fit into the mouthpiece socket, they will also fit into each other) gives D; I did not try the other combinations. There is one tuning bit and one original mouthpiece, whose dimensions I have.

Inv.23, Trompe de chasse of normal type in D, inventoried and stamped (double eagle)/Anton Kerner in Wien 1765. Large dents didn't help the sound.

Inv.29 (I'll come back to 28), Bass Recorder marked J.C.Denner/D (listed in 2500 as J.C.Denner 28). Boxwood, three pieces, square key, SATW, OL c.101.7 cm, L from lip c.90.5 cm. Blown from the centre of the head (no crook survives). Enormous thumb hole (Ø 13.5mm laterally and 12.5mm vertically). Difficult to sound but the 3-finger C is about 50 cents below modern, ie C at A 427 Hz.

Inv.28, Ivory Bass Recorder, anon. The foot is missing and has been replaced (in wood) by Pietro Verardo (who was very kindly giving up a lot of time to show me the instruments and who got them all out of the glass fronted cupboard in which they live). Phil lists this in his 2500 as Denner no.27 at Paul Hallperin's suggestion but I think that they are wrong. The turning is similar to that of the Denner but it's by no means the same (a ring on the Denner is absent on this, for example, and some of the decorative turning is different too). More important, the ramp on this is much shorter and much steeper than on the Denner, so much so that I can't see one man making both. The windway is quite open on both (much more open than our non-Bressan in the Bate, for instance) but the Denner is much higher and narrower with sides sloping outwards radially and a greater curvature on the roof; the sides of this one are vertical. The head is 1 cm shorter than the Denner, though the bodies are the same length. The block on this is original; I did not check the Denner I'm afraid.

Inv.30, Flûte d'Accord marked (winged lion or dragon)/Anciuti a Milan 1712 (listed in 2500 as Anciuti no.3). Quite a big instrument, OL c. 49.6 cm, L from lip, right tube (player's) 38.2, left tube 42.8. Right tube 3-finger note is E♭ at A 440 Hz; left tube is B♭ plus 30 cents. The finger holes are bored in a strip down the centre of the instrument and slant towards each bore; those of the right tube are wider than those of the left. The lowest finger hole (little finger) was covered by a third-order lever key to bring it within the reach of the finger; the key is now missing, which is why I gave the 3-finger note rather than the lowest.

Inv.31, Cornettino, unmarked, looks like boxwood covered with leather. It is round in section throughout, not hexagonal, and has no diamond-shaped flats. It is curved left-handed. L along the finger holes is c.51.2 cm. There is no mouthpiece.

Inv.33, Ivory Piccolo Oboe stamped Schvechbavr. Three keys, the C round and
the E♭s trapezoidal heads (I don't like Phil's 'flaps'), the usual three pieces, 2 bell vents, holes 3 & 4 double, very slender looking like a scaled-down oboe, OL c.48.2. The whole lower joint is very badly cracked. I didn't note the SAT blast it. One always forgets something.

Inv.34, Boxwood Oboe stamped J.C.Denner / D/1. Listed in 2500 as J.C.Denner no.8. OL c.53.9cm. Three brass keys, all SATW, all round heads. Holes 3 & 4 double. 4 vents in the bell at the cardinal compass points, between two rings in the short straight section between the socket and the bell flare. Very nice condition, no cracks and no other damage. Perhaps Paul Hailperin or Alfredo Bernardini can give us a cents figure.

Inv.35, Boxwood Oboe d'Amore stamped (a cross) / H.Eichentopf. Listed in 2500 as Eichentopf no.10. OL c.60.8cm. 2 keys, both with trapezoidal heads, which appear to be SATK, but it's difficult to see. C key has a forked touch. Holes 3 & 4 double. No vents. Bulb bell.

Inv.52, Two Contrabassoons with brass bells, one of which is marked Gown/AM/1853. Inventoried as Clarone (but the other clarone, Inv.36, I was told is a bass clarinet). They were incomplete and were not examined further.

no Inv., Oboe stamped (star) Fornari (star) / a Venezia, with 1808 on the bell. 2 keys, SATK (touch of C key missing), head of E♭ key trapezoidal as in 2500 (which lists four in Venice; I only saw this pair) (why didn't I note the shape of the head of the C key?). OL 55.2 or .3cm. 2 bell vents.

no Inv., Ditto but bell marked 1809 and upper joint marked 1. The head of the C key is missing and OL c.56. Otherwise the same except that while both are warped (ie banana shaped), 1809 is warped as a right-handed cornett and 1808 as a left-handed; the amount of warp looks the same in both.

And that's all that was there, though there are a number of other instruments on the inventory. Perhaps one day I'll have time to and opportunity to work more carefully and thoroughly through the Museo Correr, which is where Mr Verardo said the rest were stored.

Considering that I arrived in Milan after lunch on Monday, and we left Venice at lunch time on Thursday to get to the conference in Trento, I managed to see quite a lot, and I hope that these notes will be of use to some of you.

I would like to thank again all those who made it possible to see so much and to handle so many instruments, and especially to thank Marco Tiella, who had laid so much of this on and who was a tower of strength throughout. When one is discourteous enough to arrive in a foreign country unable to speak the language, to have someone like Marco as a guide and patient interpreter makes more difference than I can say.

Apologies for hasty typing, with all the consequent errors. Also for doing this at home and thus on the machine with a smaller face, but there's a limit, with term about to begin, a new Special Exhibition to set up, the Bulletin to do and everything else, to the amount that can be done in the day time at the Bate.
Speculation on Memling's Tromba Marina

As far as I can see from a printed reproduction, the second of Memling's Angel Musicians has a Tromba Marina which shows several spaced fret-like markings to indicate finger positions, and has two strings, the longer one passing over a bridge, and the shorter one to a small fixed bridge on the soundboard. This speculation was sparked by the ratio of the lengths of these two strings, which is not a simple fraction; on my measurement it is 0.56.

Using 65 mm as the spacing of Angel's pupils, I measured the lengths of the strings to be 75 cm and 42 cm. Assuming similar tension and density/unit length, and calling the longer string C, the shorter one would be B flat. These two strings combined yield the series of notes shown on the stave below, where the shorter string fills several of the gaps between the harmonic series notes of the longer string. Notes from the longer string are tails up with the number of the harmonic below, and the notes from the shorter string tails down with the number of the harmonic above. Three of these notes are common to both strings, and lower notes on the longer string are well separated. I have drawn a diagram for "fret" markings at these points, inscribed with the positions for each note and with the distances from the nut shown.

In the Antipodes, one is not only upside down, but is also unable to make personal inspection of sources, so, if these speculations are way out, someone who has been to Antwerp please tell me.
(P.O. Box 89, Brooklyn, N.S.W. 2253 Australia).
By alarm bells started ringing as I read Eph's response to Comm 610 on Vihuelas. I'm resisting the temptation to discuss nails and finger-picks, though the suggestion is ingenious. If true, why did mandore players bind the tip of a quill to a finger rather than use a finger-pick? Perhaps they couldn't afford ivory or silver ones.

I cannot, however, let some of Eph's statements about the vihuela and viola da mano go unchallenged. The evidence for unison pair stringing of the vihuela is good, but how can we be so certain about the viola? One painting (the Gerolamo dai Libri in the National Gallery) and a Paris inventory record of a 'guitare' with eleven strings is not a lot to go on, when one considers that unison pair stringing of lutes was probably the result of Italian lutenists being exposed to the vihuela in Spain and the Spanish influenced parts of Italy, and must have started in the 1560s to have got into the English edition of Le Roy's lute tutor (1574). One surely must accept that at least some violas were unison strung, like their Spanish cousins?

Published pictures show that c1500 vihuelas could have lute-like pegboxes or sickle shaped pegboxes ending in a scroll or escutcheon. The flat peg-plate or reverse curved viol-like pegbox seem to be later mid-16th century characteristics, with a scroll rather than a carved head on the later. Carved heads seem to be more characteristic of guitars.

What is the evidence that the viola was 'almost as popular as the lute in Italy' in the 16th century? And what is the evidence that 'by the mid-16th century the viola body was sometimes deeper (like the baroque guitar)'? Or that the neck length was 'often like the lute's, allowing 8 free tied frets'? If these statements become dogma we shall end up with precisely the type of instrument that was produced in the early days of the vihuela revival, but with the imprimatur of 'authority' this time.

Which brings me to the Praetorius quinterne. Apart from the strings and pegs it is a straightforward small guitar closely resembling the drawing used by Phalese and Mersenne, including the carved head rather than a scroll on the pegbox. It is not like any representation of a viola in any Italian source that I know of. Which is more likely, a draughting error over strings and pegs, or Praetorius featuring an exotic instrument in the Plates which is completely ignored in the text? The grounds for regarding it as a good model for a viola da mano are very shaky, in my view.

Finally, no comm would be complete without a little speculation. How about the Paris vihuela being used for the bass in church, as an alternative to the harps and big lutes that we know were used in the 17th century and presumably earlier? There doesn't seem to be any need to try to force it into a solo or duet mould.
I've missed having the usually indecisive but always constructive and friendly disputes with Donald. He has sanctioned my reply in the same issue.

The statement by Feunllana that nail playing is inferior to finger playing is most likely an aesthetic one based on the hearing of vihuelas played with nails rather than a theoretical one based on no experience whatsoever. A few pictures provide the evidence for thumb-over lute playing the the 16th century. There is no evidence for or against nail playing amongst the thumb-over players then.

I like Donald's tied-quill alternative for a fingerpick or nail by mandora players who were also either quiet lute players or nail biters.

In my view the choice between unison and octave stringing was an economic one. So if there was a vihuela player who couldn't afford catlines he would have used octave stringing, and an affuent viola player could have used unison stringing. I expect that a Spaniard seeing a viola da mano then would have called it a vihuela, and an Italian would have called a vihuela a viola. The c.1570 Le Roy report of Denticc's use of unison stringing and a 7th course is a milestone in my dating of the emergence of affordable catlines made in Bologna. I would have expected that unison stringing on violas would have grown after then in parallel with the lute.

The vihuela I was writing about in Comm 529 was that of the published repertoire, and I was not considering the late 15th century vihuela, which was the size of the later Renaissance guitar, smaller than the later vihuela. I know of only one picture of a vihuela or guitar from the Spain of the published repertoire that has other than the flat peg-plate.

In the decade before the 16th century, Tinctoris wrote "while some play every sort of composition on the lute, in Italy and Spain the viola without a bow is more often used." It is reasonable to expect that this situation persisted into the beginning of the 16th century. While the lute subsequently grew in popularity, the viola seems to have remained a viable alternative through most of the rest of the century. As Tyler (The Early Guitar, p 24) has pointed out, the Bottegari ms of 1574 seems to be for viola da mano.

As for body depth, Panhormitano in his Dialogo Quarto de musica ... per intavolare ... con viola a mano over liuto ... (Naples 1559) wrote:

"As to the body of the instrument, you will make it according to a ternary proportion ... decide first the length of the instrument, according to your desire, not including the neck, and after divide this length, and make three parts: two for the width and one for the height. Make the neck as long as there is from the bridge, where the strings are tied, to the end of the body, and do not include the small portion where they are wound on the pegs."

This description seems like a composite description of the viola and lute, but it is clearly possible that Panhormitano meant what he said, and that such long-necked lutes and deep violas were made.

As for the number of frets, it is clear that of the surviving illustrations of violas, some, like the Mola Intarsia in Mantua have 10 frets, but some I've measured (such as the Raimondi engraving and paintings by Cariani and Gerolamo dai Libri) have the body-neck join between the 9th and 10th fret positions. This is just right for tying 8 frets because any closer to the join for a Fret is inhibited by the slope of the heel (a 9th fret can be tied there, but its position would not be freely moveable). I am not aware of
illustrations of violas from after the middle of the 16th century except for Praetorius’s 'quinterne', which has an 8-fret neck. In all this I was writing about diversity, and have as much distaste for the dogma of everyone making one design as Donald has.

In Piccinini’s description of the origins of the chitarrone, he mentioned a fashion for lutes of different sizes playing in ensemble. He said that the demise of this fashion in the last quarter of the 16th century made large lutes available for higher tuning in chitarrone-reentrant fashion. The fashion did not die out completely, as evidenced by Praetorius’s different sizes, Vallet’s music for 4 lutes, and a surviving 17th century double bass lute or two. It would be difficult to imagine violas not partaking in this fashion, and a range of sizes was probably made. Praetorius’s instrument was probably originally a treble viola.

As Italians converted Renaissance lutes to archlutes and chitarroni, they probably converted good violas to baroque guitars. This would usually involve replacing the pegbox with a peg plate, deepening the body, and perhaps cutting down the bridge and rebarring the soundboard. Violas can be used as guitars before conversion, just leaving off unwanted strings. In Praetorius’s Germany (and probably generally) instruments were named according to how they were played and not how they looked. So the name ‘Geig’ applied to a rebec-shaped instrument as well as a violin-shaped one. An instrument played like a guitar would be called a guitar. If there was a draughting error in Praetorius’s plate, it would only be that too many strings were shown. If Donald doesn’t like the Praetorius viola as a model, I am sure no-one would object to his offering alternatives.

I cannot go along with Donald’s speculation about the Paris vihuela being used for the bass in church. With a nut width of 43 mm, I can’t see how heavy enough strings could have been used to make an impression in a church acoustic. I had hoped that during the conversion to a baroque guitar the neck was thinned down (on the outside, and the peg plate thinned by dropping blocks from the inside) but this hope has been dashed by Abondance’s drawing, showing the heel inside being the same width as the neck outside. He’s had it all apart and so knows. I’ll stick with the purpose of the vihuela being for accompaniment of song and of other vihuelas in a chamber acoustic.

As my final speculation, there are two design features common on baroque guitars which might derive from original conversions from vihuelas and violas. One is the heel being a separate piece of wood from the neck. One piece of wood for both as in viols would seem to be stronger, but if the two-piece construction necessitated by a conversion appeared to be strong enough, it could be copied. The other is that the height of the sides of baroque guitars is often broken up into three regions, with lines of contrasting colour inbetween. These lines usually go through the whole thickness of the sides, and the wood on both sides of a line is sometimes not from the same piece. The central and widest piece is of a height that could be of an original viola or vihuela. This feature of breaking up the sides lasted till the end of the 18th century, and it clearly persisted because if its innate attractiveness as well as tradition, with no thought of the viola or vihuela in mind. But it might have started that way, and copied on new instruments in those early days because converted violuelas and violas were particularly prized.

This parallels a peculiar design feature of lutes with more than 6 courses: points sticking into the soundboard from the fingerboard. Some such decorative feature was necessary to eliminate the rounded soundboard edge which was up against the new widened fingerboard in conversions from 6-course instruments. Just cutting off the end of the soundboard at the new join would reduce the strength provided by some of the soundboard being glued on the neck. Converted 6-course instruments were highly prized, so new instruments also had points put in. This was not necessarily a deception, but rather a symbol of quality.
On Cammer-Ton and on the size of Lutes

In his, as usual, stimulating article (PoMkHI Comm. 632: A closer look at pitch ranges of gut strings) Eph Segerman repeats one of his old beliefs (viz. that Cammer-Ton was the same in the 18th.C. as in the early 17th.C. and that both were at around modern pitch) and introduces a rather more curious idea: that the size of instrument played by the lutenist E. G. Baron was quite different to that of any other 18th.C. lute pitched in Cammer-Ton.

Eph's speculations on pitch are most comprehensively expressed in Comm. 442 (On German, Italian and French pitch standards in the 17th and 18th centuries) in which he acknowledges his debt to Arthur Mendel and, using the same information as Mendel, makes up what he believes is 'a reasonable story about what it was'. As in all good stories, there is something of a grey area between fact and fiction and I'm sure Eph would accept that there's room for dissent. Indeed, I believe that, taking Mendel's findings together with other data he overlooked, a rather different generalisation about early/mid 18th.C. German pitch is indicated.

Mendel's suggestions on 18th.C. German pitch

In his important article on early pitch (Pitch in western music since 1500 Acta Musicologica, 1978), Mendel analysed many early sources and indicated the pitch of various extant instruments, but in his conclusions he particularly refrained from suggesting any specific pitches. Indeed, he made the incontrovertible point that the subject does not lend itself to grand generalisations since the pitch of a particular work is dependant on date, location and function. However, when discussing 18th.C. pitch, even he could not restrain himself
from indulging in such a generalisation (and I'm pretty sure there's few amongst us who could).

Mendel showed that in the early/mid 18th.C., Cammer-Ton was a tone below Chor-Ton and tief Cammer-Ton was a semitone even lower. Cornet-Ton could be the same as Chor-Ton or a semitone higher. This interpretation is generally accepted. However, what is open to doubt is the precise level of these pitches. Mendel suggested that Chor-Ton was about a tone above modern pitch and therefore Cammer-Ton would be around modern and only tief Cammer-Ton would be below, and even that by only a semitone. How Mendel reconciled this view with the pitches of some extant instruments, which are below any of these levels, was not explained; though he did remark on the dilemma.

In a similar vein, whilst it's clear that Mendel was aware of the frequency measurements reported by some early writers (Sauveur, Taylor, Bernoulli, Euler, et als), he made no attempt to quantify these. This is particularly unfortunate since almost all these measurements lead to a pitch level below Mendel's tief Cammer-Ton. It is certainly true that some of these measurements do not come from German sources, but the degree of general agreement suggests that this data cannot be overlooked. The best summary of this research is to be found in the recent booklet by Cary Karp (The pitches of 18th century strung Keyboard instruments ...., Stockholm 1984, reviewed in POMMHI Comm. 606). Karp's results range from a=383 to 415, with a mean of 394. Whilst the mean figure itself has very little significance as a standard (since pitch varied from place to place), it is interesting to see that all but one of Karp's results fall below the lowest limit for German pitch suggested by Mendel. Moreover, from his work into the tensile strength of 18th.C. harpsichord strings, Karp concludes that most of these instruments were tuned at a maximum pitch of around a=405 and a working pitch of around
a=390 (i.e. about a tone below modern pitch). As is shown later, there is also very strong evidence to suggest that 18th.C. lutes were generally pitched around this lower level.

In the light of all this, it is revealing to very briefly re-examine Mendel's work to assess the strength of his argument, particularly as it relates to his generalisation that 18th.C. Cammer-Ton was about equivalent to modern pitch. His suggested pitch level for Chor-Ton seems to result mainly from an analysis of extant German Organs which, he thought, indicated two possible levels: one at a semitone above modern pitch and one at a whole tone above. He couldn't bring himself to allow that any French pitch could possibly be lower than a tone under modern (he believed French pitch to be a major third lower below German Chor-Ton, even in the mid 18th.C.) and so he decided to opt for the higher pitch level as being representative of Chor-Ton. Of course, the relationship he assumed between German and French pitch in the 18th.C. is open to question, but it might be thought that his analysis of Organ pitches is rather less a matter of opinion. However, in examining his table for Organ pitches, it is far from obvious how he arrived at the conclusion that this shows two clearly defined pitch levels. The actual pitches listed show no such clear separation and, indeed, the mean of all his German data is only about a semitone above modern.

Accordingly, if Mendel's generalisation is replaced with one proposing that 18th.C. Chor-Ton was about a semitone above modern pitch, not only is this quite consistent with most of his own findings, but it also allows the lower instrument pitches mentioned earlier to fit into the general scheme of things: those Organs pitched a semitone above the usual Chor-Ton might be thought of as being in a localised Chor-Ton, perhaps Cornet-Ton (as Silbermann allowed); Flutes and Oboes would generally be at Cammer-Ton (i.e. about a semitone under modern, as reported by Bruce Haynes and by
Friedrich von Heune) as would some harpsichords; Lutes and other harpsichords would be at the proposed tief Cammer-Ton (i.e. a tone below modern pitch). Even the Rottenburgh flute belonging to Franz Brueggen, with its lowest pitch at a=370 which so worried Mendel, would fit into this general scheme, since it would be at the old low French pitch (a semitone below tief Cammer-Ton).

Now, all of this is not really to lay down some inviolable law and I would be amongst the first to make the customary obeisance in the direction of provisos (pitch is variable in date, place, ....). Rather, the aim is to suggest that if generalisations are considered to be of any use at all, then one which places 18th.C. Chor-Ton about a semitone above modern pitch is more consistent with the available information than one which places it a whole tone above modern (as Eph prefers).

Just one final point in this section: I'm not particularly taken with the idea that Praetorius has much to tell us about pitch in the 18th.C. and I think it highly questionable to assume that his Cammerthon was the same as that of Baron's over a century later.

The sizes and pitches of Lutes in 18th.C. Germany

If 18th.C. Chor-Ton was, indeed, about a semitone above modern pitch, and therefore Cammer-Ton about a semitone below, how can this be reconciled with the size of Lute Eph believes was played by Baron? In Historisch-Theoretisch und Praktische Untersuchung des Instruments der Lauten (Nurnber 1727) Baron clearly tells us that the lute's highest string is pitched at f' in 'Kammerton'. If Eph's open string length of Baron's Lute is to be believed (62cm), then the highest pitched string would be significantly below the working stress usually associated
with Lute trebles. Two possibilities suggest themselves: either Baron's 'Kammerton' was higher (by around a semitone) than the pitch I suggest for Cammer-Ton at that time; or, Eph has incorrectly estimated the size of Baron's instrument.

Well, as mentioned earlier, I wouldn't wish to be thought too dogmatic about the precise level of Cammer-Ton and it's possible that Baron's level was a semitone higher than a usual. Nevertheless, it's instructive to consider the second possibility in some detail. The method of scaling employed in Comm. 632 is based on the, not unreasonable, assumption that typical skull size has remained fairly constant since Baron's day (1727), so that modern measurements of the cranium are directly related to Baron's bonce and from there to the dimensions of other items portrayed. There are, of course, numerous problems with this approach and the first step must be to make some overall judgement about the accuracy of the depiction. This may often be done by considering features over which there is little, if any, doubt. In the case of Baron's lute we see an instrument with just twelve strings, 6 tied frets and 3 glued-on frets. However, the disposition of these particular features was very well established by 1727 and a Lute would have at least 20 strings (in 11 course), 9 tied frets and 3 glued-on frets. Although this casts substantial doubt on the accuracy of this particular depiction, there's even more problems ahead. One of these is to do with perspective: in the picture, the torso and lute are depicted inclined a significant degree to the right, but the head is turned somewhat forwards. Consequently measurements of the cranium cannot be directly related to measurements of the lute, and a correction is required. On top of all this, are simple errors of observation: the picture is very small and certain features are obscured so that any measurements involve a substantial degree of possible error; similarly, there will have been some error and statistical spread in the observations of modern cranial measurements. Incidentally, I recall a very useful and concise work devoted to this subject and I recommend it: The errors of observation
and their analysis by Topping.

In spite of all this, it is still interesting to calculate the size of Baron's lute using the cranial measurements suggested by Eph, but correcting for perspective and observational errors. This exercise leads to an open string length of 68.5 cm. Such a figure is considerably different to that given in Comm. 632 (though no range of errors is given there) and it is therefore instructive to compare it with some other information we have about the sizes of 18th-C. lutes.

The 18th-C. lute is unique in the organological history of the instrument in that it suffered no subsequent modifications as befell earlier forms of the instrument. Indeed, although comparatively few lutes were made in the 18th-C., there are a large number still extant today. Pohlmann (Laute Theorbe Chitarrone, Bremen 1975) lists many such instruments and analysing the sizes of 11 and 13 course lutes made in Germany from 1700 to 1755 results in an open string length of 72.4 cm.

John Talbot's manuscript (Christ Church library, Mus. Ms. 1187) is, as far as I know, the only written source to give actual physical dimensions for the sizes of Lute around 1700. Admittedly, the source is English, but it is clear that Talbot had a lot of contact with continental players who favoured the type of lute played by Baron, rather than the 'English two headed Lute', which he lists separately. Two instruments are described, giving open string lengths of 71.0 and 68.6 cm.

The other source of evidence for the correct size of lute in the 18th-C. is found in the instructions of von Nadolt (Die Aller Treueste Verschwigneste ......... Freindin, Vienna 1701). Although he does not give any physical dimensions for the different sizes of Lute, his description of their relationship is invaluable for
determining the proper size of the common lute. What he has to say is so important, that I think it useful to give the relevant passage in full (and I'd like to express my thanks to Bill Samson for his help in the deciphering and translation):

'Veillen D la Sol re PRIMI THONI, auss welchen dieses erste Lautten CONCERT gemacht, is es auch zu einem anfang dieses ganzen Werckhs hieher gesezet worden. Dises CONCERT wird mit drwyen unterschiedlichen Lautten gespillet: die erste, so dem SOPRAN führet, muess ein sehr kleine Lautten sein, und wird wenigsten umb einen halben THON höher, als CORNET gestimmet; die anderte muess schon wass grüssersa, und also ein mittere Lautt sein, wird umb einen ganzen THON niedere gestimmet, wird also diser Lautten Sexter Chor nach der klein sibenden Chor gleich gestimmet V:G:

Die dritte, so ein reicht grosse ORDINARI Lautten sein muess, wird umb zwaj ganze und einem halben THON niederen gestimmet, wird also diser Lautten xexter Chor nach der klein Lautten neunten Chor gleich gestimmert, V:G:

Von Radolt tells us that his smallest lute ('ein sehr kleine Lautten') is pitched at least around a semitone above Cornet-Ton and that the proper large common lute ('ein reicht grosse ORDINARI Lautten') is pitched two and a half tones below this instrument. Now, either von Radolt's Cornet-Ton is a semitone above Chor-Ton, in which case the proper large common lute would be at tief Cammer-Ton; or it would be virtually the same as Chor-Ton, in which case the instrument would be pitched even lower at around the old French pitch. In either case, a lot lower (a whole tone to a minor third lower) than the pitch Eph believes was Baron's 'Kammerton'. If Cammer-Ton was about a semitone under modern pitch then, taking a lute string pitch-
length product of 223 m/sec., gives a string length for the
proper large common Lute of around 72cm for an instrument
in tief Cammer-Ton to 76cm in the lower old French pitch.
An instrument with a string length of 68cm would then be
pitched at Cammer-Ton. These figures fit uncannily well into
the range of sizes of extant 18th.C. lutes given earlier and
also with my estimate of Baron's instrument.

Summary

If generalisations about pitch in early/mid 18th.C.
Germany have any use at all, then a Chor-Ton of around a
semitone over modern pitch (rather than a whole tone) is
not only consistent with the information Mendel presented,
but also fits with other material he overlooked or found
difficult to reconcile with his own view.

The proper and common size of Lute in Germany during
the 18th.C. had an open string length of around 72cm and
would usually be pitched at tief Cammer-Ton (about a tone
below modern pitch).

The lute played by Baron had an open string length of
around 68cm and was, as he tells us, pitched at Cammer-Ton
(about a semitone below modern).
The stringing of a baroque guitar

Patrizia Frisoli's article in the Galpin Society Journal (1) described various paper patterns associated with Antonio Stradivari and now lodged in the Museo Stradivariano in Cremona. One of these (pattern No. 375) is of particular interest, since it gives the only extant description of the first 10 strings (5 course) for a theorboed guitar (Chitarra Torbata) and, indeed, represents almost the only information we now have about the stringing of early guitars.

In the original article, the Italian terms 'un cantino da violino' and 'un canto da violino' were both translated as 'a violin first string'. Regrettably, this interpretation has led to a belief, amongst many writers on the subject (2), that the instructions indicate almost the same diameter for each string of an octave course or, that the 5th course strings were both at the upper octave. In fact, a better translation would give 'a small treble (string) of a violin' and 'a treble (string) of a violin' (i.e. the 1st and 2nd strings respectively). The instructions for stringing the guitar then become:

1st & 2nd strings: like two guitar first course strings
3rd & 4th strings: like two guitar second course strings
5th & 6th strings: like two large violin first strings
7th string: a violin second string
8th string: a guitar second course string
9th string: a thickest possible violin second string
10th string: a violin first string
Sacconi (3) believed the manuscript hand to be that of one of Stradivari's sons. Although Stradivari lived until 1737, Hill (4) thought that from 1725 he was obliged to delegate much of the work to assistants. The description of stringing on the pattern could well date from around that time and thus be applicable to late 17th as well as to early 18th century Italian instruments.

**Early 18th century Italian violin stringing**

It may be thought a simple task to determine the stringing of this guitar by substituting the sizes of violin strings. Unfortunately, not a great deal is known about the size and tensions of violin strings in early 18th century Italy. The best information is found in results of experiments conducted by Giordano Riccati in 1767 (5). Riccati's figures have been analysed by Patrizio Barbieri (6), who calculated the string sizes as given in Table I.

There is also the second-hand report by Fétis in 1856 (7). He was told, by the violin maker J.B. Vuillaume (1793-1875), that in 1734 Tartini discovered the tension of all four violin strings amounted to 63 livres (30.3 kg). Although this seems rather high, when compared with modern stringing (not to mention modern 'baroque' stringing), there is Wagneret's account of 1702 (8) stating that the Italians used much larger strings than the French. Indeed, there is some evidence to suggest that Tartini's tension was high, even by Italian standards: in a letter to Tartini in 1743 (9), Count Gianrinaldo Carli praises him for employing thicker strings than normal. For what it's worth, modern 'baroque' fiddlers generally string their violins to give a total tension around 16 kg, for the Italian as well as the French repertoire, and modern violin stringing gives a
Nevertheless, to give some indication of the possible variation in 18th century Italian stringing practice, it is instructive to develop violin string sizes by considering 'Tartini's' tension. These results are also given in Table I.

In order to perform the calculations, the following assumptions have been made: Equal tension on all strings (as advocated by Serafino Di Colco in 1690 \(^{(10)}\) and by Leopold Mozart in 1756 \(^{(11)}\)); open string length for the early 18th century violin around 32cm (suggesting a highest reasonable pitch at about modern); a large violin first string about a semitone tension step higher than normal; a biggest possible violin second string about three semitone tension steps larger than an ordinary second.

<table>
<thead>
<tr>
<th>String</th>
<th>Pitch</th>
<th>'Tartini's' stringing</th>
<th>Riccati's stringing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>e&quot;</td>
<td>0.66mm</td>
<td>0.69mm</td>
</tr>
<tr>
<td>2</td>
<td>a'</td>
<td>0.95mm</td>
<td>0.89mm</td>
</tr>
<tr>
<td>3</td>
<td>d'</td>
<td>1.45mm</td>
<td>1.09mm</td>
</tr>
<tr>
<td>4</td>
<td>g</td>
<td>(2.18mm)</td>
<td>(1.65mm)</td>
</tr>
<tr>
<td>Large violin 1st</td>
<td></td>
<td>0.70mm</td>
<td></td>
</tr>
<tr>
<td>Biggest violin 2nd</td>
<td></td>
<td>1.13mm</td>
<td>1.06mm</td>
</tr>
</tbody>
</table>

Finally, there are, of course, the fragments of strings left by Stradivari (or rather, by his sons) which are in the Museo Civico, Cremona. However, since these are not properly...
identified, any conclusions based on them must be hopelessly speculative.

**Determination of the guitar stringing**

The open string length of the theorboed guitar described on the pattern is not given. However, by comparing the stated fingerboard length of 320mm (12) with that of another pattern (No. 374: fingerboard length 363mm; open string length 775mm) the open string length may be estimated at 683±5mm. With this string length, the maximum reasonable working pitch of the highest string would be around $e'_b$ (at modern pitch). Taking this together with the figures given in Table I and applying the stringing instructions leads directly to the results shown in Table II.

<table>
<thead>
<tr>
<th>Table II. Violin stringing applied to the guitar</th>
</tr>
</thead>
<tbody>
<tr>
<td>String</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>5 &amp; 6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>9</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>Average tension</td>
</tr>
</tbody>
</table>

Assuming the tension of the first and second course strings to be around the average tension and that of the third course (3.3Kg), applying the instructions for the eighth string gives the guitar stringing and tensions shown in Table III.
### Table III. Stringing of the theorboed guitar

<table>
<thead>
<tr>
<th>Course</th>
<th>String</th>
<th>Derived from 'Tartini's' stringing</th>
<th>Derived from Riccati's stringing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Diameter mm</td>
<td>Tension Kg</td>
</tr>
<tr>
<td>1</td>
<td>1 &amp; 2</td>
<td>0.42</td>
<td>3.3</td>
</tr>
<tr>
<td>2</td>
<td>3 &amp; 4</td>
<td>0.55</td>
<td>3.3</td>
</tr>
<tr>
<td>3</td>
<td>5 &amp; 6</td>
<td>0.70</td>
<td>3.3</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>0.95</td>
<td>3.4</td>
</tr>
<tr>
<td>&quot;</td>
<td>8</td>
<td>0.55</td>
<td>4.5</td>
</tr>
<tr>
<td>5</td>
<td>9</td>
<td>1.13</td>
<td>2.6</td>
</tr>
<tr>
<td>&quot;</td>
<td>10</td>
<td>0.66</td>
<td>3.6</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>33.9</td>
</tr>
</tbody>
</table>

* It is important to note that the above table gives the unstressed string sizes, in practice the diameters should be slightly increased (particularly of the smallest strings) by about 0.03mm (0.001") to allow for thinning when stretched.

**Conclusions**

The speculative nature of some of the previous analysis means that few unequivocal conclusions may be drawn. Nevertheless, it can be said that the nominal tension level roughly corresponds with modern practice (for what it's worth, I usually aim for a nominal tension of around 3.0Kg on this size of guitar i.e. rather higher than on similar sized lutes). Further, by equating the highest strings of the theorboed guitar with those of a guitar, the instructions tell us that these highest strings are also appropriate for an ordinary guitar in the early 18th century.
There is, however, one particular feature over which there must be rather less doubt: the highest string of an octave course is at a greater tension than nominal with the lower string being at or a little below nominal. The strings of an octave pair are typically separated by about 3 semitone tension steps. How this relates to the earlier 17th century practice (or, indeed, to contemporary 18th century practice (13)) where the fifth course strings, and frequently those of the fourth, were both at the upper octave is a matter for conjecture. Corbetta told his Italian readers to use a thin lower octave string on the fourth course to play the Frenchified music in his 1671 collection (14), but whether this was merely instructing them to depart from the usual Italian practice of unison stringing, or whether it is advising them to use an even thinner lower octave string than they might otherwise employ with this sort of stringing, must remain an open question.

2. E. Segerman: A closer look at the pitch ranges of gut strings (FoM44 Comm. 632, July 1985)
3. S. Sacconi: I 'segreti' di Stradivari (Cremona, 1972)
5. G. Riccati: Delle corde ovvero fibre elastiche (1767)
6. P. Barbieri: Giordano Riccati on the diameters of strings and pipes (Galpin Society Journal, April 1985)
Lindley's book "Lutes, Viols & Temperaments" mentions geometric means as a way of generating equal-tempered fretting. The new book by Coates "Geometric Proportion and the Art of Lutherie" gives very brief explanations of arithmetic, geometric and harmonic means, and of golden sections. I wanted to know more and so figured out the following table.

The term 'golden mean' is usually used as a contraction of 'golden-mean point', equivalent to 'golden section' or 'golden cut'. This refers to a geometrical mean point between two points, rather than a length or number that is a mean between two other lengths or numbers. I have here defined 'golden mean' as the latter, like all of the other means, as generated by a golden cut of the lengths f+g and d+e.

The formula for \( f/(f+g) \) for the geometric r-mean gives the nut-to-nth fret distance on an equal-tempered fingerboard if we put \( a/c=1/2 \) and \( r=n/12 \). The same formula gives a point on a pattern with parallel sided diamonds on a baroque violin fingerboard if a and c are the fingerboard widths at each end and \( r \) is the fraction of the fingerboard length for the same point on that pattern drawn in a rectangular frame.
**MEANS (b) BETWEEN c AND a**

Name of type of mean
- Characteristic relationship

**Equation of relationship**
- Algebraic solution for b

\[ \frac{f}{g} = \frac{d}{e} = \frac{c - b}{b - a} \]

\[ f = \frac{d}{e} = \frac{c - b}{b - a} \]

\[ \frac{g}{f+g} = \frac{d+e}{c-a} \]

**Additional geometric characteristics**

**Diagram** (with c = 2a)

**Mean between b and c:**
- called 1/4 mean from c
- or 3/4 mean from a

**Generalized r-mean from c**
- or (1-r) mean from a

\[ \frac{f}{g} = \frac{d}{e} = \frac{r}{1 - r} \]

**Not straightforward**

<table>
<thead>
<tr>
<th><strong>root mean square</strong></th>
<th><strong>arithmetic</strong></th>
<th><strong>geometric</strong></th>
<th><strong>harmonic</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>[ \sqrt{\frac{c^2 + a^2}{2}} ]</td>
<td>[ \frac{c + a}{2} ]</td>
<td>[ \sqrt[3]{\frac{c}{a}} ]</td>
<td>[ \frac{2ca}{c + a} ]</td>
</tr>
</tbody>
</table>

**golden**

**differences in golden ratio: \( \phi \)**
- (where \( \phi = \frac{1 + \sqrt{5}}{2} = 1.618 \))

\[ \frac{b - a}{c - b} = \phi \]

\[ \frac{c + \phi a}{1 + \phi} \]

\[ \frac{c - b}{b - a} = \phi \]

\[ \frac{c + \phi a}{1 + \phi} \]

**intersection of diagonals of cdfag is on b**

**not straightforward**
RUCKERS DOUBLES
- a survey of the theories

This article was sparked off by John Shortridge's short but ingenious contribution to the last quarterly.
Let me lay out the most important arguments, hopefully in a more transparent fashion than has been done hitherto.

Some definitions

In what follows, when I talk about the C-keylevers, I mean the keylevers that lie to the left of the group of two sharp keys. When I talk about the note C, I mean the note sounded by the 14 inch string, or its octaves, on a Ruckers harpsichord when tuned in the manner Ruckers intended. Similarly, by an F-keylever, I mean the one to the left of the group of three sharps, etc. I will assume that the Ruckers intended a mean-tone system of tuning to be adopted, in which the note a major third below the note C would be called A-flat, while the note a major third above the note E would be called G-sharp. G-sharp would be slightly lower in pitch than A-flat. (On a single Ruckers keyboard only one of these would be present). The centre sharp of the group of three sharps I will arbitrarily label the G-sharp keylever, without prejudice to the pitch it may have sounded. Likewise the E-flat keylever. On the commonest size of Ruckers harpsichords and virginals (the six-footers) the C-keylever sounded the note C.

By the written note C, I mean a notation such as \[ \text{\textbullet C} \]

To set the scene, we should keep in mind that we cannot take it for granted that a given player at a given time will respond to the written note C either by striking the C-keylever or by sounding the note C. He might do either, neither or both.

The Problem

The two manual harpsichords made by the Ruckers had their keyboards aligned so that the C-keylever of the upper manual sounded the note C, while this note was sounded by an F-keylever on the lower manual. This was achieved by making the plucking mechanism - the jacks - of the lower manual pluck the same string as that of the upper manual. This pattern was then repeated for the rest of the notes of the instrument, with the exception of the lower manual G-sharp keylever whose jacks plucked a different string from those of the E-flat keylever of the upper manual with which they were aligned. (Two strings were crammed into the space of one). Now if you take two ordinary Ruckers keyboards (C/E-c'') and align them in this fashion the lower one will carry on in the bass after the other has finished and the upper one will carry on in the treble. The Ruckers extended the range of the lower manual to f' in the treble, but did not extend the range of the bass of the upper manual.

The problem is to understand what this instrument was for. There follows a number of speculations, not all mutually exclusive, with pros and cons.

First hypothesis

Players of the period wishing to play a piece of music the first note of which was a written C were in the habit of pressing the C-keylever on their keyboard. Doing something else (like pressing the F or G-key lever) would have been considered a more advanced technique - transposition. In many circumstances (such as when accompanying
singers whose best ranges differed by half an octave) it was considered desirable to transpose, so the Ruckers built these harpsichords so as to eliminate the need for the more advanced technique. The G-sharp keylever of the lower manual sounds G-sharp, while the E-flat keylever of the upper manual sounds E-flat (possible because they are sounding different strings), so that if the piece of music uses either the written note E-flat or the written note G-sharp or both, the piece will sound in tune whether transposed or not.

This is my understanding of the explanations given in the literature until recently (van Blankenberg, Marcuse, Russell, Hubbard). What are the arguments for and against this hypothesis?

In favour:
There are not many published arguments in favour of this hypothesis, other than 'what else could it be for'. Here are two though.

The Ruckers wrote the note names in ink on the tails of the bone naturals of their keyboards (they are generally very faint today, but usually visible on the little used notes). They wrote C on the C-keylevers, both of the upper and lower manuals. So the fact that they wrote C on the C-keylevers lends weight to the idea that they might have found it tricky to play this keylever in response to the written notation G.

A second argument is that van Blankenberg (1739) said that this was the purpose of the Ruckers doubles. Hubbard pointed out that van Blankenberg was nearer to the Ruckers time than we are, so perhaps his opinion should carry more weight.

Against:
The use of additional keyboards to achieve a transposition is unnecessarily elaborate; shifting keyboards sideways was well known. (To counter this, perhaps speed was of the essence; in particular retuning the E-flats would be necessary if the new piece of music called for them)

Even if the extra keyboard was thought desirable, the extra jacks were surely unnecessary, all that was needed was to couple the keyboards, rather like the Mother and Child's were coupled.

Transpositions of a fourth, and particularly a fifth were much easier ca 1580 than ca 1680 let alone ca 1980 (because of the vocal training, clef systems, musical style etc).

The lower manual is equipped with extra keylevers in the treble, going up to f". These keylevers would be useless to someone who could only play the notes as written, since these notes weren't written.

The other two manual Ruckers instruments weren't made for transpositions. These were the Mother and Child and the harpsichord with virginal, so the transposition theory turns the two manual harpsichord into a special case.

Van Blankenberg discusses two sorts of obsolete Ruckers instrument: the double harpsichord and the muselaar. He says that the muselaars are unplayable, this despite their being the most popular type the Ruckers made. Clearly then he was not in touch with the Ruckers' thinking on instrument design. He also himself says that he finds it incredible that they could have made instruments for transposing, but, he says, the proof is that they made the keyboards unaligned.

Second Hypothesis

Harpsichords were much used for accompanying singers. A player would learn by heart
an accompaniment, and having got it under his fingers, would find it difficult to play it on the same instrument at a different pitch, as might be desired by another singer with a different voice range. The Ruckers double harpsichord solves this difficulty.

In favour:
This hypothesis is different from the one above, in that it does not require the idea that the players were so wedded to the notation of a piece that they felt constrained to start a piece with notation C on a C-keylever. The players are assumed to be wedded to the idea that the G-sharp keylever sounds a major third above the E-keylever, so the doubled strings are required.

Against:
Most of the previous objections still apply.

Third Hypothesis

The keyboard players of the period were completely fluent in transposition, so that switching from one keyboard to the other was no more alarming than encountering a change of clef. The instrument was designed with the idea of providing two instruments in one case; the keyboards are used for different tone-colours, which is achieved by plucking the strings with different ranks of jacks, giving brighter or darker timbre. The upper keyboard is not extended in the bass because this would destroy the familiar C-short octave of the upper manual and/or because the resultant compass would be outlandish. Having the C-short octave of the upper manual present made the upper manual just like the common six-footers, so that one could use one’s familiar fingerings in the bass of this instrument. Having been invented, the design is supposed to have persisted either because Hans Ruckers sons were businessmen and salesmen and not innovative instrument designers, and/or because the instrument had a number of useful features eg:

- the two keyboards could be used for echo effects, like the Mother and Child (by setting the 8' on one manual and the 4' on the other).

- the presence of the doubled strings at E-flat G-sharp made available one extra tonality in real terms. That is, on Ruckers six-footer one can sound the note E-flat or D-sharp but not both, by tuning the 8' and 4'strings controlled by the E-flat keylever to either note. The double harpsichord has doubled 8' and 4' strings at this point, so both notes are available by changing to the other set of jacks and the other manual, instead of having to retune. Which way round you tune the doubled strings does not affect the number of different notes that can be achieved on the instrument. All this affects is whether the note E-flat is obtained by pressing the upper manual E-flat keylever or by pressing the lower manual G-sharp keylever. The special alignment of the keyboards made it possible to achieve this extra tonality without breaking a presumed attachment to the idea that the G-sharp keylever should sound a note a major third above the E-keylever.

In favour:
The other two keyboard instruments were separate instruments of different pitches in one box or joined together. The instrument looks and sounds like two instruments in one box.

Against:
The same pitches and tone-colours could be achieved by putting all four jacks on the same keyboard. (Some argue that this would have made the action undesirably heavy).
Chromatic bass Double harpsichords were also built, and these also had notes missing in the bass of the upper manual. The argument about the familiarity of the C-short octave in the bass would not apply to these.
The registers in the double are placed close together. If the idea was to have the two keyboards sound differently, why not space them apart to get more dramatic contrasts? (A quantitative discussion of this point is given in (4), but actually playing the instrument is more convincing for most people.)

Fourth Hypothesis (5)

John Shortridge suggested in the last quarterly that the purpose of the Double harpsichord may have been to provide a keyboard with major thirds between the B-keylever and the E-flat keylever and between the E-keylever and the G-sharp keylever on the upper manual, and, on the lower manual, between the G-sharp keylever and the C-keylever and between the G-keylever and the E-flat keylever. This would be achieved by tuning the doubled strings the opposite way round from that suggested by Leonhardt and published by Hubbard. That is the upper manual would sound the note D-sharp and the lower manual the note E-flat. The performer is presumed to have had a preference for playing written notes by pressing keylevers of the same name (i.e., not ‘transposing’). The implication is that pieces written in flats were intended to be played, or thought to sound better when played a fourth lower than pieces with sharps.

In favour:
A piece of music written with many flats would be played on the lower manual, with its darker timbre. A piece written with many sharps would be played on the brighter, upper manual. This would explain the origin of the association of flats with sombre music and sharps with bright music.

Against:
This arrangement would work even better if the keyboards were aligned, with two sets of double strings per octave. These could give the notes C-sharp, D-sharp, F-sharp, G-sharp and B-flat on the upper manual, and C-sharp, E-flat, F-sharp, A-flat and B-flat on the lower manual, that is the same distribution of the positions of the good major thirds as in the Shortridge hypothesis, but with two new tonalities available, rather than the one.

Pieces of written music of the period that use twelve distinct notes in the octave during the course of a single piece are quite rare, but they include E-flat and G-sharp in the same piece (1), which cannot be played on either of the two manuals. The commonest of the exceptional written notes in the English virginal literature are E-flat, D-sharp and G-sharp, rather than A-flat. To get the best match with this one would use aligned keyboards and one set of doubled strings sounding E-flat and D-sharp.

Fifth Hypothesis (2)

At the start of the 16th century melody instruments grew families about them (called sets or chests - viols, recorders, crumhorns etc). Music for a family of lutes started to appear in the second half of the century. In 1584 Adriansen published in Antwerp a book of music for lutanists, including pieces for a such a family of lutes. These were adapted from the vocal repertoire, with each lute playing the one voice appropriate to its size plus the bass line and chordal infilling. Lutanists too, it seems, wanted to join in the social part-music scene. The Antwerp makers at about this time appear to have developed families of harpsichords, spinetten and muselaaren, similar to the new family of lutes. As a matter of economy the very large 5-footer incorporated a 6-footer.
In Favour:
The arguments for the third hypothesis above.

Against:
This might suggest that the original idea was for two people to play on the two manuals at once, which may be difficult.
In the 1600 edition of Adriansen the pieces for a family of lutes playing together were dropped, so the popularity of this form had declined. Why should it have been different for the two manual harpsichord?

The Sixth Hypothesis (6)
Nicholas Meeus wrote a double article fitting the Ruckers double into the context of the theory of modes. I don't feel I can summarise his arguments.

Some background thoughts
I suspect that one of the crucial elements in the history of the Ruckers Double harpsichord was the personalities of Hans Ruckers, his sons Johannes and Andreas, and Johannes' nephew Couchet (the elder). Hans Ruckers was working at the time when the Flemish designs were being formulated and he may well have played a part in that. His instruments are few and comparatively expensively decorated. After his death his sons expanded the business enormously, separating to become two large businesses. From the distribution of the surviving instruments and from evidence of the constructional methods of the instruments it seems likely that most of the harpsichord makers on the guild roles in the 17th century were makers of parts for Ruckers instruments.

Let us consider two examples:
Consider the marking out of the registers on the Ruckers virginals. In order to ensure that the first and last jacks fell nicely inside the keywell on the virginals, the inside edge of the keywell was scribed onto the soundboard by a workman. This workman knew where to put these lines because the soundboard had been put into the instrument and marks transferred from the spine onto the edge of the soundboard. The man that scribed these lines used a pointed tool to do his work. Later this soundboard went to a workman who from these lines measured in 3/8th inch and scribed the line to show the edge of the jack slot itself. This workman presumably made the jack slots themselves, because the tool he used to make his line was a knife. The point being that a man whose trade is cutting mortices in leather has sharp knives to hand, but not sharp points, while the man who does marking out on wood would deem the sharp point the natural tool. (Cheaper, less maintenance...)

Another pointer to the organisation of the work is the numbering of the parts by the Ruckers. The instruments were not being mass-produced in the sense that parts should be interchangeable. But neither were they being made sequentially so that only one set of parts would be present at a given time (which would have obviated the need for serial numbers).
There are no clear signs of innovation in the output of Johannes' and Andreas' workshops. It is reasonable to suppose that their personal qualities lay in the management of craftsmen, and in all the organisational headaches of running a business in a country periodically blighted by the long running civil war. It is quite possible that compared with an individual craftsman maker they were rather inflexible in paying attention to their customer's demands. As long as their instruments filled many people's (possibly diverse) needs they prospered. Some things were within their scope: they could and did make keyboards to c'''' or d'''' (Hans had done this as well); they could and did make instruments with chromatic basses (for the English and French). But if you asked them to alter an instrument already built (3) you would be told no. Altering an instrument is not at all the same thing as production. Andreas and Johannes were into production. Their success may have been launched by the soundboard design - that may have been enough. When people started using their double harpsichord for echo effects they may well not have reacted by altering its design to make such a thing easier. Likewise with any other use it may have had. From my experience with playing a copy of one of these instruments, it seems to me that generally the lower manual would have been used for a lush full sound (a little tiring if overdone) while the upper manual gave the crisper sound of a normal six-footer. It may have been that beginners used it to 'transpose'; or that seasoned professionals did the same when they thought that the sound of the other manual suited. Certainly, it would seem likely that it would be used to achieve one more 'transposition' than was usually available (transposition by minor-third for instance, reduced to transposition by a tone by switching manuals); should the need have arisen. But I think it would be vain to look to one such practice as the sole explanation for the design or even popularity of the instrument.

The Demise

So what did Couchet, the next generation, do? What was he like? Remarkably, there survives (7) a letter by him. He is telling a customer who has persuaded him to make an instrument with two 8' sets of strings that he doesn't like it - he prefers the traditional Ruckers 1x8', 1x4'. This is no way to make your customer feel happy about his new harpsichord! We have other evidence that he is responding to demands from customers. Duarte says explicitly that the now deceased Ruckers didn't pay attention to the niceties of the action on the large instruments. I think it is reasonable to interpret this as indicating that Old Ruckers didn't pay attention to the likes of Duarte! they were producing a quality product of great consistency, and weren't interested in new fangled ideas. Couchet certainly made 'deviant' instruments. His single of 1645 has a narrow octave span (a fussy customer with small hands?), his double of 1646 had a full width upper manual and no blue borders to the bridges. If the Couchets failed to produce a successful 2x8' harpsichord (perhaps because basically they didn't like the sound), then with the success of the baroque style (which seemed to be signaled by the onset of unison stringing) the dynasty was doomed.

Conclusion

I think that the whole problem can be re-cast as three questions:

1. Why was the instrument designed?
2. Why was the instrument popular for 50 years?
3. Why did it lose popularity?
Some of the hypotheses above work better for some of these stages than others. For example the first hypothesis is very poor on (1), passable on (2) and fair to poor on (3). The fifth and sixth hypotheses address themselves to (1) but not (2). The fourth hypothesis is rather radical, but could have been a factor in (2). I'm not so sure about the part such an idea may have played in (1) or (3).

The third hypothesis does well on (1), but only fair on (2), because one would have expected a greater variety of instruments along these lines. For example, putting the jacks on one keyboard. There is a Couchet from 1679 which has three of the sets on one keyboard playing 1x8', 1x4'. (Another instrument of the period, a non-Ruckers double, had narrow keyboards aligned and 1x8', 1x4'). Why didn't the Ruckers rationalise the design along some of these lines? Perhaps the other hypotheses offer a clue; the double had different advantages for different people, and the Ruckers were content to maintain a wide applicability.

So perhaps we can say

1) The design arose because the Ruckers wanted to build two contrasting instruments into one case, as part of a movement towards building instrument families for chordal instruments.

2) The design persisted because there were many features that could be exploited by various people, and because the Ruckers were unwilling to specialise the design to suit any one of these features.

3) The design was eclipsed because as the Baroque style took hold in Northern Europe, the Ruckers' competitors introduced a double with a third set of strings (perhaps thinner ones), dramatically altering the tonal ideal.

1) For example the Galiarda by Byrd, FWVB II p47
2) E. Segerman, private communication
3) As Francis Windebank did in the famous letter (Hubbard p 232)
4) My article in OSJ vol 37, (1984)
5) FoHMRIQ 40 Comm 623 p62
6) FoHMRIQs 6 and 7, Comms 45 and 57

The central theme of the booklet published by Cary Karp (I) is the "pitches of 18th. century strung keyboard instruments". He did not restrict his study to that one and same problem, but provided us with Swedish documents he kindly translated in the appendix. These latter are a most valuable contribution to the history of wire making in Europe. I'm pleased to see that C. Karp based his study on a number of historical written sources. Therefore his work does not appear as an agglomerate of hypotheses, suppositions or "personnal solutions", which, when happening, teaches us more about the authors of such frail structures than about the questions discussed.
Historians of Science and Technology know that they cannot reach their goal without long collecting and patient studying of historical documents on one side, and without taking the closest look at earlies objects on the other side. In the present case, it's a matter of sources referring to wire drawing and of the samples of old wire found on the instruments. Both these steps have been taken by C. Karp and he gives us an idea of what is supposed to be the Swedish gauge system used by instruments makers of the late 18th c. and early XIX°th c. in his country.

Historians of Science and Technology know also that their conclusions remain more often under suspended sentence until a document is discovered and opens up new ways. The documents used by C. Karp would lead all of us to more or less the same conclusions. They do not mention that it could be possible that music wire made in other countries than Sweden was available to the Swedish masters at the time.

The document I found recently re-opens the whole question.

During the years 1765-1766, Johann Beckmann did a lot of travelling through Sweden and, as usual, kept his personal diary. This manuscript was unknown until Th. M. FRIES published it at Upsalla in 1911 (2). Beckmann had a talent for observation and wrote down a lot of very interesting facts. On page 58 of the Fries edition, Beckmann describes the visit he made on the 12th of September 1766 at the brass-factory established in Blurfors, near Awestad. Among many technical data, Beckmann explains that "eine grosse Menge von Messingdraht geht jährlich nach Frankreich & c., woher ein guter Theil wieder zurück gekauft wird, wenn vorher zu den feinen Clavir Sei- ten gezogen worden."

"A good deal of brass wire is exported every year to France & c., and a large part of that is re-imported after having been converted into fine music wire."

What credibility give this report of Beckmann? We have to wait until the commercial documents are found in the archives, which could eventuaily confirm Beckmann's assertion.

It would be too long to enumerate all the questions raised by this excerpt. One can regret that Beckmann does not give more information about the places in Europe where this re-imported music wire was made: France & c....

My conclusion is that such phrases are nonetheless of great interest for the researcher. They are invaluable signposts to the historian whose aim is to describe the ancient realities, not as they could have been, but as they were.
