FOMRHI Quarterly

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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.
FELLOWSHIP of MAKERS and RESEARCHERS of HISTORICAL INSTRUMENTS

Bulletin 40

January, 1967

I'm using a smaller print than for the last two or three Bulletins because I'm coming to think that 12 pitch looks a bit better on this machine than 10 pitch, and it saves space. If you don't like it, please let me know.

Maggie, Eph and I would like to return the good wishes that a number of you sent with your renewals, and we'd like to wish you a happy new year, too. We are grateful for your appreciative comments, and also (on my part anyway) to those of you who say 'keep FoMRHIQ as it is'. We and a number of members are grateful, too, to those of you who sent donations to help those who cannot send us money. We get many letters from them, thanking us (and you) for sending them FoMRHIQ and saying how much they value it. I met some of the Czechoslovakian members a couple of years ago when I was over there for a conference, and I'm hoping to meet some of the Russian members this year, if the Galpin trip comes off. This is always a pleasure, certainly for me and they say for them, too, and if any of you are ever in any of those countries where contact with the outside world is difficult, please do get in touch with your fellow-members. One of our East German members, Bernd Deja, has just moved to a new flat (new address in this Supplement) and would welcome visitors — he has plenty of room, he says. He has suggested a new member (also in this Supplement), and we always welcome such suggestions for members in any part of the world (it's not just one area) which won't allow people to send money abroad. Finally, on this point, if you belong to any other societies and have any influence with them, try to persuade them to do the same, to ask their members or subscribers to add a bit so that free copies can be sent to such people — it really is enormously appreciated, and of course we benefit, too, when they send us information, as many of them do.

Talking of renewals, we've had one anonymous one! Some poor so-and-so has sent us his or her money and isn't going to get FoMRHIQ because there is no name on the renewal form. I'll try to remember to mention this again next October, but in case I don't, please try to remember it yourself, and don't follow his or her example.

LOST MEMBER: Another example not to follow — do send us your new address when you move. If any of you see Christopher Gray, last heard of at 10 Craighall Crescent, Edinburgh, please tell him that I've got his October Q here. And nobody has given me an address for Gerardo Parrinello, yet (lost member in last Bull.), so he's without July and October.

BACK ISSUES: I made a mistake in the last Bulletin (p.3): these cost £1.50 by surface. What Maggie put on the renewal form was right; I hope I didn't confuse any of you — apologies if I did.

FURTHER TO: Bull.45, p.6: Geert Jan van der Heide says that he has started to produce "low budget" or "practice" instruments, using seamless cylindrical tubing, instead of raising the tubing from sheet, but still with this hammered bells. "This makes it possible to keep the price down, without spoiling the authentic sound .... very suitable for people who want to become acquainted with the sound and playing possibilities of historical brass". Trumpets cost Hfl.1150; sackbuts Hfl.1550 (alto), 1650 (tenor), and 1950 (bass), all plus taxes and postage. Any more of you doing the same?
Bull. Supplement, p. 8: I wrote to Eph, saying that this Conference would be welcome in Oxford, if he wanted to hold it in the Bate. This he has decided to do, so there will be a FoMRfli Conference on Medieval Instruments and their Use, here in the Bate Collection at the Faculty of Music, St. Aldate's, Oxford, on Saturday, February 28th, starting with coffee at 10.30 am. Whether it will run on into Sunday as well will depend on whether we have all finished talking or not. It would be useful to know if you are intending to come, for reasons of space (note, please, The Bate Collection's new telephone number, Oxford (0665) 276139). If you want to come but can only manage the Sunday, ring me at home (in the List of Members) in the evening (say after 8 pm) on Saturday and ask if we are going on or whether we've finished. Known participants so far are Eph Segerman, Chris Page, David Fallowes and me.

Conn. 745: Nicolas Meews tells me that the two 9th century makers were, as I'd guessed, bell-founders: Daniel and Paterne, both from Tournai. He goes on: The building of a list of surviving instruments is a most important issue. It is odd that inventories have been made for musical sources or the iconography (RISM and RIDIM), but never at the same level for instruments. Quite a few lists do exist, for instance in Boalch, in Haine & De Keyser on Sax, in works on the major violin makers, etc., and of course in Museum catalogues. Collecting and updating all that would be of some interest; continuing with a systematic search for new information.

It's a very exciting idea, and I wonder whether it would ever be possible. I know that Ellen Hickmann has been doing something of this sort in part of Germany, but as far as I know nothing has been published yet. As you know, from previous Qs, Charles Mould is working on an up-date of Boalch, and many of us, including himself of course, have been feeding Phil Young with added information for his 2500 Historical Woodwinds, but whether he'll ever be able to persuade Pendragon to produce a second edition, I don't know.

Conn. 756: Rod Jenkins (whose 1986 Index appears in this issue; as always we are very grateful to him for doing this) writes:

I applaud Bill Samson' comments on the simple lute. The reason my interest in making musical instruments started was because I couldn't afford to buy a lute for a peripheral interest in lute playing, so on hearing about Charles Ford's book on Radio 3 I was away. As an amateur, and a dilettante at that, I am not really qualified to comment but here goes anyway. I guess that the ratio between the material and labour costs have changed so much that it would make little difference if a lute were made out of cherry or ebony. Skill has always been undervalued and it is my un-informed guess that the sort of middle-class people who make musical instruments are not prepared to accept the sort of renumeration that their equally skilled counterparts in such jobs as pattermaking or engineering have had to put up with ever since people started making things and selling them to others. This country, rightly or wrongly, is not prepared to pay for the aspirations of its workforce. If Bill wants a cheap lute then unfortunately I think that he has not to learn how to make a lute like a non-westerner, but has to learn how to live like a non-westerner. I shall be very happy to be proved wrong.
Comm. 763: Ken Williams writes:

On Comm. 763 Charles Stroom refers to the establishment of tolerances as being essential, and notes the common engineering practice assuming a tolerance of ± 50% of the final digit place unless otherwise specified. This works well when the surface finish of components varies little, but with wooden instruments the achievable tolerances vary not only from one to another but quite usually from place to place in the one instrument. With unlimited time correct values could be established, but in the meantime it’s worth noting that diametral variations of 0.2mm imply ± 0.1mm, which is too great a variation just as second decimal place is too small.

The question as to the correct method of bore measurement to adopt needs to be answered in each particular case, and examination of the profile of the 0114 head joint will reveal that from 75 to 125mm from the top the included angle of the bore ≈ 0°45', if a fixed diameter gauge were to be inserted here the radial wall pressure developed would be approximately 75 times the insertion pressure. With reasonable care direct diameter measurement is both more accurate and less likely to deform the bore surface. There are also cases where re-entrant and barrelled bores are more easily accessible by expansion gauging rather than the usual alternative using fixed gauges and inserted slipper gauges to enable extraction.

PLANS: You will find here a List of Plans from the Ruckers Genootschap in Antwerp. You may also find a List from Edinburgh — Arnold Myers sent me a very faint copy (which I will send on to Eph in case we don’t get a replacement in time and just in case it’s printable), but I’ve asked Arnold to send Eph a printable copy. It may not arrive in time because Arnold sent it to my home, which always takes a day or two longer than sending things here, in addition to which the post usually arrives at home after I’ve left the house. That’s one reason why FoNRH1’s address is the Faculty. Another thing that arrived at home was an anonymous review of one of Arnold’s exhibitions. I will send it up to Eph, in case he wants to print it, but I’m against it for several reasons: we don’t print anonymous material (except when I’m an idiot and lose the covering letter, but there wasn’t one with this); it’s printed right to the bottom of the sheet, which will cause problems (do please observe our instructions to contributors — see the back page of the List of Members); while I’m in favour of computers and word processors, I do draw the line at the ones that print F# instead of F#’. Still, let Eph decide.

Ken Williams suggested that it might be worth asking you what you thought of the plans he drew for the Bate (which many of you have bought):

I might be worth while to solicit some contributions from makers as to the values they ascribe to the measurements we’ve provided. I believe that most would use them or a reproduction based on them as a broad base for acquiring an insight into the approach of the originator, and they’d be quite surprised if it were thought that a performing duplicate could be produced with only the drawing to go on.

SOUNDBOARD WOOD AVAILABLE: John Wilson says that “the soundboard spruce from the Dolmetsch liquidation (?) which was at Marshall’s timber yard came to me shortly before Marshall’s themselves changed hands. I have no desire to sell all of it … as it’s pretty good stuff, … but it’s very unlikely that I could possibly use all that I have”. So, if you want to buy some of it, get in touch with him.
TOOLS AVAILABLE: Rod Jenkins again:
And talking of money, J. Stable & Sons, The Broadway, Queens Road Watford, Herts WD1 2LD have in their mail order tool catalogue a taper reamer that goes from 3mm to 12mm diameter in 84mm length, for about £3 (Fig 1590).
Just right for impecunious luthiers.

ARCHAEOLOGICAL INSTRUMENTS: Bernd Deja has sent me this cutting from the Tribune of 24th November about an instrument found near the town of Butzow, in the northern part of the G. D. R. Information might be available from the Schwerin museum named in the article.

The latest issue of Current Archaeology (no. 102 for November) has a very brief note, and a photograph, of a medieval (14th century) trumpet found recently in four pieces near Billingsgate in London. From the photo, it seems to be exactly what one sees as a long trumpet in 14th century manuscripts, and it looks as though the mouthpiece is integral.

THEORBO-HARPSESICHORD: Uta Henning has sent me an unprintable note (typed in red in a small format) saying that further to her article in Early Music, October 1982, Rudolf Richter has built a theorbo harpsichord. It's too long to retype, so if you want more information, ask Uta.

QUERIES: Peter Berg of 8 Park Lane, Broxbourne, Herts EH10 7NA (this is NOT our member of the same name) is trying to follow up a half-heard reference to Tudor craftsmen 'singing their tools', ie singing the names of their tools. Can anyone throw any light on this practice or give him any further information? I'd be interested myself to know how long such a practice went on, and whether anybody has encountered it in recent times.

Publications: In case some of you aren't on their mailing list, you should know that London Pro Musica Edition have started a subscription Early Music Library. Batches of six titles will appear quarterly; the subscription is £22 a year, which will save you about 40% of the retail cost of the music (which will be available in the normal way, also) but if you can get in before the end of January, there's a £2 discount. You also get 10% off LPM's
other publications (not so attractive; you do anyway if you order with reasonable speed). The final attraction is considerable discounts on Early Music Library material ordered in bulk (eg for choirs, schools, etc). All music will appear in score, with the same number of scores as there are parts (ie 4 scores for a 4-part piece, and so on). It sounds a good bargain. Their address is as for Bernard Thomas (their editor) in our List of Members.

The Centrum voor muziekinstrumentenbouw, in association with the Brussels Conservatoire Museum, has launched a new quarterly called Celesta. Lode Bauwens is one of the editorial team. It’s in Dutch (with very brief English summaries on an inserted sheet). Subscription is 350 Belgian francs in Belgium and 450 abroad. If you read Dutch and want to know more, write to Lode (address in the July Supplement).

The Bate Collection is publishing the first real Appendix to the 1976 Catalogue. This covers the end-, notch-, and duct-blown flutes. It includes everything of those types acquired since 1976 (including Edgar Hunt’s and other recorders, etc), and also, because Anthony Baines decided not to include them initially, all modern reproductions and all folk and non-European instruments of those types. Copies will cost £1.00 (including surface postage) for a 12-page FoMRFHIQ-style (but full-size, not reduced) A-5 leaflet. I haven’t printed it yet because (once again) I think I’ve found a source of carbon-film ribbons for this machine, and they haven’t yet arrived (which is why this is printed with fabric, not carbon), but it will be in print before you get this. It will be followed by other appendices as rapidly as I can produce them. This is (I think) the biggest single growth area, so it was worth doing separately. What groups of instruments other appendices will cover will be decided when they are compiled. Information is roughly comparable with the 1976 Catalogue. The next major job, after everything has appeared in similar appendices, is a Catalogue Raisonnée.

AIDS: The Minister for Employment has sent me, and all employers (which I think they assumed I was as your Hon. Sec.) an official booklet about this disease. There is only paragraph that seems to relate to us (and, at that, only to some of us): “Potential risk arises only where the blood, semen or other body fluids of an infected person can enter another person’s body, for example, through an open wound” and it goes on to mention that special mouthpieces are available (only to be used by properly trained people) for mouth-to-mouth resuscitation. So far, I gather, there is no proven case of transmission through saliva, and the leaflet says quite specifically that “cases of transmission have been recorded only from blood, semen and possibly breast milk”. However, wind players, wind teachers (who often have to blow a pupil’s instrument to see whether it’s the instrument or the pupil that’s responsible for that funny noise) and wind makers (whose potential customers obviously want to try an instrument before buying) need to be aware of the possible problems.

COURSES: The Vereniging voor muziek en instrumentenbouw (our Dutch opposite number) has sent me their usual massive list of courses for 1967, which covers not only all the Bouwerskontakt courses for makers, but many for players also. Many of the courses are just one day, but some are longer, a weekend or a week. If you’re interested in a working and pleasure trip to Holland ask them for a copy (under Bouwerskontakt in our List of Members), or look at mine if you’re within reach of Oxford. Incidentally, there’s a picture of Sverre Kolberg teaching on p.34, if Eph or anyone else still doubts his existence.
Barbara Stanley has sent the following note:

The Breiteiche Summer Courses had a very successful first year ('86) in their new venue, Stift Geras. The 1987 courses (each of 2 weeks or less) will run between 12.7 - 16.8. ForFMHI members may be interested in the introductory woodwind instrument making course, tutored by Alec Loretto and Barbara Stanley. Participants make (and finish!) a renaissance treble recorder and either a renaissance tenor flute or cornamuse. The course gives a good introduction to the relevant woodwind-making techniques, woodturning and reed making. There is also a day excursion to Vienna to examine the instruments in the Kunsthistorisches Museum. Concurrent courses are: Advanced recorder making (Alec Loretto), medieval and renaissance ensemble playing (Kees Otten), historic dance (Helga Hill), and viola da gamba consort (Alison Crum). For further details apply: "Breiteiche Courses in Geras", Stift Geras, A-2093 Geras, Austria.

There's a players' course for figured bass; harpsichord; clavichord & harpsichord (taught by Bernard Brauchli); recorder; gamba, and baroque violin at Annecy-les-Bains in April. The course costs 770 FF, with accommodation on top. Further information from ADDIM 74, 18 avenue de Tréasum, F-74000 Annecy, France.

I've already told you about the Bate Collection Early Bassoon Weekend on February 21st and 22nd, with Andrew Watts and Paul White. There will be two Weekends in the summer: a Gamelan Weekend on May 16th & 17th, open to beginners as well as the experienced (but numbers are strictly limited because there are only so many instruments to sit at in a gamelan, so prior booking is essential for once), and a Flute Weekend with Lewis Jones on 30th & 31st May. I had hoped to organise an early oboe summer school, but we could not find compatible dates; another year perhaps.

ForFMHI MEDIEVAL CONFERENCE: See above, at the top of page 3.

EXHIBITIONS: The notice of the Boston Early Music Exhibition arrived just days after the last Q went off to the printer, and it may now be too late to tell you about it, since they say that applications, with full payment, must be in by 1st February. If you want to try it on, their address is Boston Early Music Festival Inc, P0Box 2632, Cambridge, MA 02238, USA. Perhaps next time they'll send their brochures out a bit further ahead. I don't know what size of crowd they get, but their stands aren't cheap ($325 per booth, or $100 to share with someone else).

MUSEUM VISITS: Would prospective visitors to the Bate Collection please note that our telephone number (and all those of the whole University) has been changed, and is now 0865-276139 (but please don't use it for ForFMHI business except the February 28th Conference); that's more easily dealt with by post since it has to be done in my spare time). That number is the Bate's own (a new departure); if there is no answer, try the Faculty number 0865-276125 (though, if I've remembered to switch it through, you should get shunted on to them automatically; we should have a lot of fun with the new system, and if it all works nobody will be more surprised than us).

INTERVIEW: I've been sent a photocopy of an interview with the flute and recorder maker Jean François Beaudin. He discusses why his instruments depart from the originals in a number of respects. If you're interested, it appeared in "The Recorder", Journal of the Victorian Recorder Guild, no.5, November 1986, 994 Drummond Street, North Carlton, Vic.3054, Australia.
DEADLINE FOR NEXT Q: All Fool’s Day, please, April 1st. Remember that it’s the April Q that has the List of Members with it, so make sure that your entry is correct and up-to-date, and if it isn’t, let me know by then. Any minor changes that you sent with your renewals have been noted, even if they don’t appear in this Supplement (a change of instrument, for instance, gets into the Organological Index, but I don’t usually bother to type in a new main entry just for that. It waits till next April).

Unless there’s anything new in tomorrow’s post, that’s it (there was, but it’s all been built in; that’s the great joy of a word processor). I’ll be with you again in the spring.

Bulletin Supplement

Ephraim Segerman

DoMI Reviews: It seems that the philosophy of the DoMI Reviews here needs to be reiterated again and again because some people miss the beginning (see the first sentence of Slatford’s Comm in this Q). The overall evaluation of the Dictionary is very favourable and this is also true of each individual article unless stated otherwise. The reviews only cover errors and points of contention so that a possible future edition will be improved, with all of the deserved praise omitted. We don’t have the writing time needed (and could we afford the space?) to say all the good things.

FoMRHI Conference of Medieval Instruments and their Use: It is hosted by Jeremy at the Bate Collection (address on the front cover) starting at 11 am (coffee at 10.30) on 28th February). There is no booking, registration or fee. Seating capacity is 20 (30 at pinch). There will be no pity given to standees since they didn’t notify us about their desire to attend such a conference. Anyone wanting to be provided with equipment (eg tape or record player, slide or OH projector, etc) would be wise to check details with Jeremy well beforehand.

English 18th Century Pitch: John Cousin showed me his copy of "A New Musical Grammer and Dictionary..." (third edition) by William Tans’ur (London 1756), and pointed out the statement (p 83 in "Of the Organ") concerning "Concert or Opera Pitch for a Vocal Performance": "The Lombardy and Venice Pitch is a tone higher than ours, or theirs in Rome." Tans’ur gave detailed measurements of a pitch pipe to sound C fa ut at this standard, and John has promised to make one. I expect it to be a tone below modern because I think that this was Roman pitch. Taylor’s (1713) harpsichord pitch determination of a’=383-90 Hz indicates that 17th century Consort Pitch (mentioned by Mace and deduced to be about a tone below modern) continued into the 18th century, and Tans’ur’s statement seems to indicate that it continued into the second half of the 18th century with the name ‘Concert Pitch’. Does anyone know of other statements pinning down English Concert Pitch in the 18th century?

Conference on the Acoustics of Bowed Instruments: Following the success of the Tiverton Conference on Surface Preparation and Varnish last year, this conference has been announced for 2-4 May this year. Anyone interested in contributing to this conference (I’m offering to) should contact Colin Wills at The Hare and Hounds, Exton, Dulverton, Somerset TA22 9JT (Tel: Winsford (064385) 266.

Apology: Jeremy was particularly early in getting his Bulletin and the Comms to me. I am particularly late in getting the assembled Q to the printer. Djilda has been completely knocked out of action with the flu, and with the kids and NRI and my own milder flu to cope with, I couldn’t galvanize the time and energy to do the necessaries.
Workshop drawings are being published by the Edinburgh University Collection for the information of historical instrument makers and researchers. They are intended to allow detailed study of the construction of historic instruments.

Available now


Hurdy-gurdy (Low countries ?) Reid Collection. Drawn by Peter Barnes, 1985. Price £15.00 (paper), £25.00 (plastic).

In preparation


Arch-lute (Martinus Harz, Rome, 1665) Macaulay Collection.

Guitar (Matteo Sellas, Venice, c. 1620) Macaulay Collection.

Guitar (Anonymous, probably France, 18th century) Macaulay Collection.

[Flute nomenclature: the standard flute is a "D Flute in C" with the six-finger note sounding D and the actual pitch of the player's C being C. The standard fife is a "C Fife in Bb" with six-finger note sounding C and the actual pitch of the player's C being Bb.]

The discount on orders for 2 - 5 drawings is £1.00 per drawing; the discount on orders for 6 or more drawings is £2.00 per drawing.

Photographs are also available: the price for a 203 x 254 black-and-white print of a general view of the any instrument in the Edinburgh University Collection is £4.00. Photographs of particular details can be taken on request.

Orders must be accompanied by remittance. Prices include VAT and surface postage. Please remit by cheque payable to the University of Edinburgh, made out in £ sterling drawn on a U.K. bank.

7th January 1987
VERZAMELING MUZIEKINSTRUMENTEN : DOCUMENTATIE
Collection d'instruments de musique - documentation
Collection of musical instruments - documentation
Musikinstrumentenbestand - Dokumentation

I. CONSTRUCTIEPLANS (richtlijn bij verder vorsingwerk, hoofdzakelijk details van innerlijke bouw);
Plans de construction (directive de recherche mettant surtout en évidence les détails de la construction interne);
Construction drawing (only a help for an investigator, showing especially those details that cannot be seen from outside);
Konstruktionspläne (Richtschnur bei Forschungsaarbeit zu verwenden, hauptsächlich mit Angabe der Innerkonstruktion).

250 B.fr. Virginaal, Antwerpen, J. D. Dulcken, 1650.
500 B.fr. klavecimbel (harpsichord, cembalo, clavecin) Antwerpen, J. D. Dulcken, 1747.
500 B.fr. klavecimbel (harpsichord, cembalo, clavecin) Antwerpen, Andreas Ruckers, 1644.
350 B.fr. Virginaal (spinet), Antwerpen, Cornelis Hagaerts, + 1636.

II. FOTOGRAFISCH MATERIAAL (aanvulling bij sub.I)
Photos. Photographs (pour compléter les plans, to complete drawings Ergänzung der Pläne).

1. Virginaal, J. Couchet, 1650 :
80 B.fr. - Roos (rose), kleurfoto (couleur, color, Farbabdruck)
50 B.fr. - klankbord (table d'harmonie, soundboard, Resonanzboden) zw/w
50 B.fr. - binnenzijde (vue d'intérieur, inside, Inneransicht) zw/w

2. Klavecimbel, Antwerpen, J. D. Dulcken, 1747.
80 B.fr. - binnenzijde (vue d'intérieur, inside, Inneransicht) zw/w

80 B.fr. - 12 detailfoto's (prises de vues détaillées, different details, unterschiedene Detailphotos) zw/w 80 B.fr. each, per Stuck, elk.

80 B.fr. - 28 detailphoto's (28 details) zw/w 80 B.fr. elk, each, par pièce

80 B.fr. - binnenzijde (vue d'intérieur, inside, Inneransicht) zw/w zw/w = zwart/wit, noir/blanc, black/white, Schwarz/Weiss
6. Klavecimbel, Andreas Ruckers, Antwerpen, 1646
80 B.fr. - soundboard, rose, soundboard-painting, baseboard with Diderot framing, interior framing: 5 details. 80 B.fr. elk, each, p.p. zw/w

III. VERSIERINGSMATERIAAL (bedrukte stroken, papier décoratifs, Tapeten, decoration papers).
5 B.fr. - Arabesken: 3,3 cm x 19,5 cm.
20 B.fr. - Dolfijnen: 15,7 cm x 36 cm.
25 B.fr. - Moiréversiering (dessin moiré, wood grain design, moiriert, Dekor) 25,7 cm x 39 cm.

IV. PUBLIKATIES (publications)


20 B.fr. - Cimcim (the international Committee for musical Instrument Collections of the International Council of Museums)
Recommendations for regulating the access to musical Instruments in public Collections, 1985

Versending, behandeling en bankkosten!
Frais d'envoi, manipulation et frais bancaires!
Postage, handling and bankcosts!
Porto, Behandlung und Bankkosten!
België, Belgium, Belgique, Belgien: 55 B.fr. per zending - pour chaque envoi - für jede Sendung.
Andere landen, autres pays, other countries, andere Länder: 250 B.fr. per zending - pour chaque envoi - for every one dispatch - für jede Sendung.

Air Mail: amount to be fixed for every one dispatch
Betrag für jede Sendung festzustellen
montant à déterminer pour chaque envoi.

Betalingen op bankrekeningnr. 410-0573651-16
Paiements au compte bancaire n° Ruckers-Genootschap
Zahlungen auf Bankkonto Nr. Vleeshowersstraat 40
Payments on bank-account no. B - 2000 Antwerpen, België
Review of: Betty Bang Mather & David Lasocki, the Art of Preluding, 1700-1830 for Flutists, Oboists, Clarinettists and Other Performers. McGinnis & Marx, POBox 229, Planetarium Station, New York, NY 10014. 76 pp, $.

The Art of Preluding is taught here by example. By printing examples of preludes ('improvisations', cadenzas, call them what you will) by the most eminent masters from 1700 to 1830, the authors are not telling players what to do, but are showing them what was done. There are copious annotations, though never excessive, with snippets of information and advice, again almost all of them taken from, and attributed to, the works of the period, covering articulation, rhythmic alteration, the meaning of ornaments, and so forth. All the preludes are printed as in the original, with the clefs and accidentals have been modernised --a pity, perhaps, the former change; why shouldn't people playing the music of this period get used to reading the French G clef, with G on the bottom line?), though reset in modern music face, which remembering what some English music-printing was like in the late 18th and early 19th centuries, is probably just as well.

By the time a player has got the hang of all 75 preludes, he or she should be ready for the next chapter which, basically a matter of quotation from Hotteterre, Corrette and Bordet, describes Learning to Improvise Preludes. This is followed by a good architectural analysis of some preludes, with the implicit harmonies written in.

This is an extraordinarily valuable work, for very little of it rests on the authors' opinions (I don't mean by this to cast any slurs on their knowledge or on the value of their opinions, but information from the horse's mouth is always more valuable than modern interpretation; if you want to prelude like Hotteterre's pupils did, Hotteterre is going to be a better teacher than any 20th century scholar). Except in jazz circles, and among church organists, the art of improvisation is moribund if not dead, but no performance of the music of the period covered by this book can be 'authentic' if we just play the dots on the page. FoNRHIQ readers won't need telling this, but the general public get a bit shattered if you show them the Corelli Sonatas with the extra graces or any other music of that type, and they still need a bit of persuading that it's OK when one inserts such material, especially into music where you can't show them the extra dots on the paper. Also, many of our players do still need help in producing such material. After some steady work on this book, they will play with a good deal more confidence, and with more certainty that such material should be inserted, whether or no the modern audience expects it. There is no point in our readers making good copies of the instruments if the players are then going to approach the music as though the printed page were holy writ. If we're going to try to make the right sound, we've got to play the music in the right way too. Here are some of the best examples that I've seen in a long while of how to do it. The book has been in print since 1980, but I suspect, from what I hear on the concert platform, on record and over the radio, that there are a fair number of people who've not come across it -- hence this review.
Hale, John: A pity to dismiss him in 2X lines. As an instrument maker, he seems to have been comparatively unimportant (though there is a suspicion that he may have made more instruments than those on which he stamped his name). Maurice Byrne has led the way in examining the underside of woodwind keys, and the number marked IH strongly suggests that Hale was a major maker of keys, and perhaps other small parts, to the instrument trade. We have not yet spent time enough in the investigation of the extent in the 18th century of buying in parts of instruments, nor indeed of instruments themselves. If violin dealers can, with great assurance, attribute instruments to various makers, often in the teeth of a contradictory label, surely we ought to be able to do the same with woodwind instruments, and their parts, and thus be able to say with at least fair certainty, who actually made the instruments which are either unmarked or which bear the mark of one of the wholesale factors of the period such as Goulding, with or without D’Almaine and others, the various combinations of Longman and others, and so forth. I have a suspicion that Hale may have been a key person (the pun is intentional) in this investigation.

Halgi: What do you suppose is meant by The rim frame is of iron...? How do you frame a rim? Do they (the entry is anonymous and thus presumably editorial) mean that the shell of the drum (the Halgi is a frame drum) has an iron rim, or what?

Haliday, Joseph: In case you do not see the Journal of the American Musical Instrument Society, in the 1983 volume of which Ralph Dudgeon (the author of this entry) had an article on Haliday, the inventor of the key bugle, please note from this entry also that Haliday spelled his name with only the one i. The majority of references to him spell him, incorrectly, with a double-i.

Handbell: It is not made clear that fig.2a is exceptional in not being a clapper-bell; it is struck with a separate beater. Are cymbals used in Coptic plainchant or is Percival Price confusing them with the sistra (which is certainly the instrument used by the East African Coptic church)?

Hangar: This is a bamboo tube which is split for part of its length and is played by holding it in one hand and striking it against the other arm so that the two halves of the split bamboo vibrate against each other; the instrument is known over much of Indonesia under a variety of names. The problem here is with the description: The middle section of each tube is carved and narrowed, making it flexible enough to bend so that the upper portions of the tube can be flapped against each other. Possibly the Hangar of the Ifugao people differs from the similar instruments I know from elsewhere in the Philippines and from Celebes (yes, I do know that Celebes is referred to in this Dictionary as Sulawesi; I’m not sure why; they don’t refer to Germany as Deutschland, so why to Celebes as Sulawesi?) but I have never seen any that are carved in the middle (other than the normal incised decoration of Celebes), nor do I see how one can narrow a tube by carving it; one would expect the opposite to result. Nor do any of my instruments bend (of course they do, strictly speaking, but bend suggests far more movement than flex) and certainly they are not flexible enough to flap; the two halves of the tube buzz against each other with
less movement, relative to length, than that of the tines of a tuning fork or those of the well-known Chinese "barbers' tongues". This entry again is anonymous.

Harmonica: While it may be true that Wheatstone... did not exploit the symphonium to the extent that he did the concertina, there are a fair number around; it was never a one-off. Of those that I have seen, most had reeds of gold, not brass.

Harp: There are numerous small points in this long article. One is the statement that in ancient times harps were all of the 'open' type (ie without a forepillar. This is not true. The harp of the Neolithic Cycladic culture certainly had a forepillar (I cannot agree with the author that these are crudely represented — they are often shown with considerable detail, rather more than would normally be expected in carvings of such antiquity; the suggestion that these ought to be interpreted as asymmetrically lyres is nonsense. A lyre is basically quadrilateral and a harp triangular. If you doubt me, go and look at a Cycladic harpist such as the one in the New York Metropolitan, which shows precisely how the forepillar springs from the resonator and how the forepillar fits into the neck), and so does the harp on the later Greek pot (5th century BC) illustrated on p.562 of this volume, as do a number of others.

Whether a Mesopotamian plaque (fig.2) actually shows the left hand damping the unrequired notes (a form of autoharp technique) is open to question; I am inclined to agree that it does, but it can only be an assumption and should not be stated as a fact — it could as well be argued that the left hand is plucking the strings to contrast with the (invisible but assumed by the author) plectrum in the other hand.

There are a number of other odd statements, for instance that the strings of the Paraguayan harp are a number of them coloured (e.g. red to mark octaves), which can only mean that all the strings save the lowest octave are red, and I cannot believe that that is what was intended.

Another, this time of the tuning of the Ecuadorian harp, that the general pattern is hexatonic... but lacking the minor supertonic — hexatonic, strictly, means any six notes, but no tuning that would normally be called hexatonic includes such chromatics as a minor supertonic.

The Waji of Afghanistan (illustrated in the article in Vol.3 on that instrument) is not a harp; its strings do not go anywhere near the resonator (an essential to be classified as a harp); how it should be classified, I'm not sure! It's very much a problem instrument in that respect.

The article on the whole is an excellent survey of harps the world over, and since all the other debatable points are fairly obvious non-sequiturs or grammatical or other idiocies, like some of the above, the rest will be left to the reader to discover for him/herself.

Harpophone: Term for a vibraphone without vanes (this is the whole of the entry) — so how does it vibrate? If it doesn't, it isn't a vibraphone, is it? There is an entry for harpophone a couple of pages later, which is clearly the same instrument, and which is properly described.

Harper, Thomas: Worked on the slide trumpet at a time when valved instruments were beginning to show their superiority. But the whole point of the use of the slide trumpet was that it was better than the valve instrument.
Harpinella: A small harp in the form of a lyre — well, er....

Harp-lute (11): Praetorius's unnamed precursor of the harp-lute is a domra (on his plate XXXVI).

Harpsichord: Looking at the list of authors at the end of the article, I wouldn't dare to comment, even if I wanted to! This really should be the horse's mouth.

Harp zither: I've always understood (eg from the Horabostel/Sachs Systematik) that any instrument that can be described in this way (A zither in which a board serves as string bearer; there are several strings and a bridge) is a board zither; a harp zither would imply that the plane of the strings was vertical to the board, whereas this description implies (though it does not say so) that the plane of the strings is parallel to the board.

Harris, John (i): As well as making trumpets, he was well-known as a horn maker — see my entry for no.82 in the Catalogue of the National Portrait Gallery Handel Exhibition for more details.

Hasenclever, Heinrich J.: He was important, also, as one of the few people who tried to adapt the Boehm system to the bassoon.

Haus: I find it curious to say German family of wind and string instrument makers. No evidence is advanced for this statement; the rest of the article is devoted solely to keyboard instruments. Yes, they seem to have made organs as well as harpsichords and clavichords, but that does not make them, in normal parlance at least, wind & string makers, even if it is strictly correct.

Helicon: I wonder whether Anthony Baines is right in giving the derivation as being from the Greek mountain of the muses; surely it is more likely that it was from helix + ton; the characteristic of all helicons is that they are helically coiled rather than in normal tuba shape. Or did Stowasser actually give the Greek derivation in his catalogue?

Hemsey: This family of 17th century bell-founders are said to have compared the pitches obtained [from their bells] with those of a metallophone (perhaps from Indonesia) made up of a series of metal rods to obtain the very exact pitches of their bells for which they were famous. I find this inherently unlikely, for surely they would not have tuned their bells in the Indonesian scale systems, which are very different from ours. If they did use such a gadget as a pitch-standard, they probably made it themselves.

Hera: Here is Andrew Tracey using the term keys for a lamellophone — particularly unfortunate when you consider that it was his father, Hugh Tracey, who established the principle that they were reeds, as acoustically they are.

Hibernicon: The one point which Morley-Pegge doesn't make is that it was intended to be a bass, used in unison with the bass-born, rather than a contrabass to it. Cotter's idea was that it should be played in its upper range, where its six holes suffice to produce all the chromatics between the natural harmonics from the 3rd harmonic up.

Hoddu: The strings are also sometimes of twisted horsehair, laid like a rope or like catlines.
Holztrumpete: Why describe the alphorn as a Swiss folk instrument? The alphorn (and more specifically the holztrumpete or wooden trumpet) is used wherever there are mountains (and not just in Europe) in its covered version, and in many other parts of the world (e.g., Holland [see my GSJ article on the Midwinterhoorn] and the marshes between Russia and Poland) in its uncovered version, which can only be used where water is plentiful to soak and thus expand the wood and seal it against leakage.

Hook harp: Later versions had a mechanism...to operate the hooks by means of a foot pedal — I've never met a pedal that wasn't for the foot.

Horagai: A conch, in whose making the point of the shell may simply be snipped off. I assume that David Hughes has never tried to make a conch; I have, and I can assure him, and you, that it's a lot harder work than snipping. A fair time with a backsaw, or the local equivalent, as in India, is necessary. One can use a hammer and cold chisel, or equivalents, as in much of Oceania, but only at considerable risk of breakage. Snipping, i.e., the use of snips, a scissor-like tool, is just not on.

Horanava: The description (that it has a range of two octaves) makes it quite obvious that this Singhalese instrument cannot be a small oboe with cylindrical bore. So too do examples in my own and the Bate collections. It is a shawm of conical bore, rather like a small shanai.

Horn: It is not true that the bore of a trumpet is mainly cylindrical, that of a horn mainly conical — Arthur Benade pointed this out years ago (in his Horns, Strings and Harmony), and anyway, you only have to look. It was true in the 18th century and perhaps until the latter part of the 19th, but that's a century ago.

Hotteterre: The three surviving traversi are here attributed to Jacques-Martin Hotteterre (Le Romain), but they look much earlier than his working dates (up to 1746-8).

Hpé-si: The frogs on these bronze drums are not carved (have you ever tried to carve bronze?); they are cast.

Hudko: How can it be that the two heads are closed...! A head (i.e., a drum skin) cannot be closed; it closes the ends of the shell. The article was presumably written in French and mistranslated; if Mireille Helffer was kind enough to write it in English, all the more reason for an English-speaker to check it.

Hupep: It is not correct to say of this idioglot bamboo clarinet that a narrow strip of the outer shell is carefully thinned to act as a reed; bamboo does not have a shell, it has bark or a cortex.

Hutchins: A bad omission is Carleen Hutchins, who has been so influential in violin making (Catgut Acoustical Society, and so forth), and who created the New Violin Family.
The Historic Clarinet

Edinburgh University Collection of Historic Musical Instruments, Reid Concert Hall, Bristo Square EDINBURGH - 9 to 30 August 1986

This exhibition and associated events including 7 recitals, a seminar, and informal tours of the exhibits took place during the Edinburgh International Festival and was organised by the curator, Arnold Myers. The exhibits included music, illustrations of various kinds, tools and accessories, and memorabilia of famous players. A handbook of the exhibition was on sale and is still available from the above address, price £2.00 (£2.50 overseas). Also available were records, tapes and publications of relevance to the exhibition.

The variety offered and the clarity of the presentation of captions to the exhibits together with other aspects of the design projected information most effectively, thus fulfilling the exhibition's objective of increasing the awareness of historic instruments in players of modern instruments.

I was told that the day I visited the exhibition, when there were about 70 visitors, was typical even though there were no recitals. Many visitors were players, a lot of them members of CASS, in whose journal the event was extensively advertised. One enthusiast visited the exhibition 4 times.

The general structure of the exhibition which was arranged in sections such as "The early Virtuosi", "All shapes and sizes", "Reeds and Reed Making Materials", etc., was devised by TK Dibley.

It is perhaps inevitable that any UK exhibition will be biased to the English/French schools of makers and players and the instruments of Draper, Lazarus and Egerton were on show. Undervalued consequently were the mid-European origins of the instrument and the fundamental change its introduction (with associated horns) prompted in the organisation of the orchestra and wind band.

The selection of instruments can only be a matter of personal choice from what is available. I was surprised to see, however, two very similar instruments side by side, one described as "Clinton System" and the other, a metal instrument given by the late Professor Pickford, with a listing of keywork. It may be that there is no consensus view of what constitutes a "Clinton System" (not "Clinton-Boehm") which I have always understood to mean Simple system + Barret action + F/F£ vent for R3 ring with optional additions. Perhaps FOMRHI reader can confirm or clarify this.
Eight Foot (by P Williams)

As with the Four Foot entry, it is stated that "normal" pitch is now based on c' = 256 Hz. At equal temperament, this would imply a' = 430.5 Hz. I thought that the modern standards were a' = 440 Hz in equal temperament.

English Guitar (by R Spencer and I Harwood)

The origins of this instrument are not discussed. The relationship between it and Talbot's Bell-Guitarra (as well as surviving continental examples) should be obvious, with both having 10 strings and differing from citterns by having bandora-like shoulders on the body where it meets the neck. Tyler mentions the relationship between these two instruments in the entry on Cithrinchen. The Bell-Guitarra tuning of c e g b e' has the g b e' Spanish-guitar-like treble tuning of the earlier 17th century English 4-course guitar and the c e g major-chord tuning in the bass of the 18th century 6-course English guitar. The developmental sequence: English small cittern => guitterne => bell-guitarre => English guitar is well supported. The first evidence for the 17th century English-guitarra is the Spanish-guitar-like tuning used on the small English cittern as reported by Praetorius.

If, as is stated, the "watch-key tuning ... was better suited to the instrument's short metal strings than the original peg tuning", then why were later instruments with peg-tuning still made? The watch-key machine makes fine tuning easier, but maintenance is more difficult.

I would have liked to see more discussion of the cistre or guitarre allemande, which deserves an entry on its own. This instrument sometimes had a lute back and sometimes a compromise frying pan shaped back, as well as sometimes having theorbo-like diapasons. An interesting instruction book for the latter was written by Carpentier (who called the instrument "cytre ou guitthare allemande").

Fiddle (by M Remnant)

1. Nomenclature

Two families of medieval bowed instruments (besides rebecs and crwths) are distinguished: one played downwards on the lap, bowed underhand (defined as "medieval viol") and the other played upwards bowed overhand (defined as "medieval fiddle"). The statement that the Renaissance viol descended from the first of these is without foundation. Woodfield's derivation of its playing and bow-holding position from the Spanish-Moorish reab is much more convincing, since there is a gap of a century and a half between the demise of the downward-played medieval instrument and development of the Renaissance viol. If, for one, will not follow Remnant in using the term "medieval viol" since "viol" has too many connotations which may be inappropriate for the medieval instrument and there is no evidence that it went by any other name than "fiddle". If the musical function or fingering were radically different from the upwards-held fiddles played in the same environment, one would have expected a different name to have been used. I cannot understand the claim in the entry that the upwards-held instrument replaced it because of "greater convenience". Is a violin more convenient to play than a treble viol? If the question is one of the player standing up, there are many illustrations of downward-held bowed instruments played standing up.

A statement made is: "The best type of fiddle seems to have combined a clear demarcation between the body and neck, and a flat or almost flat back ...". "Best" is one
of the value judgements which are historically without foundation and mar this highly informative article.

The author ventures to identify the rebec as the intended instrument from the descriptions of performance and sound in "certain 15th century dictionaries" which equated "rybybe" with "fidula". I don't know of any distinguishing performance factors, and as for sound, some of our attempts to reproduce medieval fiddles have led to sounds which are very close to what we have nowadays come to expect as the sound of a rebec.

2. Structure

There are two statements here that appear logical but the pictures I've seen indicate that medieval fiddlers did not follow that logic. "Many fiddles had incurved sides allowing for more flexibility of bowing", but the bows in these pictures are very rarely in the narrower waist. A tailpiece resting on the bridge "allowed for a longer sounding length of string than if the bridge were separate, and consequently a lower pitch" but these tailpieces are quite long with plenty of room for a shorter tailpiece and a separate bridge in the same position. (In our experiments with combined tailpiece and bridge, we found that leather as the tailpiece material inhibited bridge vibration least.)

The report of string-making procedures described in "Secretum philosophorum!" mentions three or four lengths of prepared sheep's intestines twisted together to make a musical string, omitting the number "two" given in the source; which also implies that more than four is possible. This is surprisingly important if we want to calculate string diameters and tensions.

On the question of bridge shape, the author admits that there is clear evidence for flat bridges, claims some evidence for curved bridges in the Romanesque era (probably like Bachmann's plates 23 and 24 which show curved bridges on 12th century 3-stringed instruments), and optimistically points out that curved bridges could be included in the wide body of iconographical evidence that is ambiguous. None of this can be denied, but the casual reader will conclude that in the golden age of the medieval fiddle (the 13th to the middle of the 15th century) the evidence is equivocal, while in actuality, the weight of the evidence available is very strongly on the side of flat bridges. But this is not the real issue, which is whether the fiddle could play a part in the polyphony. See below under "Tunings".

The same type of deceptive writing is used to support the soundpost: "It is often assumed that the medieval fiddle had a soundpost to support the belly and transmit vibrations to the back of the instrument, but with no complete medieval fiddles of average type available to provide information it is impossible to be certain on this point. One indication is given by the lira da braccio of Renaissance Italy, as examples of this survive and are known to have soundposts." The implication is that a soundpost was needed, which is not true. The condition "fiddles of average type" is obviously intended to exclude the "violetta" of S Caterina de' Vigris which never had a soundpost. The phrase "known to have soundposts" carefully avoids any claim that liras originally had soundposts. This may well have often been the case since, as Witten has shown (JAMIS I, 1975), many (such as those by Gioan Maria and Ventura Linarol) are no earlier than the last quarter of the 16th century, when other evidence for the soundpost exists. No evidence from before then exists.

When the "violetta" is discussed in the entry, it is stated that "part of the soundboard is supported by a bar". Why was this mentioned? The implication, it seems to me, is that soundboards need supporting structures such as soundposts and bass bars. These structures are within the soundboard but the "violetta"s bar is along the edge, performing the same function as the instrument's sides.
3. Tunings

In reporting Tinctoris's statements about bowed violas, the entry omits the point that the 3-string type had "simple" strings (probably meaning single strings). This would imply that the strings of the 5-string type, in contrast, were somehow not simple (probably meaning that there were some paired courses). Thus this latter instrument was probably the 7-string lira da braccio and not the common medieval 5-string fiddle that Jerome of Moravia gave tunings for. Also omitted is Tinctoris's statement that the 3-string version was "the most usual". This is particularly important because Tinctoris's subsequent statement that the strings "are stretched in a protuberant manner so the bow can touch any one string the player wills, leaving the others untouched" could well have only applied to the most usual type of fiddle. This would be consistent with the information on the lira in Comm 715.

The Jerome of Moravia three tunings are given. I can add that another is implied by the diameters of the strings on the little fiddle on the table in Costa's famous "A Concert" in the National Gallery. From lowest to highest it is: up an octave, down a fourth and up an octave again. This gives two octave pairs a fifth apart, and if the musician did not exploit the octave ambiguity of each course, a 9th of range is available in first position.

This is adequate for most vocal parts in the music. If the octave ambiguity is exploited, there is a full 2-octave range in first position. This tuning illustrates how a 4-stringed fiddle with a flat bridge could be an adequate melodic instrument.

The introductory marginal note of Pierre de Limoges to Jerome of Moravia's writings on the "rubeba" and "vielle" says "Concerning four- and five-stringed instruments of music, especially vielle and such, ...". In the text the rubeba is described as having "two strings standing a fifth apart", and then the 5-stringed vielle is described. No instrument shapes were mentioned. As Galpin supposed, it is possible that the 4-stringed instrument mentioned in the introduction was the rubeba, with two paired courses, perhaps each an octave pair. This would then be the same tuning as I postulated above. In my collection of pictures of medieval fiddles, four-string varieties are as common as those of any other number of strings. I would like to suggest that these fiddles often had this tuning, and that they were often called by rebec-cognate names. This is in line with my postulation (see Comm 698 discussion of Chorus) that medieval instrument names were much more likely to be associated with technique of playing and pattern of improvisation (of which tuning is an essential factor) than with appearance or type of construction. This usage was probably not universal though, thus leading to ambiguity.

4. The Bow

"The handle was often carefully fashioned, and several 15th century paintings show a knob at the end, perhaps a device for securing the hairs. It is not impossible that elementary screws were sometimes used for this purpose." Not impossible indeed, but how likely, considering that no other consumer items of the time including such screws? The author is careful not to mention the surviving original bow for the mid-fifteenth century "violetta" which has such a knob but with no such function, having the hair and frog fixed.

5. Playing Position

There are several statements here which associate holding position with the difficulty of the music. I would be most interested in knowing what historical information they are based on.

Placing of the fingers on the bow are mentioned, but omitted are how far up the string from the bridge the bow was placed and the common positioning of the bow at far from right angles to the string. These are essential factors in understanding the bowing technique and sound of medieval fiddles.
6. Historical Development

I would like to see the date that is the basis for "After about 1300 [fiddles] were increasingly built up from several pieces, often with overlapping edges, to produce lighter instruments than had been known hitherto." I haven't noticed evidence for this before the middle of the fifteenth century.

I find it difficult to accept the statement: "In Northern Europe, however, the medieval fiddle ... was finally supplanted by the Renaissance viol." The Renaissance viol was primarily played by gentlemen, which I doubt was the case with the fiddle. Also, there is evidence that fiddles continued to be played in Northern Europe as well as in Italy, throughout the 16th century.

10. Repertory

"Johannes de Groches's statement (c 1300) that the 'viella' could play 'every cantus and cantilena and every musical form ...' implicitly acknowledges the frequent use of curved bridges." All this says to me is that the fiddle can play all kinds of tunes and partake in every musical form, all of which can be done with a flat bridge and all on the first string if necessary, with or without additional strings sounding. I also find it significant that Johannes did not include playing the tenor.

Concluding the entry are speculations about the use of fiddles in different types of music, mostly based on interpretation of iconographical evidence. Without that evidence available it is difficult to accept the conclusions or to comment on them.

There is a tendency of musician-historians to bias their research to make early music as accessible as possible to modern musicians and audiences. When the historical information tends towards large differences from modern expectations, diversity in the historical record is emphasised and conclusions about main-stream historical practices avoided, all under the banner of scholarly objectivity. Authenticity in performance can then be claimed for the historically possible, while ignoring the historically probable. This entry amply illustrates this approach.

Fingerboard (I) (by D D Boyden)

It is stated that on plucked instruments, frets in the fingerboard are the rule "but their fingerboards are flat, not rounded". Some fingerboard curvature on plucked instruments is quite common (indeed necessary when frets are tied on) and this curvature can be quite pronounced on some, such as the French baroque lute and the cistre.

There are misprints in "the fingerboard may be recessed into the neck so that the fingerboard and neck form one continuous plane." "Neck" should be replaced by "belly" in both cases.

Fingering II Bowed Strings (by S Monosoff)

2. Violin Family to 1800

The entry states "cordes ravallees or scordatura" in a discussion of Corretti's 1738 method. If Corrette included the r, it should be pointed out that normal usage was "cordes avallees" (see entry under that name).

The discussion of cello fingering describes Corrette's (1741) fingering which was diatonic (like on the violin) plus chromatic fingering (like on the viol) in chromatic scales in half-position. Then Baumgartner's method (c 1774) is discussed, which is chromatic like on the modern cello. The statement that "his is the first attempt to systemize cello fingering" can be argued with since Corrette's method, though more complex, can be considered systematic as well.
3. Violin Family after 1800

It is stated here that in the 19th century "simple gut strings were to some extent replaced by wound strings" is just not true. This is the one century when string types did not change. Unwound 1st, 2nd and 3rd gut strings and a close-wound metal on gut 4th string was the most common stringing from late in the 18th century to early in the 20th.

Keyboard, bowed-string and wind-instrument fingering are covered here, but it is shocking that plucked-string instruments are omitted.

**Fipple** (by J Montagu)

"Fipple flute" is used by people as a more aesthetically satisfying term than 'duct flute' (whatever fipple means), and I doubt whether Jeremy will change their ways. Similarly I am not going to get people to stop using 'consort' for a set of instruments of one type. We're both right, but linguistic habits are hard to shift.

**Flute** (by H M Brown)

The definition of a flute including an "air column" is inconsistent with the inclusion of vessel flutes (such as the ocarina) which are Helmholtz resonators working on an oscillating volume of air and not a column.

**Fret** (by I Harwood)

The second sentence says: "The sound of a plucked string stopped by the finger against a fingerboard without frets is unsatisfactory; the ... string ... is partly damped and sounds with more of a thud than a musical tone." This is grossly overstated. Lute players regularly played past the frets, and pizzicato on bowed stringed instruments is equally satisfactory. Playford's recommendation of using frets on the violin for beginners to get better intonation is quoted, but the clarity-of-tone reason for frets is emphasized as paramount. Then why would one ever take the frets off the violin? The answer is of course that on the violin, playing only one or two notes at a time, one can get better intonation without than with frets. But when one plays chords on lutes or viols, one gets better intonation with than without frets. The double bass plays one note at a time, but is a borderline case because its long string stop makes the hand have to move for each note, making accurate intonation harder than on smaller instruments with stable hand positions. Leopold Mozart and Quantz both approved of frets on double basses for both better-sound and better-intonation reasons. Nowadays, training standards on the double bass are higher, and frets are not needed to get better intonation, and players prefer the finer intonation control by not having frets to the marginally improved clarity in tone by having frets.

It would have been good to have mentioned that at times the action has been deliberately set so low that the plucked strings slapped against the frets. This was the recommendation in the Capirola lute ms (c 1517), and is often done on the modern flamenco guitar.

There is a distortion of the historical picture by the presentation of single tied frets on an equal footing with double ones. It is stated that "Mace (1676) mentioned both single and double frets, saying that the latter were "after the old fashion", which can easily be read as indicating that single frets had become fashionable. This is not implied by Mace, who is the only source that indicates that single frets were ever thought of in early periods. Mace gave full instructions on how to tie double frets and afterwards he argued the advantages of single frets which he had "lately try'd", giving no tying instructions. Then, about single frets, he wrote: "This I confess is a curiosity, yet I think it worth Examination."
Grove Review: Double Bass

Having read the review of my Double Bass article recently re-edited and re-published from the larger article in The New Grove, I am sad your critic found so little to commend. He is wrong to suggest that I do not know that violone is often applied to viols and not just to the lowest of the family.

His comments about solo tuning are, to say the least, misleading and muddling. I know of no actual evidence to suggest that solo tuning increases the power of any double bass (Dragonetti, who didn't use it was renowned for his uncommonly powerful tone): the usual reason is one of brightness, although in a recent bass competition in Rome when players were required to use solo scordatura for one round and orchestral tuning for the others, the Jury (of which I was a member) agreed that it seemed to be the player and not the tuning that made the difference. It has ever been thus.

It is easy to pick holes in any theory about the evolution of the double bass, as there is so little concrete evidence on which to base any facts. The truth of the matter probably is that wherever there was music being made, sooner or later there was call for a sixteen foot bass capable of playing long sustaining notes. The haphazard evolution that followed led to many different varieties of instrument, different tunings, different fingering and bow techniques, all of which defy tidy classification. Even today it is the ingenious musician who will make it to the top of the bass playing profession and he will do so not because of the strings, tuning or technical style he adopts, but because he is an artist.

Finally, "I can't imagine any criterion that would make [the double bass] a member of [the violin] family": I know of very few players who seriously consider it as anything else - reference to my original text in the longer dictionary, and the various cross-references, will clarify all.

One could go on!

Yours faithfully,

Rodney Slatford
1986 FoMHLI List of Members - 3rd Supplement as at 5th January 1987

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

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- Ian Allan, 6 Grove Road, Broughty Ferry, Dundee DD5 1JL, UK; 0382-76043 (vcl, vln, vla, M, pfte, orgn, P).
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- Josep Tubau Bartomeus, 08240 Manresa (rest as before).
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- Adrian Brown, Krókabraun 2, IS-220 Hafrarfjorður, Iceland; 354-1-52161
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- Philip Gruar, Brook Cottage, Burton Road, Holme, Cumbria LA6 1QW, UK; 0524-781601.
- Geoffery Hannon, 10 Aintree St, Brunswick East, Vic. 3057, Australia; (03) 387 4110.
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- D. Kershaw (M.U. Kersham — apologies, jm).
- Peter Liersch, Conrad-Blenkle Str. 4 W 0502, DDR-1055 Berlin, East Germany (bar/ren vln, fdl, bow, etc; M, R, P).
- John Minnitt, Scoboyo Cottage, 10 Higher Polscoe, Lostwithiel, Cornwall PL22 ONS, UK.
- Berthold Neumann, Ottostraße 46, D-5000 Köln 30, West Germany; 0221/552770.
- Nicholas Perry, The New House, Gypsy Lane, Knebworth SG3 6DJ, UK (brass instrs, crnett; M, P).
- Georges Piris, 12 Le Courreau, F-26130 Saint Paul Trois Châteaux, France.
- Angelo Piumelli, Via Casamare 7, 1-84011 Amalfi (SA), Italy.
- Carsten Rosbek, Hovedgaden 42A, DK-5932 Humle, Denmark; (09) 57 2330.
- David L. Smith, 15 Tanekaha Rd, Titirangi, Auckland 7, New Zealand; 817-6402 (clar, sax, sarrus, P; wind instrs, R, Coll).
- Paul White, Hertford College, Oxford, OX1 3BW; 0865-510442.
- Anatoly Zajaruzny, USSR, Kiev-121, a/box 963/5.

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Response to an Attack on Modern Catlines

This was my reply to an article in the Newsletter of the Lute Society of America by Frank Eyler, an American baroque lute player operating out of Paris. The points argued with are outlined, so this reply can be understood without the original article.

Frank Eyler has been an important contributor to the exploration of methods for making roped gut strings. In his article, "The Modern 'Venice Catline' Reconsidered" in the August 1986 issue, he expresses the motivation behind many of those explorations: the expectation that all-gut basses must have sounded 'better' than the gut ropes made today. The quality of catlines has been improving, but there are no hints of the sharp increase in projection that Eyler seems to want. That article is an understandable statement of his disappointment. Yet, in spite of its negative stance (condemning modern 'catlines' without offering any historically-possible alternative) Eyler is performing the very constructive function of asking us to re-examine the evidence and not to allow best guesses of one time to become unassailable dogma later on (as has happened with fiddle identification).

Eyler starts with stating that the "gut ropes now being sold as 'Venice Catlines' have a pedigree reaching back only as far as the 1970s". Yes, we introduced them then, but the idea was not original. A gut manufacturer in Manchester had stocked superior sash cords made of roped gut as far back as anyone there could remember. Eyler's most valid criticism is that modern catlines are bumpy and historically they shouldn't be. His evidence, quoting Mersenne's statement (1636) that gut strings are like polished cylinders, could be argued against (eg Mersenne could have been referring only to thin strings, which command much more attention) - Dowland wrote: "this choosing of strings is not alone for Trebles, but also for small and great Meanes: greater strings though they be oud are better to be bourne withall")

Mace (1676) is much more explicit: He wrote: "Strings ... would be of three sorts, viz Minnikins, Venice Catlins and Lyons (for Basses). There is another sort of string which they call Pistoy Basses, which I conceive are none other than Thick Venice-Catlins ... They are indeed the very Best, for the Bases, being smooth and well-twisted Strings ..." Pistoy Basses were smooth and, aside from size, were apparently the same as Venice-Catlins, which therefore were also smooth. But Minnikins were also smooth, so Venice-Catlins were different from Minnikins in some other way. This difference has to include a difference in physical function, since for Pistoy Basses to fret in tune and to have enough in-tune harmonics in the sound to be musically useful, they need more elasticity (a lower elastic modulus) than that offered by a singly-twisted gut string with enough weight to give the pitch. Therefore they (and Venice-Catlins) need to have been either thinner but loaded up with some heavy substance or have more twist put in than a single bundle of gut fibres can take. We have played with the former a bit, but got nowhere, and the latter is very well served by some sort of rope construction. Some surviving information indicating thick diameters for bass strings (eg Stradivari’s 2.9 mm violin fourth string) favours the latter. So Pistoy Basses (and Venice-Catlins) most probably had rope construction but were somehow made smooth. This can be done either by polishing off the bumps or filling the grooves between them with some other substance. We’ve tried the polishing option, and it makes good strings. We have not been able to make them appreciably better in sound than a bumpy catline built to the same weight per unit length as the smooth-polished catline. The cost of the gut polished away and the labour of polishing makes such strings very expensive. We make them only to special order (mostly for fiddlers for whom smoothness of surface gives quicker bow response). We have not had much success with the filling-in option yet, but we are not giving up on this project.
A particular approach to filling the groove (but not to full smoothness) is putting a metal wire in it. This kind of string was invented by Dugolecki a few years ago, and in response to customer demand we are now making them under the name 'tigerline'. They are remarkably popular as a smoother version of an open-wound string. The technology was just as historically possible as wound strings; silver and gold cloth had been made from medieval times by winding metal foil over the threads, and metal wire was also available. I doubt whether tigerlines could have been available much before proper wound strings were introduced (c 1660) because once the idea of marrying round wires with gut strings was thought of, and a musical use found, normal wound strings would quickly follow. The initial use for wound strings was to allow smaller, more agile instruments to tune as low as larger instruments and thus usurp their musical function. Tigerlines would perform the same function, and there is no evidence for any string doing this before the 1660's. After wound strings were available, tigerlines are indeed historically possible. Nevertheless, I doubt whether, as alternative open-wound strings, they were ever serious competitors to normal open-wound strings. This is because of the following: Open wound strings went decidedly out of fashion in the second half of the 18th century, just at the time when high-position playing on fiddles became a standard aspect of technique. The only reason I can think of for abandoning that most useful kind of string (beautifully bridging the gap in tone quality between wound and unwound strings) is that its roughness wouldn't allow the sliding associated with position changes. If tigerlines were available as types of open-wound strings, I can't imagine why they would have been abandoned. These are not compelling arguments, but they are the only ones I can think of for or against tigerlines. I would be most happy if someone came up with an historical argument for tigerlines. It would solve Eyler's problem, make a lot of other people happy and bring us good business.

And now back to Mace. Lyons were somehow different from the smooth Pistory Basses and Venice-Catlins. Their need for twist-on-twist (ie rope) technology was just as great as Pistory Basses. The obvious possibility for that difference is that Lyons retained the rope bumps. So what we produce now under the name of "catlines" would be better called "Lyons".

While making his point on smoothness, Eyler mentions that the Talbot ms (c 1694) "states that the bass viol is strung completely with catlins." Eyler has misread Talbot. The quote is "Bass Violin all Venice Catlins". It was a special bass violin with six strings tuned like a bass viol, and a string stop of about two feet, that of a tenor viol. (This is the only case I know of when an early source distinguished between viol and violin on the basis of design rather than tuning.) According to Talbot, this special instrument's "treble string is of the same sound and size with the 3d of B Violin (or B Viol); it is louder than either." There is inconsistency between the above "same sound [pitch]" and "its neck is somewhat shorter than that of usual B Violin to bear a Pitch [ie for the first string not to break]." An octave higher than "the 3rd of B Violin (or B Viol) solves all problems. The treble d' catline at Chappell Pitch (a' = c.430) just avoids breaking, and the sixth string, two octaves lower, is just at the bottom of the string-stress range for roped-gut strings. The stringing of other instruments where the types of strings is mentioned by Talbot, and the same by Mace, conform to the generalization that one used catlins for strings tuned between one and two octaves below the highest pitch (for a Minikin) on that string stop, and one used Lyons for the remaining half octave below that. Incidentally, Talbot mentioned that the lowest string of the Bass violin or Bass Viol sometimes had a metal winding on it.

Eyler's next point is that catlins for lute fourth courses are indicated by Dowland and Mace, and this could imply a catline as thin as .7 mm. He suggests that this is impossible to make as a rope and still be very thin. He will be surprised to know that our production catlins of this size are quite popular as violin second strings; the Talbot ms indicates catlins for the third and fourth strings only, but some bowing customers emulate the early pluckers and go for every bit of brightness in treble sound.
they can get). Eyler is under the misapprehension that a rope is only as true as its component strands. In fact the unevenness which leads to each component strand being musically untrue on its own is diluted when incorporated into a catline, which therefore tends to be truer. Skilled final polishing of the catline will make it as true as one likes. Also, thin catlines don't need to be at maximum twist.

The point by Eyler that follows is that rope construction requires such little skill and equipment that one should question why catlines were not made in Munich where the best treble strings were made. They probably were. The Capirola ms (c 1517) states that the truest strings and the most elastic strings were made in Munich. These elastic strings were probably the original catlines. In the 16th century, these Munich catlines were very expensive. It is likely that there was a Munich guild of ropemakers, who held a monopoly on the technology (no matter how simple), and they kept the price high. After the late 1560's, when Bologna string makers started making catlines, these strings became much more popular. This is probably because the Bologna catlines (called Venice Catlines because that is where they were shipped from) were much cheaper. One must remember that restrictive practices by craft guilds strictly controlled who did what at that time.

The next point is an argument against the following paragraph in our paper "Catline Strings" (FoMRH 10 Comm 138, July 1978)

The big hint comes in the following quotation from Mersenne: "And then the ropemakers sometimes twist the strings more in one place than in another..." In normal gut twisting, the whole length of gut is twisted by spinning one end, and the maker cannot control the twisting at any particular point along its length. Contrast this with ropemaking, where the twisting is started at one end and the craftsman has to carefully control the evenness of the twisting all the time as he works his way along the rope. Only in the ropemaking process would the craftsman have had the kind of responsibility which Mersenne's statement seems to imply.

Eyler's first comment here is that Mersenne was trying to be clear and not interested in being obscure, offering only hints. I agree, the "hint" being in our search for information, not in Mersenne's intention. Next he claims that Mersenne says no more than a quote Eyler gives from Mauguin and Maigne (1865), which states that one runs one's fingers over the string (while twisting it up) to prevent the development of unevenness. He also claims that "in both cases, the string makers twist or wring out any inequalities." I strongly doubt all of these claims. We do a lot of string twisting and uneven twist occurs only at weak spots, and what we do about such a spot is to cut it out. If we try to redistribute twist by wringing it, it goes right back to where it was before. Yet we run our fingers over the string to detect the beginnings of the development of a corkscrew shape, which tells us when the string has as much twist as it can take. But if one makes catlines by using standard rope-making technology, the tightness of twist at each point is strongly affected by the pressure exerted against the advancing twisted string by the dolly moved by the ropemaker. Eyler's claim is not true even if we interpret what Mersenne wrote as a colloquial way of saying that "strings the ropemakers make twist up more in one place than another", in which case, no technology information is contained in it. This interpretation is possible, but the historian must always prefer the reading of a source which is most direct unless there is independent evidence to the contrary.

I wonder whether Eyler didn't translate his French passages because of not being sure about the 17th century meaning of "cordiers". They were clearly ropemakers and had an incorporated guild under that name in Paris from the 13th to the 18th centuries. A guild of gut string makers, "boyaudiers" was incorporated in 1656. Mersenne clearly stated that ropemakers both made and sold the gut strings, so the boyaudiers had not yet operated independently in 1635. It would be natural for Mersenne not to think of explicitly mentioning that rope-making technology went into some gut strings since that would be expected from ropemakers.
The final two historical points Eyler makes have to do with characteristics of thick gut strings reported in early sources that modern catlines seem not to have. The first is a quote from Mersenne that the thickest string of a lute can sound up to 10 or 20 seconds, and the second is from the Burwell lute tutor stating that the lowest bass string was often not used because "the sound is too big". Mersenne (2nd Book, Prop II) mentioned a diameter of one line (2.28 mm) for the thickest lute string and his illustration of a lute shows a bridge proportionately rather larger than those on the lutes we play today (which are all modelled after those made by the early German international cartel of luthiers). I doubt whether Eyler has checked modern catlines under these conditions. A heavier string and a heavier bridge each lengthens the sound's duration. As for the French lute masters who rejected the thick string on the lowest course, their aesthetic criteria were most likely very different from ours. These criteria were clearly very different from Burwell's contemporary, Mace. According to Burwell, these masters also rejected the two-headed lute invented by English Gaultier (Chapter XVI) because the added "length of strings produce a longer and bigger sound". Nevertheless, the two-headed lute was such a satisfaction to Mace that most of his book "Musick's Monument" was devoted to it. Burwell's French lute masters were obviously advocates of a sound balance weaker in the bass than Mace's balance. It is a pity that Eyler, who specializes in playing the music of these masters, is striving for a sound balance that seems so at odds with their aesthetic leanings.

There are two pieces of evidence concerning voices which imply that concepts of balance in the Renaissance and early baroque were more top-heavy (or more accurately bottom-light) than they are today. One is Ganassi's report of Gombert's advice about what pitch level a choir should sing at (Ganassi suggested that this advice should be followed when trying to assemble a set of viols to play together). Gombert said that it is most important that the pitch be low enough so that the top voice is not strained. If necessary, one rewrites the bass part, but one doesn't need to if the lowest notes of the basses are just audible. Similar evidence is in Praetorius's table of the ranges of each type of voice according to a pitch standard that he clearly defined by giving dimensions of a set of pitch pipes. The pitch at the bottom of the range of the basses is much lower than that which is nowadays acceptable for balance in an ensemble. To me, the balance profile on a lute with modern catlines for the thick strings mirrors the situation with voices implied by Gombert and Praetorius.

Aside from a final summing-up where Eyler writes as if he has proven that catlines were definitely not gut ropes (which is too foolish to deserve further comment), Eyler's last point is that "no source from the 16th, 17th or 18th century supports the gut rope hypothesis." I have mentioned above two aspects of Mersenne's writings which support this hypothesis (that ropemakers made gut strings and that the ropemakers apparently controlled the degree of twist from point to point along the string). But it must be admitted that no source specifically stated that thick gut strings were made by using rope technology. Nevertheless, there are very few sources from before the middle of the 18th century (when the use of catlines faded away) that describe strings at all. The only one (Mersenne) that goes into the technology of string making deeply enough to possibly expect such a statement, has an excellent excuse for the omission, viz it would be understood since ropemakers made the strings. I've heard that some people have seen paintings that clearly show the rope construction. I've not seen these paintings and leave this point for them to make in their responses to Eyler.

The main issue we need to face is that strings existed during the Renaissance and early baroque which were required to fret reasonably truly at pitches two and a half octaves below the highest pitch for its string stop. These were described as gut strings and did not have metal windings on them. They had names such as Venice Catlins, Lyons and Pistoy Basses. High-twist gut strings will not meet the true-fretting criterion. There are various other possibilities which can meet all of these criteria, including rope construction. Rope construction seems the most probable since in Paris these strings were made by ropemakers in the 1630's. Roped-gut strings are now being made and have
been musically satisfying to many players. The other possibilities have not yet led to useable strings. So roped-gut strings are the best we can do at the moment to be consistent with the historical evidence. Is this not what we all claim to do in our early-music activities?

Eyler’s predicament might be more complicated than this. I understand that Eyler had earlier fully accepted the sound of the modern catline. What has changed? I do not know him so I can’t say, but I have been following the careers of some of the other high-quality lute players who perform in England. In maturity, their priorities have shifted: while initially their primary loyalty was to the ideal of historical accuracy, now it is to expression of their musical personalities. These personalities cannot escape their 20th century existence, so beautiful tone becomes very important, and historical factors such as embellishment become unimportant. They are now more interested in making what they perceive is beautiful music than anything else. They have joined the mainstream of musicianship today. I would be the last person to suggest that they be untrue to themselves. But I wish that some other players with the same talent were coming along who were more able to integrate the exploration of historical practices with full musical expression.

A 1656 Tabley ms: On Viol Players, Cittern and Gittern

This is a transcription of an extract of Sir Peter Leycester’s instruction book for his son, a ms. until recently in Tabley House, Cheshire, and now in the Cheshire Record Office as ms DLT/B33. Following this extract is a discussion of the organ in which the current date (1656) is mentioned.

For Instrumental Musicke the most excellent in curious handling of the Instruments of moderne English Musicians are now

Violists. [in margin]

For the Viole! Mr.Younge, Mr.le Strange; Mr.Stephkins; these are for the Basse Viole. Mr.Lilly for the sixe=stringe treble! David Mell of London for the Violin or fiddle, which hath but foure strings.

Psithyrists. [in margin]

For the little instrument called a Psithyrne, Anthony Holborne, and Tho: Robinson were most famous of any before them; and have both of [fol 85] them set out a Booke of Lessons for this instrument; Holborne hath composed a Basse-parte for the Viole to play unto the Psithyrne with those lessons set out in his booke: these lived about anno Domini 1600. This instrument is not so apt for the voyce as the Lute or Viole; but yeilds a Sweete and Gentle Sound, which the name importeth: for ψθυρίς a Greeke word & commeth of ψθύρα which signifies a whisperinge Sound: like to which is the Sound of this Instrument; some write it Citharen, but falsely, for Psithyren, & by [fol 85v] contraction Psithyrne. It containeth foure courses of stringes, as at this day we use it; each course beinge doubled, havinge two stringes of one sound in each course; They are Wire stringes & is a played uppon with a little piece of a Quill or Pen wherewith the stringes be touched: It is now usually taught by Letters, not by Notes of Musickel.
Gitterne [in margin]
Like unto this is the Instrument we now usually call a Gitterne, which indeed is onely a Treble Psithyrne, [fol 86] beinge somewhat lesse than the other, yeildinge a more Treble Sweet Sound, havinge the same number & the a same order of Wyre-stringes & playd upon with a Quill after the same order as the Psithyrne; onely some variation in the Tuninge which may also be baryed [borrowed?] in the Psithryne at pleasure?!

The most excellent Artist on the instrument, either in England or FFrance, was Thomas Pilkinton (sonne of H Pilkinton, one of the Quiremen at Chester) who dyed anno Domini 1654; a and a little before him lived James Kelly of Chester an excellent Artist thereon.

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I would like to amplify three of the points made by Leycester:

1. The naming of Mr Lilly as a renowned treble viol player implies that there was a school of virtuoso treble viol players in England. This is supported by Coryat's mistake in describing an Italian performance on violins as being on treble viols.

2. The statement "Treble Psithyrne, beinge somewhat lesse than the other" implies two sizes of citterns, probably the larger being the instrument which Playford wrote for and Talbot measured, and the smaller being similar to the one depicted by Praetorius. Playford's illustration (1666) in "Musick's Delight on the Cithren" shows a large one being played and a small one hanging on the wall (see LSJ XVII (1975) p30,31 and Plate 3). This establishes the first link in the development sequence: small English cittern, guittern, bell guittern, English guitar. Holborne and Robinson apparently wrote for the small one because 1. Leycester called their cittern "the little instrument", and 2. he praised both their cittern and the Gittern (Treble Psithyren) in the same "Sweete Sound" terms. It is quite possible that Leycester was not quite sure on this point since his experience was with 8-string instruments while the instruments depicted by Robinson and Praetorius had 9 strings, so either he may not have knowingly seen a c.1600 cittern or his memory about it was hazy.

3. We know about the Gitterne's mid 17th century popularity in England (from Playford's publication (1652), Leycester's inventories including an instrument and book of lessons (see LSJ, XXI (1979-81) p99, 101), and Leycester's discussion here) and in Germany (at least one large ms in Dresden), but the statement here about the reputation of Thomas Pilkinton implies that it was also played in France.
This is the paper I gave at the Tiverton Conference on Surface Preparation and Varnishing last year!

In instrument making there are various chemicals that we apply to the wood. One expects that they will do the wood some good. My purpose here is to present some ideas about what happens to wood in time, and indicate the probable effects of these applications. I will not be concerned with the difficult problem of what happens when wood matures in the first few years after the tree is felled.

If we either remove or ignore the water, the remaining dry weight of wood is made up of about half cellulose, about a quarter hemicellulose and about a quarter lignin. Most woods also have about 1% of other types of molecules in them, including silica, calcium salts, resins and gums, as well as molecules which impart colour and smell.

The cellulose molecule is a very long polymer of the polysaccharide type. Hemicellulose is the name given to a variety of shorter molecules which are saccharide and uronide polymers and copolymers. The lignin molecule is a phenolic type of polymer.

The cellulose molecules pack together in a regular parallel crystalline pattern to form microfibrils. These are the basic fibres of wood. The microfibrils spiral together around the walls of the long thin cells in several layers. Inbetween the microfibrils within each layer, between layers and between cells is a mixture of hemicellulose, lignin and water molecules, with the hemicellulose more prevalent within each layer and lignin more prevalent between cells.

The cellulose microfibrils give the wood most of its strength, while the hemicellulose and lignin constitutes the matrix which binds the microfibrils together. The water going in and out of this matrix causes the characteristic swelling and contraction of wood associated with variation of moisture content.

The different components of the wood structure differ in their chemical stability. The crystalline cellulose microfibrils are very stable, they are unaffected by alkali and weak acids, but are attacked by strong acids. Hemicellulose is much more reactive, attacked easily by alkali and strong acids, but attacked only slowly by weak acids. Higher temperatures greatly increase the reactivity of these materials. Lignin is a relatively stable and inert substance, but it is degraded by ultraviolet light which catalyses its oxidation. Oxidation of lignin turns the surface brown when dry, and grey when the surface has been exposed to moisture-cycling conditions. A varnish on the surface filters out much of the ultraviolet radiation.

In 1956 A J Stamm studied the chemical self-degradation of wood as a function of time and temperature. He oven-dried small pieces of softwood at 105°C for 4 to 6 hours, and weighed them after cooking at 8 different temperatures ranging from 100 to 275°C and various times from 1 minute to 2 1/2 years. He recorded the time needed for the loss of 1, 2, 5 and 10% in weight. When he plotted the logarithm of the time vs temperature for each percentage reduction, the results were very accurate straight lines. These, when extrapolated to 20°C, would give a loss of 1% in 100 years and 10% in 1,000 years.

All of the heating in this experiment was done with no moisture around. Stamm did other experiments with moisture present and reported that moisture speeds up the degradation by a process known as 'hydrolysis', where the natural acidity of the wood has its effect, mostly on the hemicellulose. So in moist room conditions we would expect shorter times for 1% and 10% weight loss than predicted above.
The heated samples didn't change much in dimensions or stiffness, but they lost much toughness and abrasion resistance. They also responded less to subsequent humidity variations. We observe all of these effects in wood aged at room temperatures, so the extrapolation seems to be largely valid. Anyone who fixes old violins knows how the wood has become crumbly with age.

Stamm found that the chemical effect of the heating was mostly in degradation of the hemicellulose in the binding matrix. Bits of these molecules come off as water vapour, leaving shorter chains. The missing bits had been involved in holding water, so the total capacity of the matrix for holding water is reduced, thus lowering the movement of the wood with varying moisture conditions. When the degraded wood is subjected to abrasion, whole cellulose fibres (ie bundles of microfibrils) come out because the fibres are held less tightly.

Artificially ageing wood by baking it is not a new idea. Vuillaume did it to his violins. In his 1923 instruction book, Flesch complained that perfect concert instruments were rare because Vuillaume 'baked' some 3,000 of them. I doubt whether this is true. To give 100 years of artificial ageing one needs a year at 80°C, a temperature at which the glue will melt and the instrument will fall apart. He probably did it to his new instruments before he assembled them. One day at 150°C would do the job.

Handling violins involves a certain amount of rubbing of the surface. The wood surface should not be allowed to crumble away when the wood gets a bit old, so it is a good idea to have as first line of a defence, a varnish which takes the brunt of the rubbing, and as second line of defence, a substance that goes into the wood to some extent and adds to the binding of fibres.

When wood vibrates, some of the vibration energy gets absorbed by the wood and is converted into heat energy. This happens because heat is the consequence of internal vibration of the material. While most of the vibration modes of heat are at frequencies higher than those in the audible range, some are in this range, more in the higher regions than the lower ones. So there is resonance between the heat vibrations and the acoustic vibrations of the soundboard, and the heat vibrations suck energy away from the acoustic vibrations. When the hemicellulose binding of the cellulose fibres deteriorates, this loosening-up of the structure lowers the frequencies of the heat modes of vibration. This brings more heat modes of vibration into the audible region and increases the high-frequency absorption of the acoustic vibration. So the wood absorbs more high-frequency acoustic vibration if it is old than if it is new.

High acoustic frequencies are what provide the brightness of sound essential for plucked instruments. So the soundboards of plucked instruments deteriorate with time. Old lutes and guitars with original soundboards in apparently good condition do not sound as well as modern copies. Modern classical guitars are rarely useful for concerts after about a half dozen years. The oud is the Arab version of the lute (still popular today), and many professional players replace the soundboard yearly because it gets "played out".

Old soundboards are considered good on violins because we like the sound better with some suppression of the very high frequencies. Varnish also suppresses high frequencies so that can be desirable. More wood in the soundboard does this too. So many 19th century violin makers used thick soundboards and smothered the instrument with varnish. We would then expect Old Master violins with thin soundboards and thin varnish to have sounded harsher when new than they do today. This may be true, but the strings were thicker, with 50% more tension, and thicker strings suppress the high harmonics.

This analysis seems to be going in the opposite direction to that concerning string inharmonicity. Gut strings sound better than metal strings because of lower
inharmonicity. With lower inharmonicity one gets more higher harmonics, which is good in this case. So what is the difference? I can't give a definitive answer, but I suspect that one needs to look at the details more carefully. There needs to be the right balance between low, middle and high frequencies and the combination of gut strings and high frequency absorption of the soundboard seems to give the best balance.

It is reported that Old Master violins play with less effort than modern violins. This is probably just the consequence of thinner soundboards. Less wood to absorb the acoustic vibrations can have a stronger effect than the additional absorption due to wood degradation with age. It is also reported that playing changes the vibrational characteristics of an instrument. To the extent that the changes are reversible, it is most unlikely that the structure of the wood is involved, but it is quite possible that vibrating the wood will speed up the hemicellulose degradation.

Another type of degradation of wood with time is physical degradation which can lead to surface checking and age contraction. The basic process here is that a gradient in moisture content makes one part of the wood want to expand more than the next part. Since they are attached, the wetter bit is under compression and this can collapse some of the cells and weaken them. If this is on the surface because the surface was wet and the inside dry, some surface cells collapse and weaken, and when the surface is next dry, surface cracks will form. This is called checking and it is most unsightly. The avoidance of surface checking is probably the main motivation for wood surface treatment. A treatment which glues the surface fibres together can help to avoid checking, and a treatment which slows down the wetting of the wood surface will reduce the amount of moisture gradient which causes the collapse of cells.

A treatment which strengthens the surface can exacerbate the other kind of physical deterioration. This is when the inside cells are expanded because they are wet, but they are compressed by a sudden dry spell which contracts the surface. The result is age contraction of the wood. This can be avoided if the wood treatment expands the surface and locks it in the expanded state. This could be the application of a water-soluble glue of some sort or even a water suspension of small inert particles which wedge into the swollen pores. Then the contraction of the surface which collapses the inside cells can't occur. A treatment which slows the passage of moisture from the outside also helps here.

In summary, wood chemically degrades with time causing more damping of high frequency sound vibration. Heat and moisture speed up this degrading. This degradation is detrimental to the soundboards of plucked instruments, but seems to be good for the soundboards of bowed instruments where the design can lead to a harshness in the sound. There is no treatment that stops this, but a surface cover will prevent surface abrasion which old wood is increasingly susceptible to.

Physical degradation of wood results from the collapse of the cells due to stresses that come from moisture gradients in the wood. By coating the wood with a material which slows the passage of moisture between the air and the wood, moisture gradients can be kept to a minimum. Surface checking can be reduced by a surface treatment which binds the surface film together, and age contraction can be reduced by a swelling of the surface and locking it in the swollen state. Most of the beneficial effects of the various methods of wood treatment reported can be understood in terms of the above mechanisms.
Nut Groove Diameters on a Sellas Extended-Neck Lute

Gary Stewart of the Shrine to Music Museum in Vermillion, SD, USA measured the groove diameters of the two nuts of the Matteo Sellas extended-neck lute (c. 1639) from the Witten Collection at that Museum. The nuts appeared to be original. There are 7 double courses on each nut with 54 and 82.7 cm string stops for the treble and bass strings respectively. The groove diameters, from the first to fourteenth courses, in thousandths of an inch, are:

20, 22, 22, 24, 23, 26, 26, 29, 28, 28, 30, 30
28, 29, 30, 30, 31, 32, 34, 34, 36, 36, 36, 36, 36
36, 36, 36, 40, 38

Joseph R. Johnson a Research Associate at the Museum sent me a copy of the measurements for my opinion as to how good a guide to the original string diameters they are. Permission to publish them was kindly given by Margaret Downie of the Museum. The following is a somewhat revised version of my reply.

The measurements represent upper limits to the string diameters. Each string needs to be somewhat smaller than the groove diameter to ride freely over the nut. It can be much smaller without impairing the groove's function. Theoretically, all the grooves can be the same size, large enough for the thickest string. Grooves for thinner strings are usually thinner, probably because it looked more appropriate and was less work. Careful fitting of each groove to its string could easily have been considered more work than would be necessary. I imagine that after making sure that the groove for the thickest string was big enough, the others would be made thinner, graduated by eye and experience, without continual reference to the strings themselves. There is not the penalty for making the groove too wide, as there is for making it too narrow.

Nevertheless, let us explore the consequences of taking the data at face value and assuming that each string was individually fitted. Assuming a constant ratio of groove diameter to string diameter, one can calculate the relative tension across the instrument since the tension ratio between any two strings equals the product of the squares of the ratios of the diameters, string stops and frequencies. If we take logarithms of this equation, we can add logarithms of ratios, choosing the scale so that it is just adding semitone steps. If we compare any string with some standard string, the number of semitone steps of tension greater it is (the number of multiples of 1.1225 in the ratio of tensions) equals the number of semitone steps in diameter greater (the number of multiples of 1.0595 in the ratio of diameters), plus the number of semitone steps (frets) of greater length, plus the number of semitones higher in pitch.

Taking the average groove diameter for each course, the number of semitone steps thicker than the 14th (negative since they are actually thinner), rounded to the nearest integer, is:

-11, -10, -9, -7, -5, -6, -5, -5, -4, -2, -1, -1, 0.

Similarly, the number of frets longer the string stop is:

-7, -7, -7, -7, -7, -7, 0, 0, 0, 0, 0, 0.

As an archlute, the number of semitones higher the pitch is (approximately):
38, 33, 26, 24, 19, 14, 12/ 10, 9, 7, 5, 4, 2, 0.

This leads to the number of tension steps greater being:
20, 16, 12, 10, 7, 1, 0/ 5, 4, 3, 3, 3, 1, 0.

As an angel lute, the number of semitones higher the pitch is (approximately):
22, 21, 19, 17, 16, 14, 12/ 10, 9, 7, 5, 4, 2, 0.

This leads to the number of tension steps greater being:
4, 4, 3, 3, 4, 1, 0/ 5, 4, 3, 3, 3, 1, 0.

Mersenne (1636) described angel-lute tuning on an ordinary lute in his Proposition XI of the Second Book of String Instruments.
In both cases, the tension of the 8th course (the highest of the long basses) is 5 steps higher than that of the 7th course (the lowest of the short strings). We would expect the opposite because scale passages in the bass cross this transition between the long and short strings, and it is most likely that the stringing would minimize the difference in sound projection and the feel to the player when crossing this transition. A lower tension on the long strings accomplishes both of these ends. We are thus led to the conclusion that the groove diameters were most probably not fitted accurately to the individual strings, and that the most important information we have here is the largest groove diameters on each nut.

The grooves of the 14th course have a minimum diameter of .038 inches, and the largest diameter string that could run freely through it would perhaps be .035 inches (.89 mm) thick. If we assign a pitch to such a string, we could calculate its tension, which would be the maximum for a gut string in that groove. That pitch would be about 38 semitones lower than the first course in archlute tuning, and 22 semitones lower in angel-lute tuning. On the 7th or lowest course on the treble nut, a .028 inch (.71mm) string would be tuned about 26 semitones lower than the first course in archlute tuning and 10 semitones lower in angel-lute tuning.

The highest stress for a gut string that we have historical evidence for corresponds to a product of frequency and length of 235 Hz m. (See FoMRHI Comm 632 (July 1985) pp 46-56.) So the highest pitch for the highest string of this instrument with string stop of 54 cm would be 435 Hz. This leads to 48 Hz and .54 Kg tension for the 14th course in archlute tuning and 122 Hz and 3.48 Kg tension in angel-lute tuning. For the treble nut, this leads to 97 Hz and .60 Kg tension in archlute tuning and 244 Hz and 3.78 Kg tension on the 7th course. In each case the tension with archlute tuning is about half of what modern ears (at least) would begin to find acceptable. Plucking has to be very careful to avoid the strings of a course slapping against each other, and then the string is hardly audible and sounds rather like a rubber band. To be musically useful, these courses would rely very heavily on the sound of the octave string of each pair. I can only conceive of a player choosing such a thin low-octave string if somehow neither high-twist nor catline strings were available, and he preferred a thin weak string with some focus to the tone to a louder string with less focus. But it is very difficult to imagine how these other types of string (which provide that focus on a thicker and louder string) would not be available.

There are no tension problems with angel-lute tuning, and I consider that this is the most likely use of this instrument with the present nuts on it, whether they are original or replacements during the first century of the instrument's existence.

In the above analysis I've indicated why taking the diameters of grooves (other than the thickest) as indicating string diameters is unsatisfactory because the tension jump from the long strings to the short strings is in the wrong direction, and why even the thickest groove diameters are unsatisfactorily small with archlute tuning because they lead to string tensions too low for acceptable sound quantity and quality. Angel-lute tuning is very satisfactory. This all assumes that modern criteria for musical acceptability applied also in the 17th century, an assumption one must always be suspicious of.

It would be worthwhile to speculate about other possibilities for how the present nuts could have been historical replacements. Metal wound overspun strings became available in the 1660's and the second necks of many archlutes were subsequently doubled in length, making the long strings over twice the length of the short strings (while before they were slightly more than 1.5 times the length of the short strings). I associate this modification with the use of overspun strings on the lower short strings. This increases their resonance and allows more resonant long strings across the long-short string transition. The increased resonance of the longer long strings then makes the instrument an effective competitor to the theorbo for continuo duties in ensemble music. The archlute (or liuto attiorbata) was rarely specified for this purpose.
previously, but the specification was very common late in the 17th century and early in the 18th century.

Some Sellas instruments (such as No 1748 in the Bologna Museo Civico) were so lengthened, but most were not, probably because of the decoration on the second neck. Second best for those unlengthened instruments is to use overspun strings for the long strings as well (the long strings of lengthened archlutes did not use overspun strings except perhaps for the lowest notes). With overspun strings, octave courses would not be necessary. Overspun strings are thinner than the unwound strings they replace. This could be the origin of the nuts currently on this Sellas instrument. The original nuts could have been replaced because the large grooves might have looked unsightly (and unfashionable) with much thinner strings in them.

Another opportunity for restringing (and renutting) 17th century archlutes occurred late in the 18th century. At that time, English guitars, with a C-major open-string tuning and metal strings, were very popular. All kinds of instruments, including archlutes were pressed into service as variants of English guitars. Metal stringing in the treble, with bass strings overspun on metal or gut, could be an occasion for renutting.

In conclusion, it is remotely possible that the nuts on the Sellas instrument were for archlute tuning and are original, but it is more likely that the nuts were for angel-lute tuning (original or not), or were replacements, either late in the 17th century for overspun-on-gut bass strings, or late in the 18th century for metal stringing.

FoMRHI Comm. 777

UNHAPPY

N. Meeûs

It is odd to have to answer such narrow Comms as Richard Shann’s n. 765. I can make narrower (and shorter). Does Richard mean that the alleged contrasting purpose of the Ruckers double was intended for song accompaniment and not for solo keyboard music?
Geoffrey King raises in the last Bulletin the question whether the arrangement of the chromatic keys in the standard keyboard layout could have had its origin in the keyboard of the hurdy gurdy. Without claiming to be able to conclusively answer the question, I'd like to present some comments and a hypothesis.

The standard chromatic keyboard layout was established in the 14th century at the latest and survived up to our days without major modification. Conceived originally for a rather limited medieval repertoire, it proved able to serve for Baroque, classical, romantic and modern music and for instruments including not only the organ, clavichord, harpsichord and virginal, pianoforte and modern grand piano, but also various kinds of electronic devices. This is to say that the well known arrangement of the keys proved extraordinarily successful in its compromise between the needs of the music and the physical limitations of the human hand. One could believe that the reason why the keyboard eventually came to include twelve keys per octave is that the chromatic scale has twelve degrees per octave, but exactly the reverse is probably true: it is to a large extent because the keyboard had octaves of twelve keys that the theory of music came to build a chromatic scale of twelve notes, implying the enharmonic equivalence of notes a comma apart. The modern twelve tone music, therefore, may be viewed as a consequence of the keyboard layout invented six or seven centuries ago (1).

We know very little of the layout of the antique organ keyboard. Hero of Alexandria gives a sketch of one key seen from the side (2). It seems reasonable to suppose that several such keys were arranged side by side, with a spacing dictated by the width of the sliders in the wind chest. Jean Perrot argued that the pipe lengths visible in many antique organ representations less than halved at every twelfth pipe, implying a system of more than twelve notes in the octave that may have corresponded to the enharmonic system of the Greek. None of these representations appear to show keys arranged in more than one row; the truth is that very few of them show the keyboard at all.

The early medieval keyboard was diatonic. This is an important point because the chromatic keys have had to be conceived as an addition to the existing diatonic layout. It seems reasonable to believe that whoever conceived the chromatic keyboard tried not to interfere with the playing of the diatonic keys or, in other words, to arrange the chromatic keys in a way that did not preclude the use of the older, diatonic technique. This, to me, must have been the reason why the chromatic keys were added higher and back from those of the diatonic series.
The hypothesis that Stephen King quotes amounts to saying that the reason why the chromatic keys were set up and back from the diatonic ones is that space lacked between the diatonic tangents of the hurdy gurdy. The reason why the hurdy gurdy is mentioned rather than the organ is that the problem of spacing, resulting from the spacing of the tangents along the strings, supposedly was less pressing in the case of the organ. As to the other stringed keyboard instruments, they did not yet exist (3). It must be kept in mind, however, that the width of the octave on a keyboard is dictated not only by the spacing in the mechanism but also by the measure of the hand. As soon as the keys were intended to be played by the fingers, even diatonic organs must have had a system of trackers or ducts that made it possible to build keyboards where the spacing of the keys was narrower than that of the pipes. The octave span of keyboards with real keys (that is, keys for the fingers) must never have been wider than, say, 18 to 20 cm (seven diatonic keys).

At some point in the history of the keyboard it appeared desirable to add chromatic degrees. It has been claimed, namely by A. Schering, that the need for chromatic notes appeared mainly in instrumental music and particularly in music for the organ. The origin of this claim is to be found in Joannes de Garlandia's sentence about "musica ficta que instrumentis musicalibus multum est necessaria, specialiter in organis". Lloyd Hibberd, however, convincingly argued that in medieval terminology the musical instruments included the human voice and that the organa were polyphonic compositions rather than the instruments of the same name (4). But even if Joannes de Garlandia thought of polyphonic music rather than of the organ, it seems nevertheless that the latter was more likely to participate in polyphonic music than the hurdy gurdy.

In any case the earliest known mention of the addition of chromatic keys to the keyboard specifically refers to the organ. The Summa musicae which Gerbert attributed to Joannes de Muris states that "some makers place a semitone on musical instruments between g and f and others also between g and a, and they call this key a clavis formae; this is useful in the chant, especially on the instrument that is called the organ, but it has no place in vocal music" (5). Hibberd quotes Curt Sachs's explanation that the medieval Latin formae sometimes referred to the two rows of chairs for the choir, especially the rear row; clavis formae therefore could mean a key belonging to the back row. Jacques of Liege wrote before 1330 that "it may be possible to place an intermediate note between A and B and to divide the tone there into two unequal semitones, as is done on some artificial instruments such as organs, on which almost everywhere the tone is divided into two unequal semitones so that several chants may be played there and several consonances and counterpoints obtained; nevertheless this is not useful with respect to the chant of the human voice" (6).

Both Joannes's and Jacques's texts appear to mean that chromatic notes were more useful on instruments than in singing, which means either that the repertory was different (but both texts refer to playing the chant on the organ), or more
probably that the chromatic keys were needed because the organ is an instrument of fixed pitches: transposition certainly has been an important early purpose of the chromatic keys of the keyboard.

A treatise on the mensuration of organ pipes dated from the early 14th century, De formatione organorum (7), describes the mensuration of the pipes for the chromatic notes, resulting in an overall range of two octaves and a fifth, G–d*, fully chromatic. It is the earliest of such treatises known today to deal with a chromatic division. In the very same period, the Robertsbridge fragment (8), the earliest keyboard music preserved today, calls for a keyboard range of cdef–e* (that is, without chromatic degree below f).

This, I believe, is the essential of what is known today about the origin of the chromatic keyboard, an origin that seems connected both with the rise of polyphonic music and with the accompaniment of plainsong. The participation of the organ in this evolution appears more likely than that of the hurdy gurdy.

Turning now to the origin of the layout, with the chromatic keys in groups of two and three at a higher level than the diatonic ones and usually in contrasting colours, I indicated above that the fact that the keyboard first was diatonic necessarily resulted in the chromatic keys being viewed as additional keys. The Greek term for the b flat, synemmenon, which remained in the medieval usage, meant "added" or "additional". From the 14th century onwards the hexachords producing chromatic degrees were called coniuncta, in the sense of "additional", and the chromatic degrees themselves may at times have been called coniunctae.

My conviction is that the row of chromatic keys must have been conceived originally somewhat as an additional keyboard, similar to the diatonic one and placed above it. Several medieval representations of keyboard instruments, especially of portatives, appear to show keyboards consisting in two rows of keys, often button keys, in which the upper row counts the same number of keys as the lower one: there are no gaps visible like those that can be seen on the standard layout between b flat and c sharp or between e flat and f sharp. The question that arises about these instruments obviously is how the degrees of the scale were distributed between the two rows. A distribution in which the keys of each row would be a tone apart from each other, as in modern experimental keyboards such as the Janko keyboard, is most unlikely.

Rather, I would believe that the upper row merely duplicated the lower one, that is also showed a diatonic series, but shifted in pitch so as to produce the chromatic semitones. As a result, in each octave, the upper row not only would have included the five chromatic degrees needed to divide the tones of the lower row, but would also have duplicated two notes of the lower row. This result could have been achieved, for instance, by shifting the upper row up a diatonic semitone with respect to the lower one. The two rows would have given the same series of notes, say c d e f g a b c, but the upper row
actually would have sounded db eb f gb at bb c db, with the f and c available in both rows.

Some indirect arguments support this hypothesis. It may be noted that the chromatic keys resulting from this arrangement are all flats. It is known that keyboard instruments have been tuned with five flats in the late 14th and early 15th century (9); this tuning may have originated in the keyboard layout proposed here. Conceptually, viewing the chromatic keyboard as two diatonic ones shifted, with each other corresponding to the theoretic derivation of chromatic notes as resulting from shifted (ficta, conjuncta) hexachords.

The authors of the 'Harp' entry in Grove DoMi explain that in Renaissance harps with two parallel ranks of strings "one rank was tuned C-D-E-F-G-A-Bb (i.e. transposed 7th mode), the other CH-D-Db-FH-GH-A-B". In other words the notes D and A appear in both ranks. This is the tuning suggested by Galilei, but I would nevertheless be tempted to believe that at an earlier stage the second rank of strings corresponded to a true diatonic series, say CH-DH-E-FH-GH-A-B. As in the chromatic organ keyboard proposed above, the chromatic series would then appear to result from two interwoven diatonic series, with two duplicates in each octave.

It should be noted also that if the organ had duplicate keys, it probably had duplicate pipes as well. The number of pipes therefore would have been larger than the number of playable pitches. The famous positive organ depicted by Jan Van Eyck in the Ghent Altarpiece apparently has a total of 42 pipes in two rows of 21 pipes each. Ed Ripin ascertained by geometrical means that the keyboard range (which is partly hidden by the player) was 21 or at most 22 diatonic keys or, in the earlier version of the painting, 32 to 35 keys in all including the chromatic ones. Ripin then considered two possibilities, either that the two rows of pipes corresponded to two independent ranks or that they formed part of the same register. Considering that "it would appear that not only are there too few pipes to provide two for each key but also that there are too many for each key to have only one", he was forced to conclude that "clearly this organ - despite the extraordinary impression of verisimilitude that it gives - cannot be a literal quasi-photographic rendering of a real instrument" (10). It is nevertheless striking that the number of pipes in each row, 21, matches that of the diatonic keys. Might it not have been that the tradition of building two full rows of pipes corresponding to the two rows of keys had been preserved, even although the row of chromatic keys itself was no more complete? One might then imagine that the back row of pipes in the Van Eyck organ included 7 to 10 dummy pipes.

Another point that needs stressing is that the earliest chromatic keyboards often show keys of the same form and even sometimes of the same size in both rows. This is almost always the case with button keys. The Norrlanda organ and the Van Eyck one in its earlier version have pallet keys in both rows. The keys protrude from the vertical front of the instrument, so that the upper row of keys is not recessed behind the lower one; in order to permit an easy access to the lower row, the
pallets of the upper one are made shorter, but the width is
the same in both rows so that there can be no question of
playing between adjacent pallets of the upper row. This type
of construction, with keys of the same shape in both rows,
once again suggests that the two rows were conceived original­
ly as similar to each other.

The Norrlanda organ however raises a problem in that it
has both Bb and B in the lower row, the upper row consisting
of four keys only in each octave. Diatonic keyboards with Bb
were not unfrequent in the middle ages. To view early chroma­
tic keyboards as consisting of two interwoven diatonic series
each including b-flat’s, that is with three duplicate degrees per
octave, may seem farfetched.

(1) See my 'Keyboard' entry in the New Grove DoMI.
(2) See the (modernized) drawing of Hero in P. William's 'Or­
gan', fig. 1, in DoMI.
(3) I will argue in the coming Organ Yearbook, 1986, that the
clavichord originated around the middle of the 14th century,
the harpsichord slightly later and the virginal after about
1450.
(4) Li. Hibberd, 'Musica ficta and Instrumental Music c.1250-
(5) GS III, p. 221a.
(6) CSM 3, vol. 6, p. 146 (cf. CS II, p. 271b). This text spe­
cifically refers to the Bb of the low octave, not to any b­
flat in the range.
(7) Cf. J. Handschin, 'Aus der alten Musiktheorie', in AMI xiv
(1942), p. 16s., and K. J. Sachs, Mensura fistularum, vol. I,
(8) London, British Library, Add. 28550. Transcription in CEKM
1.
(9) Cf. M. Lindley, 'Pythagorean Intonation and the Rise of
the Triad', RMA Research Chronicle, xvi (1980), pp. 4-61.
(10) E. M. Ripin, 'The Norrlanda Organ and the Ghent Altarpie­
195.
Addresses

For reasons which are not entirely clear to me, the address of the museum at which I work seems to be highly unlearnable. A while back I asked Jeremy to provide current info in the Bull. This request was made over the phone and, unfortunately, the notice which ended up being printed was not entirely correct. In Comm 763 Charles Stroom mentions not knowing how to get a letter to me. Assuming that others may share this plight, instructions on how to do so will follow. I wouldn't normally waste anyone's time with as inconsequential an item as this, but Comm 763 also raises the question of electronic mail, and I have some comments on this as well.

First to the address of Musikmuseet in Stockholm. (The Swedish word, museet, means "the museum". However awkward, it is not correct to say "the Musikmuseet".) The museum has been at its present location since 1978; Sibyllegatan 2, in the heart of downtown Stockholm. However, no mail has been delivered directly to our building since July 1981, when we were given a postbox address. Anything sent to our street address will be substantially delayed, if it arrives at all. (Our postbox is not in the same post office as the one which otherwise serves our neighborhood, and the postal service gives the necessary forwarding a very low priority.) The correct postal address is, Box 16326, 103 26 Stockholm. This is the official address of Statens musiksamlingar (The Swedish National Collections of Music), a tripartite governmental agency established in July 1981. The museum has been one part of SMS from this date, at which time the earlier official name, Musikhistoriska museet, was abandoned. All our mail is delivered to the main office of SMS, which is not located in the museum's own building. If an individual museum employee's name is the first line in the address of a letter, it should go straight through to him or her, unopened. Otherwise, everything gets opened before being sent over to the museum, with all sorts of possibilities for screw-ups.

Prior to 1978 the museum was located at Slottsbacken 6. Stuff is apparently still being sent there, but the post office has long since stopped the routine forwarding of mail from that address. Sometimes they do it, but by no means always. Also, some people confuse my private address with that of the museum. Aside from the postal difficulties which this can cause, I am not willing to use my own mailbox as a quick way for avoiding the "take your chances" aspect of trying to get a letter through the Swedish mails, past the SMS front office, and through our generally inefficient internal mail distribution. If you want to get a letter to me it's probably just as well to use my home address. If it's a museum concern, write to the museum.

Now to the computer business. I've tried to avoid periodic nagging about any of the points which were raised in my earlier Comms. The FQ doesn't need a regular "Komputer Korner". However, the general nature of the commentary which has followed my Comms strongly suggests that these have been somewhat misunderstood. It's quite obvious that a lot of what I've referred to is highly unfamiliar "new" technology. Question is if and how the reaction to this can be turned from fear to at least mild curiosity. I am quite convinced that we're not going to be able to avoid becoming familiar with all this as time wears on. I'm perfectly content to sit back and watch this happen, but have a rough time not doing whatever is possible to speed things up.

The biggest mystery seems to relate modems and their use. (If anyone wants, I'd be glad to prepare a Comm on the basics of the subject, including some how-and-what-to-buy advice — requests to my home address.) However, it might be worthwhile to discuss electronic mail in greater detail now. The experiences with E-mail reported by Charles Stroom in Comm 763 are somewhat at odds with my own experiences, and it might become easier to understand this medium if the matter were examined more closely.

Any computer which hosts a public conference or message system will, virtually by definition, be accessible via a telephone connection. For reasons which are most often of financial origin, there will usually be some sort of identification procedure required before a caller is permitted to "log-on". The security risk which telephone access would pose to other computer systems is not relevant to our discussion. There are three basic types of conference and E-mail service networks: the commercial ones, the academic
ones, and those run by enthusiastic individuals. All use essentially the same type of communications technology, but there is a substantial difference in their scope and costs. A previous call for dedicated individuals from within the FoMRHI community who might want to set up a microcomputer based CBBS network caused just about no reaction. On the basis of this it would be reasonable to assume that there wouldn't be much interest in our subscribing to a rather expensive commercial service, either.

What remain to be considered are the academic networks and, indeed, Charles Stroom names several of these and asks to hear from others who have had experience with them. I'm not sure why he assumed that I was not speaking from direct experience when I broached the subject earlier, but I make regular use of the international academic networks for mail transfer. I find them to be generally quite reliable and far easier to use than is reported in Comm 768. The question of reasonable cost is a matter of individual judgement, it may be worthwhile to present a rather detailed exposition of what the whole thing entails. I won't do this in my own words, but will use a professionally prepared text on the subject. This may also provide an introduction to the general flavor of the networks. My own network address is given below. I check for incoming mail twice daily, in case anyone wants to give it a try. (This is not enthusiastic lunacy, but is simply the way many people use their network mailboxes.) Please note that the X.25 services are not mail systems in themselves. They can be seen as less expensive alternatives to directly dialed telephone connections which are reserved for non-voice communication. If calling a host computer would involve an expensive long distance telephone charge, calling via the "packet switching networks" might be a more economical alternative. Most people using the academic mail networks will be within normal local telephone distance of their mailboxes.

The following is a modified excerpt from a document prepared by the computer center at the University of Stockholm. The abbreviation for the university is SU. The computer center is QZ. The COM system is a conference system which they have developed, which is run at many academic sites. This material will give some idea of the scope of the international academic communications networks and the cost of using them. The prices quoted below are for both university and commercial users. Note that the SU fees are 87% of the basic rate. Similar prices are likely to be available to anyone with access to a university computer center. The rate of currency exchange is presently about seven Swedish crowns to one US dollar. For reference, the current Swedish postal rate for a 100 gram letter sent special delivery is SEK 18.50. A 250 gr letter costs 26.00, and a 500 gr letter costs 39.00.

As will become obvious, any shortish message that I might want to get to the FQ editors in England would go quicker and cheaper by E-mail than as a special delivery letter. (Both Jeremy and Eph should be able to swing easy access to mailboxes on JANET.) If the message were addressed to several recipients, E-mail would be far and away the best alternative. For lengthier messages price is weighed against speed of delivery, and the convenience of not having the material on paper. (In this regard it may be worth noting that a properly packaged floppy diskette can be sent as a 100 gr letter, and could contain over 100 pages of text. A second diskette would fit into the same package without pushing the weight over 100 gr.) This latter factor would be an important consideration only if the Comm, or whatever, were to be stuffed into a computer for further processing. Although this is not an aspect of our current editorial practice, I am unconvinced that things are always going to be this way. Without suggesting that everything submitted to the FQ is of sizzling time value, one of the main ideas behind this venture was to get worthwhile material into circulation as rapidly as possible. There are ways of realizing this goal that can usefully supplement the mailing, cutting and pasting of camera ready copy. Why slam doors in our own faces, especially since we've already got the tools necessary to keep them wide open?

The QZ blurb:

*Messages can now be sent between QZ and some international message networks. QZ has a direct connection to the British network JANET (also called JNT-MAIL and SERCNET) which comprises about 140 computer sites mainly in the United Kingdom. QZ also has a direct connection to the American network MAILNET with participants like the EIES system at New Jersey Institute of Technology.*
Via MAILNET, QZ also has unofficial indirect connections to the American network CSNET, and it is also be possible to indirectly via unofficial gateways reach other American mail networks such as BITNET, UUCP and ARPANET. These networks comprise in total several hundred sites.

QZ finally has a direct connection to EARN, the European section of BITNET via the Swedish main EARN node SERN. Note that messages to EARN and BITNET can be sent either via MAILNET or SERN, but sending via SERN costs less and is usually faster.

Sending messages from other nets

If your name in the COM system at QZ, called QZCOM in the networks, is "Cary Karp SU", then your network address is: (This is my actual address.)

in JANET:    Cary_Karp_SU@QZCOM
in MAILNET:  Cary_Karp_SU@QZCOM.MAILNET@MIT-MULTICS.ARPA

Note: Some JANET hosts cannot send to QZCOM. In that case, mail can be sent from JANET hosts via MAILNET, using the address:

Cary_Karp_SU@QZCOM@MIT-MULTICS@UCL-CS

Note that the character between the words in your name above is underline ("_") and not hyphen ("-").

Give this information to people at other sites who want to send messages to you via the networks.

Sending messages from BITNET/EARN to QZCOM

If your site runs the Crosswell mailer, you can send messages to QZCOM sites in the same way you send to BITNET sites. If you don't run the mailer, you must create a file with your message text and ARPANET-style headers (see template below). Once your file is created in the format indicated, you should PUNCH it (CLASS=M) to the node SERN and the vmid MAILER. Note that the MAILER at SERN cannot accept NETDATA format.

Date:  27 Nov 84 17:00 EST
From: youruserid@yoursite
To:    QZCOMuserid@QZCOM
Subject: (This is optional)

Message text. Note that the blank line separating the headers from the text is NOT optional.

Charges for message transfer

The charges due to QZ for sending and receiving messages via these networks are given below in SEK (Swedish crowns). These charges are experimental and provisional and may be changed when we get more experience with the real cost of these kinds of message transfers. They are listed at the rate applied to non-local universities. For other rates the listed charges are to be multiplied by:

0.87 for rate 1 = certain local universities (The rate paid by Cary_Karp_SU)
1.00 for rate 2 = all other public universities
1.70 for rate 3 = other publicly-financed research
2.00 for rate 4 = other users

The rates given are for single message units. A message of less than 500 characters of text (exclusive of header) is one message unit. Each additional 1000 characters of text becomes one more message unit.
The sending of one unit to one recipient  |  Additional cost for one more recipient  |  Receipt of a message
JANET  |  4.00 SEK  |  0.20 SEK  |  3.50 SEK
MAILNET  |  9.00 SEK  |  3.00 SEK  |  3.50 SEK
Other nets via MAILNET  |  6.50 SEK  |  0.50 SEK  |  6.50 SEK
EARN, Nordic countries  |  2.00 SEK  |  0.20 SEK  |  2.00 SEK
EARN and BITNET, other countries  |  3.50 SEK  |  0.20 SEK  |  3.50 SEK

Note 1: For a message to receivers in both MAILNET and other American networks on the same message, we will charge 6.00 SEK plus 3.00 SEK per receiver in MAILNET and plus 0.50 SEK per receiver in other American networks.

Note 2: When we cannot deduce from the return path or host name that a site belongs to MAILNET or another American network, we will charge the fee for MAILNET on outgoing messages and the fee for other American networks for incoming messages.

Note 3: The reduced fare for additional receivers only applies if all receivers are added at the same time on the same COM account.

Note 4: If an additional receiver is added at a later time, the message may be sent again to previous receivers, and charged once more for this.

Note 5: The "EARN, other countries" rate also applies within the Nordic countries for messages transported via EARN to/from other nets, and for new EARN nodes during their first month of operation.

Note 6: The EARN rates given above apply to messages to EARN and BITNET via the direct QZCOM-SEARN link. Messages to EARN and BITNET via MAILNET pay the price for "Other nets via MAILNET".

QZ is willing to discuss the sharing of the costs for getting incoming messages to certain conferences between several institutions.

When is the postbox emptied?

Here are the present times for message deliveries for the QZCOM system. These times may be changed at any time without prior notice:

<table>
<thead>
<tr>
<th>Deliveries to/from</th>
<th>Deliveries to COM</th>
<th>Deliveries from COM</th>
</tr>
</thead>
<tbody>
<tr>
<td>JANET</td>
<td>05:30 - 06:30</td>
<td>After 05:30</td>
</tr>
<tr>
<td></td>
<td>12:15 - 13:15</td>
<td>After 21:00</td>
</tr>
<tr>
<td></td>
<td>21:00 - 22:00</td>
<td></td>
</tr>
<tr>
<td>Mailnet and other</td>
<td>04:00 - 04:30</td>
<td>After 00:10</td>
</tr>
<tr>
<td>American networks</td>
<td>11:15 - 12:15</td>
<td>After 06:00</td>
</tr>
<tr>
<td></td>
<td>20:40 - 21:30</td>
<td>After 19:00</td>
</tr>
</tbody>
</table>
ARTIFICIAL IVORY RINGS
FOR WOODWIND INSTRUMENTS

I HAVE BEEN ATTEMPTING FOR SOME TIME TO FIND A SUITABLE SUBSTITUTE FOR IVORY IN THE MAKING OF RINGS FOR WOODEN FLUTES. VARIOUS SOLID MATERIALS PROVED DIFFICULT, BUT THE FOLLOWING METHOD, USING LIQUID RESIN HAS GIVEN EXCELLENT RESULTS:

TURN THE INSTRUMENT SECTION TO THE SHAPE AS IN FIG. 1.

THE SIZE OF THE GROOVES IS NOT CRITICAL, BUT THEY ENSURE GOOD ADHESION BETWEEN THE WOOD AND RESIN.

NOW FIT A STRIP OF THIN BUT RIGID PLASTIC SHEET ROUND THE OUTSIDE OF THE SECTION AND SECURE IT WITH SELLOTAPE AS IN FIGS. 2 AND 3. THIS LEAVES A TROUGH BETWEEN WOOD AND PLASTIC TO HOLD THE LIQUID RESIN.

FOR THE ARTIFICIAL IVORY USE POLYESTER RESIN SP701 PA, AND MIX IN A SMALL QUANTITY OF OPAQUE IVORY PIGMENT, THEN SPREAD IN THE CATALYST, AND POUR THE MIXTURE INTO THE TROUGH. THE SETTING TIME IS APPROX. 15 MINS. AT ROOM TEMP.

A SMALL PLASTIC SYRINGE OR EVEN AN EMPTY TOOTHPASTE TUBE MAKES HANDLING EASIER.

WHEN THE RESIN HAS FULLY HARDENED REMOVE PLASTIC SLEEVE AND TURN RING ON LATHE TO THE REQUIRED PROFILE. POLISH WITH BRASO OR T-CUT.

VARIOUS DEPTHS OF COLOUR IN THE RESIN MAY BE PRODUCED BY THE ADDITION OF BROWN PIGMENT.

ALL MATERIALS WITH INSTRUCTIONS CAN BE OBTAINED FROM TRYLON LTD. THRIFT ST. WOLLASTON, NORTHANTS. NN8 7QS.

DESFORGES
21 JENKS AVENUE
KINVER
STOURBRIDGE
WEST MIDLANDS
DY7 6AQ
Section turned with grooves

Plastic sleeve

Fig. 1

Fig. 2

Trough between wood and plastic to be filled with resin mixture

Fig. 3

(Handwritten note: Deformed)