## CONTENTS

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Bulletin no. 6.</td>
</tr>
<tr>
<td>10</td>
<td>Announcement: Early Musical Instrument Exhibition and International Harpsichord Week</td>
</tr>
<tr>
<td>11</td>
<td>Metropolitan Museum of Art, New York, X-rays and technical drawings</td>
</tr>
<tr>
<td>13</td>
<td>List of Members. 4th supplement as at 31st December 1976</td>
</tr>
<tr>
<td>15</td>
<td>FoMRHI Rules</td>
</tr>
<tr>
<td>18</td>
<td>Communications 45. Renaissance transposing keyboard instruments. Nicolas Meeus</td>
</tr>
<tr>
<td>27</td>
<td>Recommendations for drawings of keyboard instruments. John Barnes</td>
</tr>
<tr>
<td>30</td>
<td>Lute pegboxes in pictures: 1600–1800. William B. Samson</td>
</tr>
<tr>
<td>32</td>
<td>The twelve-course lute. William B. Samson</td>
</tr>
<tr>
<td>33</td>
<td>Classic guitar shape. Peter Ecker</td>
</tr>
<tr>
<td>34</td>
<td>Jerome of Moravia and bridge curvature in the medieval fiddle. Ephraim Segerman and Djilda Abbott</td>
</tr>
<tr>
<td>36</td>
<td>Some speculations on medieval fiddle technique. E.S. and D.A.</td>
</tr>
<tr>
<td>38</td>
<td>What is a musical instrument? Bob Marvin</td>
</tr>
<tr>
<td>40</td>
<td>The words &quot;authentic&quot; and &quot;original&quot;. E.S.</td>
</tr>
<tr>
<td>43</td>
<td>Felling your own timber. John Rawson</td>
</tr>
<tr>
<td>46</td>
<td>Some notes on Com. 39. Donald Gill</td>
</tr>
<tr>
<td>47</td>
<td>Detailed comments on &quot;Instruments of the Middle Ages and Renaissance&quot; by David Munrow: part I. E.S.</td>
</tr>
</tbody>
</table>
Before anything else, I must apologise for the inexcusably late despatch of the last issue; dated October, it didn't get out till the end of December. As you saw from the note on its back page, this was chiefly because Eph Segerman didn't want to hurt my feelings by not including his review of my book, but also couldn't think of a way of not hurting my feelings about what he didn't like in it - I was abroad in Israel and Russia through most of the delay, and my wife kept trying to persuade him that after what I've said about authors (see GSJ and EM passim), I was not going to be able to object to what he said, but he's obviously a nicer chap than I am. Anyway, it's not likely to happen again, and this one should be out before the end of January and we will then try to keep to quarterly intervals.

As you will see from the heading, we have decided to number consecutively and not to go in for Vol.1 and so on. Personally, for reference purposes, I usually quote a Communication by number, adding 'in Bull/Comm. x' since the x is the number at the top here and the first item in the list of contents on the front.

My trips to Israel and Russia were successful and have brought us in members in both countries, with the possibility of the Russians translating our bulletins and Communications and circulating them in Russia. If people in other non-English-speaking countries think there would be any demand for translated FoKRI material, please let me know (especially if they are willing to do the work). The Fellows are discussing the question of foreign-language branches and may be in favour of it; I hope that they will be for Russia and for other countries who cannot export their currency. On which subject, if you have friends in such countries, there is no reason why you should not pay a subscription for them; we have several such members already.

LIST OF MEMBERS: Partly because the last issue, with the request for renewal of subscriptions, went out so late, and partly because many of you may need reminding, we have decided to leave the new List of Members till April and to include a final Supplement to the first list (even though that is out of print - apologies to recent members) herewith. I have divided this into two parts: 1976 up to 31st December for those who joined in the last quarter, and 1977 for new members since 1st January and for those few who joined right at the end of '76, paying for both years.

LOST MEMBER: Can anyone put me in touch with Bryan Tolley, lately of East Molesey, Surrey? His Bull/Comm. was returned marked 'gone away'.

MISPRINTED PAGES: Some copies of the last issue had one page, some had two pages, printed upside down. The ones that I've seen were pp.13 & 40 upside down to 14 and 29, and 21/32 to 31/22. If anyone is seriously worried by this, the printer will replace them; it's probably easiest to send the copies directly to them: Beeprint Ltd, attn.Mr.B.E.Roberts, 45 Branksome Drive, Cheadle, Cheshire SK8 3AL, with a note 'for replacement of pp....'. They apologise and will check more carefully in future.

FORMAT: Most of you are getting used the photo-reduction, but I get a few comments, usually in conversation rather than by post, so I presume that the complaints are not too overwhelming. It's partly a matter of convenience (full-size A4 sheets would be difficult for me to store and for you to store) but mostly economic. Full size would double the printing costs, double the postage costs, and mean the additional cost
of a plastic binding strip or else the inconvenience of staples in the corner or the edge. Type-set printing is way beyond us in price, nor can we afford to pay someone to retype the whole thing on an electric machine. I have not yet found an electric typewriter that I can afford, though I do buy a new ribbon every quarter for the Bulletin, but that doesn't help a two-finger typist to get the attack even - the trouble is that I'm a two-finger keyboard player as well. We do the best we can within our means and hope that you will forgive us the bad patches.

LAYOUT of LIST OF MEMBERS: As I've said above, you have till April to make any comments on this. So far, I've only had a couple. They would like the instrumental breakdown to continue, so it will, but are divided between a straight alphabetical list and some geographical division. Further opinions will be welcomed; after all, you have to use it so you might as well say how you like it to be.

LOCATING REINFORCEMENT BARS: George Sandberg, who asked about this (see the second paragraph under REQUIREMENTS on p.4 of Bull.5) amplifies what he said last time: "Scratching with a finger nail seems to be a horrible expression, I meant: sliding or gliding the fingernail over the wood, just evoking enough sound to measure somewhat more precisely. Before trying on an historical instrument, I tried at home: no damage, no traces, no gloss even, also not on the summergrain....'Hard brush' means a painter's brush for oil paint, flat, made of pig's hair, rather long and still rather soft...I worked only on Italian (so unpainted) harpsichords and spinets so far. On paint I should not dare, just to prevent any possible damage to the tempera-paint....I had no signs of 'shredding the fibres of the wood', the historical instrument has got no signs of my measuring." He adds that damage might be caused, as I suggested, if one were not as careful as this.

Two possible solutions to this question have arrived in the last couple of days. One from NHI, who have developed a Underbelly Feeler, a piece of wire bent into a logarithmic spiral which can be inserted through a hole in the rose; this looks OK for a lute but is not likely to work on a parchment rose as on a chitarra battente. Queries on it to them, unless they like to add a reduced print of their blueprint to this.

The other comes from Donna Curry: "To determine bar width and placement in lutes, etc., that may not be opened for investigation, it is a simple matter to illuminate the instrument. In a darkened room place a cool light source, such as a powerful flashlight, over the rosette. All except the height of the bars will be revealed. Do not use high intensity desk lamps for they give off too much heat."

Donna's suggestion seems to me the best if the belly is thin enough to be translucent, since I don't much like the idea of poking wire through the rose even if one can pad the edges of the ends to prevent internal scratching and scraping.

REAMERS: Ronald Hachez says that he has made several very successful small reamers by grinding down an old file to the proper taper and then dulling one edge and sharpening the other.

Bill Elliott suggests using a Y section fence post (called a 'Star Stake' and costing $A 1 for 8 feet in Australia), but his description is sufficiently complicated that I've asked him to write it up properly for the next issue.

FURTHER TO PREVIOUS COMM.: Comm.9: Stephen Taggart says that I may have been wrong in querying the use of 'brand' for woodwind marks; bow-makers heat their stamp "to around electric soldering-iron temperature prior to naming their work".

Comm.40: Stephen Taggart comments on this also that if lute pegholes were
John Leach pointed out, during a gap in a recording session yesterday, that the Arabic 'ud always has a bent-back head, to which I added that the Chinese p'1-p'a always has a bent-back top (similar to our scroll) at the head of the peg-box, and we suspected that this might be one of those features that has always been there, and therefore remains there. Certainly the 'ud/lutes in the Cantigas have bent-back heads and so have the Sassanid 'uds of the 8th century (Farrer, Musikgeschichte in Bildern, Islam, pl.5 & 8). I would not know whether the Sassanian Persians "huddled round the fire" but I doubt that that is the explanation. My own guess is to help the instrument balance, but, as Eph pointed out (Comm. 44) I'm not an expert on lutes!

IVORY SUBSTITUTES: Ron Hachez adds to his Comm.35 that Angus-Campbell will send a free sample, at least in the USA.

H.J. Fletcher & Newman Ltd (39-41 Shelton Street, London WC2H 9HL) have sent me samples of what they have available. They are piano factories (and always helpful; they stock all sizes of music wire, tuning pins and so on; in fact every part of a piano and some parts useful for other instruments) so what they have is geared to key-covers. There is plain white celluloid in sheets, 1/16" thick; grained celluloid, same thickness (they quote prices for these 122 x 15 cm at £1.88 and £2.56 respectively). Then there is a ready-shaped plastic key-cover, 3/32" thick, at £3.10 the set (presumably, like the previous sheets, enough for a piano keyboard), and secondhand ivory heads and tails at 22p each; the thickness of these will vary, of course, according to the maker of the instrument they took them off; the samples they sent me were 1 mm and 1.3 mm thick, the wide part being thicker than the narrow (I'm not sure which is head and which tail). The plastic and the plain celluloid are both dead white and shiny and not very convincing; the grained celluloid is creamy and not bad; the secondhand ones are real ivory and I'd have thought worth considering if they are thick enough for what you want. The prices are ex-works in London; postage is extra. If anyone wants to see them, I have the samples and a copy of their catalogue here.

REQUESTS: Richard Loucks wants information on the pedal mechanism of a 1799 Erard square piano; it's missing from an example that he is restoring. See 1976 Members' Supplement herewith.

Harold Steafel (List in last issue) is reconstructing the harp in the same Bosch painting as Comm.31 and would like advice on the stringing, both materials and gauges. The longest is 810 mm and the shortest 135 mm; he suspects that they should be iron at the top and brass at the bottom and pretty thin, but would be grateful for any advice.

Mark Langweiler (1977 List herewith) wants to become an apprentice to a woodwind maker (early). He holds a bachelor's degree in biology, is 2nd oboe in the Northwest Arkansas Symphony and oboist in a local quintet, and plays "a fair krumhorn" as well as recorder. Can anyone take him on?

Stephen Taggart (1 Mill Road, Lincoln, LN1 3JJ) has gone into bow-making and wonders if anyone would be prepared to lend him drawings and/or dimensions, weights, etc of any Renaissance and baroque bows that they have studied.

He also asks if anyone would write us a Comm. on the drill for sending instruments abroad. He gets occasional orders but knows nothing about export regulations, duties, etc. I would think that there must be other very small makers in the same situation who would be grateful for the voice of the experienced, both here and abroad.
Harold Snyder says that he needs information on Vihuela and baroque Guitar bracing, and asks if there is someone who could write us a good article. If someone would be helpful enough to do so, press date is April 1st. I think that a number of people would be interested in such a Communication.

Paul Kemner (new address at the end of this bull.) wants any construction details available for the tiorba that was used for solo work by 17th century Italians, and of the Theorbo pour les pieces.

Ronald Hachez (July List) asks for any hints and advice regarding the construction of parchment roses as used in baroque guitars and vihuelas. Any answers either, or both, to him or in the Communication on bracing.

Harold Snyder is also in trouble over roses, but for lutes this time as well as for Vihuela and guitar (especially the Votoam guitar). He needs rose patterns for Tieffenbrucker soprano, alto and tenor, Martin bass and Henri Arnault tenor. I have referred him to the page of rose details in Schloesser's Vienna Catalogue, which will help him on some of these, but if anyone can help with the others, especially the Arnault, it would be a kindness. Another useful Comm. might be one on how to construct roses for instruments on which we have no evidence, such as the Arnault, and I would like to see a proper acoustical study of the function of the rose. I've mentioned before, though I can't remember whether it was in a FOMOD note or elsewhere, that the area of the open hole has a critical control over the tone (it tunes the resonance pitch of the body, as in a Helmholtz resonator) and thus while the pattern of the rose is decorative and should reflect the art and decorative styles of its period, the area of the holes pierced in it have an important function and control much of the response of the instrument.

Philip Lourie (July List) wonders if anyone has drawings or sets of photographs of the Laux Maler lute (Vienna, C.92). He has asked the museum but they have no plans for that lute and, while they have offered to have photographs taken for him, I know from experience over my book that they will take a long time if they arrive at all. He says that he has been experimenting recently with polyurethane and fibre glass lute moulds, and also with plaster of Paris, and would be willing to pass on any information.

Tom Savage (1976 List herewith) asks for measurements for: "1, Miniature or Reel Pipes, mouth-blown, cylindrical bore chanter with drones in a single stock. 2, Chanter and drones for early Piob Mor or Highland bagpipe (or similar bagpipe) 18th century or earlier."

NOTES & NEWS: Bill Elliott (July List) has some ideas on checking authenticity of copies. One is that a maker should ask: 'how close is my copy to the original pitch?' (without any fiddling around with it), and a second, related, question is 'is there any evidence of how the maker brought the instrument to the desired pitch?' He suspects that makers often produced a slightly flat instrument and then opened the foot with a tapered reamer to bring it up to pitch (same relationship to the Helmholtz resonator as in lute roses, above!). Another way of checking is comparing the relative intensities of the harmonics produced by the copies with those of the original. As he says: "Let us face the fact that if instruments of fixed pitch are going to play together, they must all play at the same pitch, whatever the pitch of the original. I would feel much happier about basing an instrument to sound A 440 on an original sounding A 445 if I knew that I had not significantly changed the harmonic development in the process." He has some electronic/acoustical friends who think that they might be able to find a fairly inexpensive way of checking this, but I think that it would be of
such general interest to wind instrument makers that other people may be interested to get in touch with him on this. An easier check that he suggests is producing a loudness curve, using the VU meter of a tape recorder; I have a nasty feeling, myself, that he may then be testing the player as much as the instrument, as I've found in teaching that the volume of a player's chest, influenced also by posture, can make a considerable difference to loudness irrespective of air pressure (ie one player will blow piano and produce as much volume as another who slumps their shoulders blowing mezzo-forte or even forte). A quick and cheap, and portable, way of measuring and recording the harmonic spectrum would seem an excellent check - after all, what we're after is copies that sound the same as the originals.

Lph and Djilda have sent me some literature of a local firm that makes varnishes, saying that they seem very helpful and will send stuff anywhere. The firm is Rubert & Co.Ltd., Acru Works, Demmings Road, Cheadle, Cheshire, SK8 2GQ. Their varnish is called Meloton and comes in various colours which can be mixed to produce other colours. They also produce a fair range of tools and other materials, as well as a small handbook of advice and instruction on varnishing. Some of their measuring tools look useful, also.

Peter Foster recommends three Technical Notes from the Forest Products Research Laboratory, Princess Risborough, Aylesbury, Buckinghamshire: No.11, The steam bending properties of various timbers. No.16, A method for improving the bending properties of wood. No.52, The bending of solid timber. He also asks (10 Benson Close, Lichfield, Staffordshire) for advice on pipe scalings, wind pressures etc, for a small portative or perhaps a positive to accompany recorders, etc. I should have put that in the section above - apologies, but can anyone help him?

Walter Hermann Sallagar suggests that we should set up a system to collect data, measurements and photos of instruments in collections. He offers to contribute from sources, both private and public collections, in Austria. I have suggested such a central archive in earlier Bulletins, but while we have had one or two offers to house it, nobody has offered to undertake the considerable work involved, nor have we had any real consensus as to what details need to be recorded. Let's have another crack at it. Who will volunteer to organise and run such an archive? Who has notes that they will contribute? Who will collect information as requested (ie with all the measurements that a future committee will decide are necessary)? If, to take two examples, Peter Tourin put in all his viol information (Bull.3) and Bob Marvin all his flute and recorder information (GSJ 25), running such an archive with those and with comparable information from others might well prove a full-time job, so think carefully before you volunteer.

John Rawson has prepared a short Comm. (herewith) on cutting down trees because various of his friends who know that he has a chainsaw ask him to help them move vast bits of wood. If you get asked to do things for your friends because of your special knowledge or equipment, write a Comm. for us; then, if you're busy, you can refer them to that, and it will help others also.

Brian Carlick (April List) asks me to say that he is now working on his own, restoring woodwind and making various types of historic recorders and flutes. He used to work for Horace Fitzpatrick.

Theron McClure (October List) has sent me various things he has issued on the Violone, including a periodical of that title. Anyone interested in playing or making the great bass viol should be in touch with him,
especially anyone who does not know the instrument but who is dissatisfied with the sounds that they are getting from their bass lines at the moment. The tone of the violone, and thus the foundation of the whole string band, is very different from that of the double bass violin.

William Cumpiano (Windsor Mill, 121 Union Street, North Adams, Mass. 01247) has "access to fairly good builders prints (for sale or xerox) of late and mid 19th century guitars".

Djilda has passed on a note from the Catgut Accust.Soc. Newsletter no.26: R.K.Lee of 353 School Street, Watertown, Mass.02172 can supply drawings of keyboards. Information includes wood types, grain orientation, changes from restorations, comparisons to other instruments by the same maker, and previous owners. She has written for further information and if any comes in before this issue is printed, she'll add it; look for the odd half page note elsewhere.

The Crafts Advisory Committee (12 Waterloo Place, London SW1Y 4AU) is "compiling an annotated list of organisations concerned with the conservation of decorative and historic works in England and Wales. The list is intended to be of use to practising conservators and people who have historic objects within their care. It is to be freely available from the CAC in the form of a booklet". Their letter came in November so the list won't be out for a while yet; in fact there might still be time if any of you are involved in any organisation which was not approached - if so, get in touch there with Helen Wilks. The Crafts Centre runs an Index like that of the Veesen Centre (the two organisations are linked) and maker who thinks it worth being in their Index could get in touch with them. It seems to be run on a nominated basis; their leaflet says: "The Index is an illustrated guide to the current work of Britain's artist craftsmen. It consists of 35mm colour slides and biographical information provided by craftsmen who have been selected by a committee nominated by the British Crafts Centre." There is nobody involved with music or musical instruments listed among their Committee Members. They did put on one exhibition of instruments a few years ago and asked me to adjudicate on authenticity etc., but when I objected to a portative because it was so heavy that I couldn't lift it (I would have thought that portability was a sine qua non for a portative) and to a serpent because I'd never seen an original with walls nearly half an inch thick, I was told that in fact they could not reject any exhibits "because the makers had been invited to send them"; thus the whole idea of adjudicating, and as a result the exhibition itself, was rather a waste of effort. However, if members think it worth it, I will approach them and see whether authenticity might be one of their aims in the future if not in the past and whether any cooperation might help us all. Both Bob Hadaway and I had articles in their Journal once, so we are not wholly unknown to them.

Andrew Parkinson (130 Farley Road, Selsdon, South Croydon, CR2 7NP) is a calligrapher, working mainly for printing purposes. He does programmes for his own early music group and others and would also do labels for makers in a variety of early scripts. Leaflet available from him if you send a stamped addressed envelope.

Bengt Lonnqvist (1977 List herewith) offers to collect information about the bowed lyre and the Finnish Kantele and about instruments in museums in Sweden and Finland. He is an electronic engineer and bilingual in Swedish and Finnish as well as competent in German and English. He comes to England frequently and, having taught himself to make guitars and lutes, is very anxious for contacts with experienced makers.
Roger Spalding has built a table organ, using drawings which he bought from John Nicholson which he says are very good. He got the pipes from Mr. T. Davis, 15 Greenhill Chase, Wortley, Leeds 12 and can thoroughly recommend his work: "Very fair prices and a willingness to make authentic low wind pressure pipes". For anyone who hasn't got the main List of Members, John's address is Bream House, Hungershall Park, Tunbridge Wells, Kent TN4 8HS, but bear in mind the note from a previous Bull that these drawings are not meant to be authentic; they are for a small organ that works.

There is to be a Conference on The Future of Early Music in Britain at the Royal Festival Hall in May (14th-16th). I'm not clear as to whether it will be open to the public or not, but I should be able to tell you about that in the next Bulletin. The 14th is just a general reception; the 15th has three talks on performance, Medieval, Renaissance and Baroque, and a session on instrument makers. None of the speakers are definite yet, since the preliminary letter merely says who is being invited to speak; however, if you have any views about the position of makers, it might be worth getting in touch with Ian Harwood. Philip Shirtcliffe has been asked to speak on the early training of instrument makers and I have been asked to speak on the possibilities of a central library (as it were) of instruments so that beginners can borrow instruments before they commit themselves to expensive purchases and experienced players can try new and unfamiliar instruments. Speakers are asked to consult with their colleagues in preparing their talks, which will have to be quite short (20 minutes or so), and I would be grateful for any comments on such a lending library of instruments. I think it a good idea myself (I have a vague memory of discussing something of this sort with John Thomson once) and it has the incidental advantage that one can compare different makes of the same instrument; I wanted Early Music to run some sort of which? comparative testing reports on instruments, but the nearest that we could get have been the various articles on choosing instruments. The main idea of the conference is to attract financial support, so that such a lending collection would be subject to such support. It is possible also that there will be some sort of exhibition connected with the conference.

A more extensive exhibition will be the next Early Musical Instruments Exhibition. This will be from 15th to 17th September and it will be at the Horticultural Hall in Vincent Square, off the Embankment (round a couple of corners from St. John's Smith Square). John Morley has promised to write a detailed note on this (and on another forthcoming exhibition at Bruges) for this issue, so I'll leave the details to him apart from saying that there are two great advantages of the Horticultural Hall; one is that there will be about 2½ times the space that there was at the Royal College; the other is that there will be no restrictions on buying and selling. So there will be plenty of room to show your instruments and the big inducement to do so will be that you can actually sell them on the spot rather than telling potential customers to write to you and hope that they'll remember to do so; if you only sell by order, you'll still be able to take orders and deposits at the exhibition.

Fellows: One new Fellow since last time: John Hanchet.

Changes of Address: Paul Keener to: 16374 Fish Road, Pemberville, Ohio 43450, USA, tel: (419) 287-3338.

Linda Simonson to: 10626 South Dunmoor Drive, Silver Spring, Maryland 20901, USA, tel: (301) 681-6570.

Do please remember to send me changes of address; don't be a 'Lost Member'.
FINALLY: (and about time too; I seem to have been typing this Bulletin for ever and I don't know whether any of you are still with me; I hope so, because all this news and requests and so on may be useful to some of you). About a year ago I suggested that anyone who had other FoKHI members living nearby should organise occasional get-togethers to swap news and problems or just to gossip (harking back to p.2 and the lay-out of the List of Members, this is one advantage of some geographical breakdown). I offered to put such meetings in the bulletin but I've never heard from any of you; perhaps you are organising it yourselves. I hope that you are; it doesn't take much effort and many people like the occasional get-together with colleagues. I've tried twice; the first time was a very pleasant evening; the second time nobody turned up at all! However, I'll try again. Anyone within reach of London who likes to drop in on Sunday, February 20th about 8.15 (pm) will be very welcome. Bring any wives/husbands you like, and any prospective members (and some of your own beer; some beer and light refreshments will be provided). 1400 or so instruments to look at (mostly but not all ethno) and a library and I hope some of your colleagues to talk to.

Jeremy Montagu
7 Pickwick Road
Dulwich Village
London, SE21 7JN.
The Third London
EARLY MUSICAL INSTRUMENT EXHIBITION

The Early Musical Instrument Makers Association wish to extend a cordial invitation to instrument makers and restorers to apply for space at the largest and most comprehensive Exhibition of Early Musical Instruments so far held.

As a direct result of the success of the previous Exhibitions organised by Richard Wood, the Early Musical Instrument Exhibition will be in a hall over two and a half times as large as that used on previous occasions and possessing the facilities needed which include accommodation for concerts and recitals, restaurants and snack bar facilities.

In order to ensure that stand charges are minimised and adequate advertising takes place, an admission charge will be made to the public.

Applications for stands are now being accepted.

Correspondence and enquiries to:- Richard Wood, Early Music Shop, 28 Sunbridge Road, Bradford 1, Yorkshire. Tel: Bradford 20014.

INTERNATIONAL HARPSCHORD WEEK.
Brugge 30th July - 5th August 1977.

This year will see an Exhibition of Harpsichords in more spacious surroundings of the "Provincial Hof", a large grey stone building in the main square of Brugge. The well appointed interior provides a number of large rooms on the ground and first floors in which the instruments will be displayed with a Principle Hall on the first floor in which the competitions will take place.

Over forty makers have indicated an intention to exhibit from Belgium, Germany, U.S.A., France, Switzerland, Canada and the U.K., so it is likely that the many different views of harpsichord makers today will be well illustrated.

The Festival of Flanders concert programme starts on 28th July with Musica Antiqua Amsterdam and Gustave Leonhart and ends on 12th August with the Cardiff Polyphonic Choir.

Programme and full details from:- Tourist Office, Markt 7, B.8000. Brugge, Belgium. Tel: (050)-33-07-11.

-10-
THE METROPOLITAN MUSEUM OF ART, NEW YORK
X-RAYS AND TECHNICAL DRAWINGS

LIST OF X-RAYS AVAILABLE, JUNE 1975

D denotes technical drawings available November 1974

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<th>Accession Number</th>
<th>Description</th>
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<tr>
<td>X307</td>
<td>oboe, early 19th century</td>
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<td>89.4.890</td>
<td>soprano shawm in F, 18th century</td>
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<tr>
<td>89.4.892</td>
<td>oboe in C, 18th century</td>
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<tr>
<td>89.4.893 D</td>
<td>oboe, J. Denner, 18th century</td>
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<td>89.4.894</td>
<td>oboe 19th century, &quot;Camus&quot;</td>
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<td>French flageolet in G sharp, mid-19th century</td>
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<td>89.4.907</td>
<td>tenor recorder in C, 18th century (?)</td>
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<td>alto recorder in F, 18th century</td>
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<td>alto recorder in F, ca. 1700, &quot;I. B. Gahn&quot;</td>
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</tr>
<tr>
<td>89.4.1134 D</td>
<td>cornetto, early 17th century (?)</td>
</tr>
<tr>
<td>89.4.1191</td>
<td>spinettino (part of cabinet organ) late 16th century</td>
</tr>
<tr>
<td>89.4.1215</td>
<td>clavicord, 17th century</td>
</tr>
<tr>
<td>89.4.1349</td>
<td>reed pipe (musette), 19th century</td>
</tr>
<tr>
<td>89.4.1350</td>
<td>fagottino, 17th century</td>
</tr>
<tr>
<td>89.4.1566 D</td>
<td>oboe in C, early 18th century, &quot;Denner&quot; (partial X-ray - lower body joint without keys)</td>
</tr>
<tr>
<td>89.4.1632</td>
<td>French flageolet in F sharp, 18th century</td>
</tr>
<tr>
<td>89.4.1633</td>
<td>French flageolet in C sharp, 19th century</td>
</tr>
<tr>
<td>89.4.1634</td>
<td>French flageolet in C sharp, ca. 1840, &quot;D. Noblet&quot;</td>
</tr>
<tr>
<td>89.4.1645</td>
<td>falconer’s horn, 18th century</td>
</tr>
<tr>
<td>89.4.1670 D</td>
<td>cornettino in D or C, early 17th century</td>
</tr>
<tr>
<td>89.4.1671</td>
<td>hautbois de Poitou, 18th century</td>
</tr>
<tr>
<td>89.4.1673</td>
<td>reed pipe (piffero), 18th century</td>
</tr>
<tr>
<td>89.4.1674</td>
<td>fagottino, 17th century</td>
</tr>
<tr>
<td>89.4.2040</td>
<td>cor anglais or alto oboe, Germany</td>
</tr>
<tr>
<td>89.4.2208</td>
<td>alto recorder in F sharp, mid-18th century, &quot;I. W. Oberlender&quot;</td>
</tr>
<tr>
<td>89.4.2266</td>
<td>reed pipe, 19th century</td>
</tr>
<tr>
<td>89.4.2309</td>
<td>French flageolet in D (?), 18th century</td>
</tr>
<tr>
<td>89.4.2344</td>
<td>virginal, ca. 1600 (partial X-ray - rear end)</td>
</tr>
<tr>
<td>89.4.2395</td>
<td>transverse flute, 18th century</td>
</tr>
<tr>
<td>89.4.2406</td>
<td>French flageolet in C sharp, before 1830, &quot;Collin a Paris&quot;</td>
</tr>
<tr>
<td>89.4.2466</td>
<td>oboe, 18th century</td>
</tr>
<tr>
<td>89.4.2545</td>
<td>clarinet, 19th century</td>
</tr>
<tr>
<td>89.4.2627</td>
<td>flageolet in G, 19th century</td>
</tr>
<tr>
<td>Accession Number</td>
<td>Description</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>89.4.2644 D</td>
<td>tenor recorder in C sharp, before 1686, &quot;H.F. Kynseker&quot;</td>
</tr>
<tr>
<td>89.4.2663 D</td>
<td>alto recorder in F sharp, Hieronimus Franciscus Kynseker, before 1686</td>
</tr>
<tr>
<td>89.4.2695 D</td>
<td>soprano recorder in C sharp, Hieronimus Franciscus Kynseker, before 1686</td>
</tr>
<tr>
<td>89.4.3132</td>
<td>oboe (ivory), 18th century</td>
</tr>
<tr>
<td>89.4.3133 D</td>
<td>tenor recorder in C sharp, renaissance style</td>
</tr>
<tr>
<td>06.194 D</td>
<td>flageolet in G, 17th century, &quot;DeHaze&quot;</td>
</tr>
<tr>
<td>52.96.1 D</td>
<td>cornetto in A (ivory)</td>
</tr>
<tr>
<td>53.56.11</td>
<td>oboe in C, 18th century, &quot;Richters&quot;</td>
</tr>
<tr>
<td>53.56.14</td>
<td>tenor recorder in C sharp, 18th century</td>
</tr>
<tr>
<td>53.56.15</td>
<td>alto recorder in F, 18th century (?)</td>
</tr>
</tbody>
</table>

Orders for X-rays should be sent to the Department of Musical Instruments, The Metropolitan Museum of Art, Fifth Avenue at 82nd Street, New York, New York 10028. You will be informed of the price before the order is processed since prices vary according to print.

All drawings are in full scale on paper. Though intended mainly for organological research, hence omitting occasional details, the drawings include comprehensive measurements. Photographs of these instruments are available on special order. Drawings of other instruments are forthcoming.
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Martin Adcock, Lamb Court Cottage, Pudsey Hall Lane, Canewdon, Rochford, Essex; tel: Canewdon 503 (early strings; M).

R. Anderson, Bakteriologiska Institutionen, Karolinska Institutet, S-104 01 Stockholm 60, Sweden.

Peter Baldry, Fourah Bay College, Freetown, Sierra Leone; (lute, cornett; M,P).

Joachim Braun, French Hill 309/14, Jerusalem, Israel; tel: 02-614195 (bowed instrs; P, hist. of instrs; L).

Peter Ecker, 18 Mount Street, Evesham, Derby, DE7 3AJ; tel: Draycott 2593 (stringed instrs, guitars, keybds; M,H).

John Hodgkinson, 55 Seaberg Road, Kendal, Cumbria, LA9 6AD (violins & bows; M,P).

Gildas Jaffrenou, Ty-Hhos, St. Monica's Road, Kingsdown, Deal, Kent, CT14 8A2; tel: Lea 3858 (harp; H).

Peter Ecker, 18 Mount Street, Evesham, Derby, DE7 3AJ; tel: Draycott 2593 (stringed instrs, guitars, keybds; M,H).

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Gildas Jaffrenou, Ty-Hhos, St. Monica's Road, Kingsdown, Deal, Kent, CT14 8A2; tel: Lea 3858 (harp; H).


P. McCrone, Laxton, nr. Corby, Northamptonshire (bar. oboe; M,P).

K.M. McKay, 27 Elsdon Drive, Forest Hall, Newcastle-on-Tyne 12; tel: Newcastle-o-T 663578 (Northumb. small pipes; M).

Bob Marvin, CP 71, Kornum, Province de Quebec, Canada, G0Y 1A0; tel: 819-544-2091 (flutes, recorders; M,P, teaching).

David G. Miller, Sub Post Office 13, Saskatoon, Saskatchewan, Canada, S7H 0R0; tel: 306-374-9176 (fretted str.; M).

R. J. Peckham, 7 Kirklee Circus, Glasgow, G12 0TV; tel: 041-354 7830 (lute, guitar; M).

Thomas Proctor, 63 Inveraray Avenue, Glenrothes, Fife, Scotland.

B. Richards, Flat 4, 19 King’s Road, Richmond, Surrey (violins; M,P).

Tom Savage, 4 St Ignatius Terrace, Fairhills, Galway, Eire (dulcimer, M,P; bagpipe, P).

Søren Scholtz, Aalyskeves 2, DK 3230 Graested, Denmark; tel: 03-290299 (lute, guitar; M,P).

H. L. Shorto, 5 Denny Crescent, London, S21 4UY; tel: 01-735 7808 (flutes, violin, cornett; C,F).

D. J. Tatem, 34 St Agnes Road, Heath, Cardiff, CF4 4AP (guitar, violin family; M).

Jacqueline Wilthshire, Missenden Abbey, Great Missenden, Buckinghamshire; tel: Gt. Missenden 2328 (harp).

Hans Hermann Ziel, caixa postal 398, 89.100 Blumenau - SC, Brasil (woodwind, recorders, cornettino, violins; M,P).

1977 List of Members - New Entries, as at 13th January, 1977

Christian Brosse, D-2 Hamburg 11, Delchstrasse 32, West Germany (violin, viol; M,H).

Dalia Cohen, 13 Hashba Street, Jerusalem, Israel; tel: 02-350952 (acoust. research, keybds; F,T).

Martin J. Finn, 26 Wades hill, Winchmore Hill, London N21 1EG (guitar, lute; N).

Mark Langweiler, c/o The Turner Brown Farm, Route 1, Highway 45, Fayetteville, Arkansas 72701, USA; tel: (501) 521-4748 (oboe, recorder, crumhorn; F).
Bengt Lennqvist, Ostdalsgatan 8, S. 591 00 Motala, Sweden; tel: 0141/19990 (guitar, lute; M,P).

Ihor Macievski, Candidate of Sciences, 190000 Institute of Theatre, Music & Cinema, Izakijevskaya pl. 5, Leningrad, USSR; tel: 2-11-73-00 (all instrs, esp. ethno & folk).

The Director, The State Museum of Music Culture, Georgievski pereulok 4, Moscow, USSR.

S.G.Stoppani, Lodge Farm, Sheriff Hutton, York.

Because there are so few 1977 members so far that it's not necessary for them, and because only one or two of the 1976 members on this supplementary list have so far renewed for 1977, I've decided to be lazy for once and omit the instrumental breakdown. It will be in the next full list with the next Bulletin and include all who by then will have had time to renew.

A number of small corrections have come in with renewals: additions of instruments, telephone numbers, P.O.Codes, etc., which will also all be in the April list. There is still time to send further corrections.

I would appreciate also any corrections on style; I hope, for instance, that I show foreign telephone numbers in the correct way, but it has sometimes been a matter of guesswork (for instance, some American members give the phone number with hyphens, some don't; some put the area code in () and some don't). Any advice as to the official way to do it in your country, including the address codes, is always welcome.

Jeremy Montagu
1. The name of the organisation shall be the Fellowship of Makers and Restorers of Historical Instruments, and the organisation may use the abbreviated title of "FoMRHI".

2. The objects of the Fellowship shall be the promotion of co-operation and mutual assistance between members in the interests of authenticity in the manufacture, design, reconstruction, restoration, repair and use of historical musical instruments of all types and periods.

3. Membership shall be open to anyone interested in the objects of the Fellowship, irrespective of nationality or domicile.

4. (a) There shall be two classes of members of the Fellowship, ordinary Members and Fellows. In these Rules, the expression "Members" shall include Fellows, but the expression "Fellows" shall not include ordinary Members.

   (b) Any Member may propose the election of any other Member as a Fellow and any member may become a Fellow by a resolution passed by two thirds of the Fellows voting in a postal ballot in accordance with Rule 10 hereof, and the Fellows may rescind any such resolution by a similar resolution passed at their sole discretion.

   (c) Unless the Fellows resolve that there are special reasons why the election of a particular member as a Fellow would be for the benefit of the Fellowship, the qualification for election as a Fellow shall be that the proposed Fellow has made a substantial contribution to the satisfaction of the Fellows by the publication or dissemination of research material or otherwise to the cause of authenticity and accuracy in the manufacture, design, reconstruction, restoration, repair or use of historical musical instruments and has a definite area of expertise, trusted as such by other Fellows, and the Honorary Secretary may call for evidence of such qualification for submission to the Fellows.

5. The annual subscription shall be as determined from time to time by the Fellows. The initial subscription shall be £2 for Members resident in the United Kingdom or elsewhere in Europe and £4 for Members resident outside Europe. Subscriptions shall be payable in advance on the 1st day of January in each year, and if any Member fails to pay his subscription within one month of that date he shall cease to be a Member. However, if arrears of subscription are subsequently received, such person may resume his membership and, if already a Fellow, his Fellowship without re-election.

6. (a) The funds of the Fellowship shall be applied solely in the furtherance of the objects of the Fellowship and no part thereof shall be transferred or paid to members by way of bonus or dividend.

   (b) All monies received by or on account of the Fellowship shall be paid with due promptitude into a banking account to be opened in the name of the Fellowship and no money shall be paid by or for the Fellowship (other than petty cash disbursements or postage.
(6b c't'd) or telegraph fees) except by cheques on such account.
Cheques on the said account up to and including a value of £20
may be signed by the Honorary Secretary or the Honorary Treasu­
er and cheques of a value in excess of £20 shall be signed by
two persons being both the Honorary Secretary and the Honorary
Treasurer or one of such officers and a Fellow.

7. (a) The Honorary Secretary may if he thinks fit at any time, and
shall on the written requisition at any time of not less than
three Fellows stating the business for which it is required,
convene a General Meeting of the Fellowship to be held within
not more than three months of his receipt of such requisition,
if any. It shall not be obligatory on the Honorary Secretary
to call a General Meeting annually or at any other interval (in
the absence of such a requisition) and all business may (unless
otherwise required by these Rules) be transacted by postal
ballot in accordance with Rule 10 hereof.

(b) The Honorary Secretary shall at least one month prior to any
meeting of the Fellowship send to every Member at his address
in the Fellowship's books notice of such Meeting, stating the
time and place of the meeting and the business to be transacted.
No business other than business of a formal nature shall be
brought forward at any meeting unless due notice has been given
as herein provided.

(c) All Members may take a full part in such meetings.

(d) The chair at meetings shall be taken by a Fellow (other than
the Honorary Secretary or Honorary Treasurer) elected at the
meeting for that purpose.

(e) At any such meeting three Fellows shall form a quorum. The
Honorary Secretary and the Honorary Treasurer shall not be
counted towards a quorum.

(f) Resolutions at such meetings shall be passed by a simple majority
of those present and voting (unless otherwise required by these
Rules).

(g) No resolution, motion or election (other than a procedural
resolution for the conduct of the meeting or motion for the
election of auditors) shall have effect unless and until it
has been ratified by a postal ballot in accordance with Rule 10.

8. The accidental omission to give notice of any meeting or other
proceeding, motion, nomination or other matter to, or the non-
receipt of such notice by any Member shall not invalidate the
meeting or other proceeding, motion, nomination or other matter
in question.

9. (a) The Officers of the Fellowship shall be the Honorary Secretary
and the Honorary Treasurer (who may be the same person). Each
shall be elected to their office for a period of three years
and shall be eligible for re-election on retirement. The Hono­
rary Secretary and/or the Honorary Treasurer may be removed
from office at any time by a simple majority of all the Fellows
or by a two-thirds majority of those Fellows actually voting in
a ballot held for the purpose.

(b) The Fellows shall have the power to set up any Committees for
any purpose which they may hold to be desirable and which is
within the objects of the Fellowship.

-16-
10. (a) The Honorary Secretary shall put to all the Fellows for postal ballot or election any resolution or nomination proposed to him for such ballot or election, or any resolution or election passed by any general meeting, as soon as is reasonably practicable and in any case within three months of such proposal or general meeting.

(b) If the Honorary Secretary has received any comments in writing on any such resolution or election within one month of the posting referred to in sub-paragraph (a) above, with a request that such comments be circulated to other Fellows, he shall within three further months so circulate any such comment or comments or a fair summary thereof, and any Fellow who has already voted shall be at liberty to alter his said vote.

(c) Counting of votes shall take place one month after the posting date referred to in sub-paragraph (a) above, or one month after the further posting referred to in sub-paragraph (b) above if such further posting has taken place.

(d) Fellows whose subscriptions have not been received by the Honorary Secretary or the Honorary Treasurer by the time for the receipt of comments or for the counting of votes shall not be entitled to comment or to vote.

(e) The non-receipt by any Fellow of any of the documents referred to in this Rule shall not invalidate any election or other decision made by the required majority of those voting, provided that such documents were properly posted to the last address notified to the Honorary Secretary by such Fellow.

(f) Any resolution, election or other decision shall be passed by a simple majority of those actually voting unless these Rules require some other majority. Election of Fellows shall be in accordance with Rule 4(b) and (c) hereof.

(g) The Honorary Secretary shall keep copies of all material circulated to the Fellowship and shall also keep minutes of all meetings of the Fellowship and of all decisions or elections made by postal ballot. He shall also notify to all members the results of all postal ballots and elections as soon as reasonably possible and in any event within three months after the result thereof is known.

(h) The Honorary Treasurer shall keep proper accounts of the income and expenditure of the Fellowship and shall cause the same to be audited annually by one or more auditors. Such auditors shall be elected by the Fellows by postal ballot or at a general meeting. The audited accounts, together with any report thereon by the auditors, shall be circulated to all members to their last notified address within six months of such audit being completed.

11. These Rules may be altered, repealed, added to or amended, or the Fellowship may be disbanded by a Resolution passed in accordance with these Rules, provided that no such Resolution shall be deemed to have been passed unless it is carried by a majority of at least two-thirds of the Fellows actually voting thereon.

12. If the Fellowship is disbanded any assets remaining after all liabilities have been met shall be divided equally amongst those persons who at the date of the resolution to disband the Fellowship were members thereof, or may be given to such other organisation as the Fellows may decide.

Approved by the Fellows,
September, 1976.
It is a well-known fact that, in the Renaissance, several pitch-standards coexisted, at times even within one single instrument. Although the particulars of the construction of Ruckers' 'transposing' double manual harpsichords are now well known, the role that such instruments played in the contemporary musical life is not yet enough understood. The problem posed by different instruments at different pitches is in fact the same, even if it is less obvious. The distance between the pitches often is a 4th or a 5th so that, in the hypothesis that these instruments served transposition purposes, the transpositions implied are the easiest among the few ones which 16th- or 17th-century musicians had to perform. Another possible hypothesis is that instruments at different pitches corresponded to varying usages; but it would then be very surprising that these pitches should be an integral number of semitones apart. Or else, they corresponded to the usual vocal or instrumental ranges, treble, alto, tenor and bass.

None of these explanations is entirely satisfactory; the fact that they do not necessarily exclude each other is interesting, but not very enlightening. In my opinion, the difficulty arises from the fact that our modern concepts of pitch and transposition are not more adapted to these ancient instruments. The mental processes of the Renaissance musicians were probably not much different from ours but the difference, tiny as it is, produces enough distortion of the image to make it difficult to understand. Our modern theoretical concepts are misleading because they cannot readily adapt to Renaissance times. The conception of pitch and transposition has known a constant evolution since the origins of the Occidental music theory in the Carolingian era. The Renaissance conception is one step of this evolution, ours is another. It may well be that Renaissance musicians considered their conception as the ultimate one, much as we do today. This, of course, was and remains untrue.

In order to fully understand the problem, we should be able to recover the viewpoint of Ruckers' time, abandoning any preconceived idea. It would not be possible to describe in a few pages an evolution of centuries. I will try to give enough below to make my opinion more or less clear; for the rest, I can only refer the reader to the study I am preparing on the subject. The problem is of musicological rather than technical nature; it involves various aspects of the music theory, but I will try to avoid any excessive technicality. In order to set the scene, let us start with the medieval conception, from which the Renaissance one is derived.
1. Diatonic medieval keyboards and modal transpositions

Medieval and Renaissance keyboards often lacked raised keys in the low octave. Edwin Ripin has been able to reconstruct the appearance of the organ keyboard in the 'Mystic Lamb' before its repainting by van Eyck: it began on G with no raised key before f#. As Ripin further showed, the pedalboard of the Norrlanda organ in Stockholm, beginning on C with B♭ as its first chromatic key, is a precise analogy to the bass end of the keyboard in van Eyck's original version. Any regular short octave shows the same succession of tones and semitones, TTSTTTSSS, in the bass octave. The medieval and Renaissance music made little use of complex tonalities: even if chromatic degrees were often demanded in the upper parts of keyboard compositions by the laws of counterpoint, they usually remained un-needed in the bass part.

This explanation is generally thought sufficient. However, it does not take account of the transpositions that may often have been needed when keyboard instruments, the organ in particular, accompanied voices. One may assume that the earliest medieval organs, which often included no other chromatic degree than a b-flat and at times covered no more than an octave, were utilized for playing Gregorian melodies. Later, in the 14th century, it became usual to add counterpoints above the plainsong melody utilized as cantus firmus; the keyboard ranges were extended chromatically toward the treble, but the function of the low octave remained the same as before: it served for the playing of Gregorian melodies.

Thus, the bass part of keyboard compositions usually was given: it normally included no chromatic degree but, in notation at least, its pitch-level was predetermined. The bass part, the cantus firmus, also was the part sung by the choir, either accompanied at the organ or following an organ prelude which gave the pitch and recollected the tune. In any case, it was essential that the pitch at which the cantus was played corresponded to that at which it was sung. Of course, organ builders chose a pitch-standard which, in most cases, equated the notated pitch-level with that convenient to the voices, but the best chosen pitch-standard could not have afforded a complete solution: the plainsong, if notated at its theoretical pitch-level, without alterations, covered a range of about two octaves, too wide for unison singing. The singers themselves would have been unable to sing the whole repertory without transposition.

Even at the time when keyboard ranges were not wider than an octave, the organist's problem was not so much of confining the plainsong within the keyboard range — fragments of the melody could have been omitted — than of giving the correct pitch to start from. Actually, there existed a simple

1 Cf. E. M. Ripin, 'The Norrlanda Organ and the Ghent Altarpiece', in Fest-schrift to Ernest Emsheimer (Musikhistoriska museets skrifter 5), Stockholm, 1974, 193-196. The following section of my communication is an adapted version of a letter sent to Ed when he was preparing this article in 1973.
trick, documented in medieval treatises\(^2\), permitting the choir to intone any chant at any pitch: the singers merely had to transpose at the octave the notes which fell outside the range they could sing. Yet, one could hardly believe that this ever was more than an expedient. Surely, singers and organists knew more satisfactory transposition procedures.

What I want to show is rather obvious: transpositions at the 4th or 5th, the only ones performable on a diatonic keyboard with one chromatic degree per octave, sufficed to solve all problems of pitch. The corollary of this thesis is that transpositions to the 4th or 5th must have been performed much more often than any other and, possibly, knew a special status in the period concerned. For the sake of the argument, let us envisage a somewhat oversimplified case. Since, before the mid 15th century at least, the cantus firmus regularly was confined in the bass part of the keyboard compositions, one may assume that medieval organs often were built at such a pitch-standard that the lowest notes of the keyboard or pedal corresponded with the lowest pitches that the choir could sing. Therefore, the organist's problem reduced to playing the cantus firmus as low as the keyboard permitted. Let us examine the case of a c-keyboard without chromatic key before b\(^5\). The table hereunder shows under a sketch of the keyboard the lowest possible position of an average range for each of the eight modes\(^3\). The finals are underlined.

\[ \text{Mode 1: } \begin{array}{cccccccc} c & d & e & f & g & a & b & b & b \\ c' & d' & e' & f' & g' & a' \end{array} \]

\[ \text{Mode 2: } \begin{array}{cccccccc} G & A & B & c & d & e & f & g & a & b & b & b \\ c' & d' & e' & f' \end{array} \]

\[ \text{Mode 3: } \begin{array}{cccccccc} d & e & f & g & a & b & b & b & c' & d' & e' \end{array} \]

\[ \text{Mode 4: } \begin{array}{cccccccc} A & B & c & d & e & f & g & a & b & b & b & c' \end{array} \]

\[ \text{Mode 5: } \begin{array}{cccccccc} e & f & g & a & b & b & c' & d' & e' & f' \end{array} \]

\[ \text{Mode 6: } \begin{array}{cccccccc} c & d & e & f & g & a & b & b & b & c' & d' \end{array} \]

\[ \text{Mode 7: } \begin{array}{cccccccc} f & g & a & b & b & b & c' & d' & e' & f' & g' \end{array} \]

or \[ \begin{array}{cccccccc} a & b & c' & d' & e' & f' & g' & a' \end{array} \]

\[ \text{Mode 8: } \begin{array}{cccccccc} c & d & e & f & g & a & b & b & b & c' & d' & e' \end{array} \]

\(^2\) Cf. for instance Notker Labeo, in Gerbert, Scriptores de musica (henceforth GS), I, 100; Berno of Reichenau, GS II, 76a; Joannes de Muria, GS III, 272b f.; Engelbert of Admont, GS II, 327b f.

\(^3\) The ranges considered are those described in Oddo's Dialogus, GS I, 259 ff., as tabulated in W. Apel, Gregorian Chant, Bloomington, 1958, 135.
Modes 1, 3, 5, 6 and 8 are untransposed; modes 2 and 4 are transposed to the high 4th; mode 7 is the most troublesome, being either too high or too low. The transposition to the low 5th, with the final on the first key, does not permit the $b_2$ — which would rarely be needed in mode 7, however — nor the subfinal. The organist would probably have transposed the melodies of rather high range, leaving the others untransposed. The overall range of the plainsong in the table covers an 11th or a 12th between c and f or g'. In order to further reduce this range, mode 4 should be transposed to the high minor 3rd instead of the 4th, with three flats; mode 5 should be transposed to the low 2nd, with two flats, and mode 7 to the low major 3rd, with four flats. A fully chromatic low octave would be needed but, even so, the overall range could not be less than a 10th since modes 2, 4 and 8 each cover it alone.

Let us briefly envisage the case of the G-keyboard, supposing that here too the lowest notes correspond with the lowest pitches that the choir could sing — that is, that the G-key of the G-keyboard sounds the same pitch as the c-key of the c-keyboard, or that the pitch-standard of the G-keyboard is a 4th higher than that of the c-one. Obviously, since the succession of tones and semitones remains the same, the modes can be played in the same arrangement as in the table above, where the sketch of the c-keyboard could be replaced by one of a G-keyboard. Modes 2 and 4 would then appear untransposed, modes 1, 3, 5, 6 and 8 transposed to the low 4th and mode 7 to the low 4th or low 8ve. The advantages of the c-keyboard are obvious: the transpositions are much less numerous and they involve a flat rather than a sharp, which seems to have been preferred in the Middle Ages. And indeed, c-keyboards appear to have been much more frequent than G-ones.

2. Transposition and Solmization

In our modern conception, it is possible to transpose following the cycle of fifths toward the sharp or the flat side to the infinite without that the theoretical complexity of the procedure increases as one departs from the starting point. Any remote transposition can be described as resulting from several transpositions to the 4th or 5th. In the Middle Ages and the Renaissance, on the contrary, transpositions to more than one 4th or 5th away from the starting point may at times have seemed to be of a different nature than those involving one step only in the cycle of fifths. In that sense, transpositions to the 4th or 5th which, as we have seen, could meet all needs in the Middle Ages, may have known a special status in that period.

Most medieval organists probably received their first training in music as singers; in addition, when improvising counterpoints on a cantus firmus, they probably used to read the cantus firmus in vocal notation. These are reasons to believe that they thought in terms of solmization. The solmization system, in the Middle Ages at least, included two terminologies. The first one described the position of the notes within the gamut or, more practically, within its materialization on a keyboard or a monochord. According to this terminology, the final of mode 1 would have been described as solre on the c-keyboard, as Are on the G-one: it closely corresponded to our modern terminology. The second solmization terminology described the
function of the note considered, saying for instance that the final of mode 1 was re^4. This implied that there was a semitone between the 2nd and 3rd degrees above this note. The first terminology was utilized in theoretical discussions and appears more often in treatises. The second was practiced by singers and probably by instrumentalists — although the latter often were confronted with the duality of solmization since the notes they played, when viewed as degrees of an instrumental range, were named according the first terminology.

However, if one can admit that some medieval organists at least dubbed re the final of mode 1, and the other notes accordingly, then one must admit that the difference between transposed and untransposed modes, or between the c- and G-keyboards, must have been much less obvious to them than it is to us. Both keyboards began with an ut and, if the pitch-standards were exactly a 4th apart, both ut's sounded the same pitch. The only obvious difference between the two keyboards was that the first had its second fa (bb), the second its second mi (f#) as first raised key — the fact that the Norrlanda organ has both bb and f#, that is both fa and mi, as lower keys takes here its full significance. Unless the organist, having developed some insight into the theory of the Gamut, realized that the ut of the c-keyboard was a cfaust, that of the G-keyboard a Gammut, he may not have been fully aware that one keyboard was 'transposing' with respect to the other.

The relation between the two solmization terminologies is clear: each name in the first terminology includes all syllables that can be utilized for that degree in the second terminology: thus, dsolre means that the degree d can either have the function of a sol or that of a re in a melody. Inversely, each melodic function, each syllable of the second terminology can be found in several names of the first terminology. For instance, re appears in Are (or its octave alamire), in dsolre (or its octave diasore) and in gsoireut. In general, each syllable is found in three different names per octave and can thus be played on three different degrees per octave in the Gamut, on three different keys per octave on the keyboard. The 'natural' position of re, for instance, is on dsolre; it can be transposed to the low 4th on Are ('hard' position, involving the bb since the degree above re must be a tone above it) or to the high 4th on gsoireut ('soft' position, involving the bb since the degree a 3rd above re must be a minor 3rd above it). Any other transposition is outside the possibilities of the system and involves musica ficta.

Apparently, the transpositions possible within the solmization system would be to the high or low 4th — or, of course, to their octave5. Things were somewhat more complex in practice, however. The melodic function of a note was deduced mainly from its proximity to a semitone. The notes bounding a semitone were called mi and fa; sol and la respectively meant 'a tone' and 'two tones above the semitone'; re and ut meant 'a tone' and 'two tones below the semitone'. There was no need to imagine names for notes farther

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4 Several medieval treatises describe the finals of the modes as re, mi, fa and sol rather than as D, E, F and G, e.g. Hieronymus of Moravia in Coussemaker, Scriptorum de musica ..., I, 77a f.

5 Unlike our theoretical musical scale, the Gamut has limits and a rather narrow range, so that strictly speaking octave transpositions are not always possible within the system.
from the semitone since, provided the music was diatonic, these notes farther away always would be closer to another semitone and be called with respect to it. Thus, the syllables attributed to the degrees of a melody in mode 1 without b₇ would have been the following:

\[
\begin{array}{cccccccc}
\text{c} & \text{d} & \text{e} & \text{f} & \text{g} & \text{a} & \text{b} & \text{c'} & \text{d'} \\
\text{ut} & \text{re} & \text{mi} & \text{fa} & \text{sol} & \text{re} & \text{mi} & \text{fa} & \text{sol}
\end{array}
\]

Such a melody was not readily transposable to the low 4th or high 5th: the lower re was transposable from d (dsolre) to A (Aare) or a (alamire), but the higher re could not have been transposed from a (alamire) to e or e' (both called elami) without 'placing on this degree a syllable which is not naturally there', which is one of the definitions of musica ficta.

To some extent, medieval musicians utilizing the solmization system would have considered that the higher re in mode 1 untransposed, placed in 'hard' position on alamire, was placed there by virtue of some kind of transposition. Transposing mode 1 to the high 4th, as this:

\[
\begin{array}{cccccccc}
\text{f} & \text{g} & \text{a} & \text{b₇} & \text{c'} & \text{d'} & \text{e'} & \text{f'} & \text{g'} \\
\text{ut} & \text{re} & \text{mi} & \text{fa} & \text{sol} & \text{re} & \text{mi} & \text{fa} & \text{sol}
\end{array}
\]

not only implied transposing the lower re from its 'natural' position on d to its 'soft' position on g, but also 'detransposing' the higher re from its 'hard' position on a to its 'natural' one on d'. Mode 1 was not theoretically more complex when transposed to the high 4th than when untransposed: rather, half of the melody was viewed as transposed in both cases — what varied was which half was transposed.

If the melody included a b₇ instead of a b₄ when untransposed — it must be kept in mind that the b₇ was an intrinsic part of the Gamut and that its presence in a Gregorian melody does not necessarily result from a transposition — it was not readily transposable to the high 4th or low 5th:

\[
\begin{array}{cccccccc}
\text{c} & \text{d} & \text{e} & \text{f} & \text{g} & \text{a} & \text{b₇} & \text{c'} & \text{d'} \\
\text{ut} & \text{re} & \text{mi} & \text{fa} & \text{re} & \text{mi} & \text{fa} & \text{sol} & \text{la}
\end{array}
\]

The lower re is transposable to its 'soft' position on g but the higher one, already in 'soft' position, cannot be further transposed in that direction without musica ficta. This makes it clear that the only transpositions performable in the solmization system had the effect either of adding a flat in melodies having none or of removing it from melodies including it when untransposed. The Gregorian repertory also includes melodies having both b₇ and b₄, which were wholly untransposable without recourse to musica ficta. I cannot enter here a discussion of musica ficta: for the present purpose, it will suffice to know that it was quite a complex procedure, one to which, as Schlick said, 'not everyone is used'.

To sum up: in the solmization system, transpositions to the high or low 4th and their octaves were in some cases so trivial that organists — and musicians in general — might not have been aware of performing them. All other transpositions involved such complex processes that not everyone was able to perform them.

This is the obvious reason why the solmization system is based on hexachords. In the diatonic system, semitones never are separated by less than two tones nor by more than three.
3. The transpositions according to Schlick

Schlick's Spiegel is the earliest treatise known today that provides detailed information on the performance of transpositions. His discussion confirms that the foregoing description of the medieval transposition procedures is in general correct and shows that things were not yet much different in 1511. Schlick describes two pitch-standards, recommending one of them for the facilities it affords when accompanying singers. At his recommended pitch, he shows how to play modes 1, 3, 5, 6 and 7. The table hereafter, which adapts Schlick's indications to the same modal ranges as in the table above, has an overall range of an 11th between e and a'.

![Diagram of musical notes]

Mode 1: c d e f g a b b b c' d'
Mode 3: d e f g a b b b c' d' e'
Mode 5: e f g a b b b c' d' e' f'
Mode 6: c d e f g a b b b c' d'
Mode 7: f g a b b b c' d' e' f' g' a'

Although Schlick does not discuss mode 8, it could easily be added to the table: transposed to the high 4th, its range is f-a'. Adding modes 2 and 4, on the other hand, necessarily would extend the range to a 12th or 13th; whether this must be done on the high or the low side raises the controversial question of Schlick's pitch, which I will avoid here.

Although Schlick's keyboard is fully chromatic, no transposition other than to the high 4th is envisaged as a regular procedure at his recommended pitch. The indications concerning the other pitch are too incomplete to permit drawing a table as for the recommended pitch, but the important point is that all transpositions envisaged there are to the low 5th. The whole discussion of the pitches in the Spiegel is in fact to the effect of avoiding \textit{ficta} transpositions. If none of his two pitches is utilized, Schlick says, 'persons are often forced to sing too high or too low, unless the organist plays the semitones, which is not convenient for everyone.'

\footnote{The choice of Oddo's modal ranges for the table above would need a justification in the case of a discussion of Schlick's pitch. The repertory includes melodies of much wider range than these.}

\footnote{Spiegel, ij r°. Mendel's translation as in \textit{MO} XXXIV (1948), 33.}
The medieval idea that the bb could at times be a lower key was still in existence in Schlick's time. He recommends a pedalboard covering a 12th from F to c', which is in two keys more than many early-16th-century pedal ranges. Therefore, special care was needed for the appearance of the two top keys which may have seemed unusual to some organists. Schlick writes: "The bb at the top of the pedal keyboard, just under the c', should not be a long key, like the Bb an octave lower, but short and high, like the other semitones. Then the bb will remain below, as was customary among our forefathers, and is more practical for everyone even today, since until now few organs have had any keys above bb in the pedal."

Schlick's descriptions of transpositions to the high 4th or low 5th are rather laconic. He says for instance that 'mode 7 will have to be played on clau' or that 'mode 3 will be played on alamire' - 'mode 7' and 'mode 3' meaning of course 'the final of mode 7' and 'of mode 3'. These transpositions clearly needed no explanation. In view of this, it is particularly enlightening to note how detailed the descriptions of other transpositions are. They always include considerations of the solmization procedure involved and always warn against the difficulties. Here follow a few examples.

One advantage that Schlick cites in favor of his recommended pitch is that the finals of modes 1 and 7 fall on the same key, g, while at the other pitch the final of mode 7 is on c, that of mode 1 on d. Since in both cases the final of mode 3 falls a tone higher still, the other pitch has three different finals for these three modes unless the organist plays in musica ficta, mi on d, which is good to do, but not familiar to everyone. Mi is the final of the third mode, of which the natural position is on e; the transposition implied is to the low tone.

Schlick discusses melodies involving both bb and Bb which, as we have seen, cannot be transposed without musica ficta. He mentions one in mode 7 as much easier to play at his recommended pitch - where indeed it would not be transposed - 'for otherwise the organist would have to play it on c, where mi and fa would fall on e, or play it on d, with mi and fa on f. He may be fluent in playing chromatics, as is necessary and agreeable for a master organist, but not everyone has practised this.' That is, the final must be placed on c through a transposition to the low 5th, the chromatic semitone (mi and fa) falling on e and e, or on d through a transposition to the low 4th, with the chromatic semitone on f and f#.

He also mentions the hypothetical case of two masses based on the same cantus firmus - a Magnificat in mode 6 - where the bass counterpoint would descend to c in the first, to Bb or A in the second. Although the two masses be written 'on the same lines and spaces' - that is, at the same notated pitch-level - the second will have to be played with the modal final on d, a tone higher than the first where the final would be on c', in order that the low notes of the bass remain within the singable range. In the second case, 'fa will be on d, mi on the semitone above c', or c#, re on b and ut on a, which however is difficult and impossible for some organists, who did not exercise themselves at that. Use will indeed be made of the ficta hexachord on a.

9 Spiegel, vij r°; Mendel, 39. 10 Spiegel, iij r°; Mendel, 35.
11 Cf. note 4 above. 12 Spiegel, iij r°; Mendel, 36.
13 Bass counterpoints were usual in Schlick's time, which is the reason why his plainsong range is not confined at the bottom of the keyboard. 14 Spiegel, iij r°.
These examples show clearly enough, I hope, that Schlick's conception was closer to that of the Middle Ages than to our modern one. Transpositions were still performed through the solmisation system, with the result that transpositions other than to the high 4th or low 5th remained extremely difficult. Such transpositions were 'necessary and agreeable for a master organist', but Schlick apparently did not expect the normal organist to be fluent at them.

(To be continued)
COMMENDATIONS FOR DRAWINGS OF KEYBOARD INSTRUMENTS

Workshop drawings of musical instruments have until recently been made largely by builders for their own use, and their style and completeness was a matter of personal convenience. A new generation of workshop drawings now exists, however, made by or for the owner of the instrument and offered for sale to builders who wish to make copies.

This practice is popular with the owner, usually a museum, because it is a useful source of income and at the same time protects the instrument from the repeated measurements of various builders and from the consequent liability to damage. Compared with drawings produced by private visitors for their own use, those produced officially by museums are likely to be more thorough and more accurate. Since the instrument will need to be dismantled for drawing there are advantages in undertaking it in conjunction with a restoration.

The production of a drawing often involves considerable scholarship in the identification of alterations, and there are parallels with the production of performing editions of early music. About 25 harpsichord drawings are already available from seven or eight different sources, and the fair measure of agreement on content and method which these show owes much to the outstanding work of R. K. Lee, Watertown, Mass., USA.

It should now be possible, therefore, to discuss in some detail how harpsichords should be drawn and how much information is desirable. Builders buy at least 95% of the drawings sold, and if their needs are considered, the interests of smaller groups such as musicologists and teachers will automatically be served. The following discussion and recommendations will apply closely to clavichords, virginals, spinets and pianos and apply to some extent also to non-keyboard instruments.

CONTENT

1. The original state should usually be the main subject of the drawing. If the instrument has been altered, it will nearly always be the original state which is of most importance to builders of copies and to musicologists. Sometimes a drawing done in this way will look very different from the surviving instrument which, if it is restored, will normally be returned to the last state of legitimate musical use.

2. Alterations from the instrument's history of legitimate musical use should be shown if possible, but with less visual prominence than the original state.

3. When distortion is present (as in almost every stringed-keyboard instrument) the simple distortions caused by string tension should be corrected. Thus when a wrestplank is concave on one side and equally convex on the other it is reasonable to assume both sides to have been flat when they were planed. If the distortion is slight its correction need not be noted, but if it is great it may be best to indicate its extent and to correct the nut positions also. Bentsides are subject to
considerable stress and usually distort at the top edge while retaining their original curve where fixed to the baseboard. At the same time the cheek twists out of parallel with the spine. This effect should be corrected without mention if it is small and uncomplicated but its correction should be mentioned if it is large or combined with other effects. The same rule should be applied when a piece of wood is obviously warped, e.g. the stretcher of a stand, or when it has been cut to remedy a distortion e.g. a lid or front flap. Keys should be drawn as regularly spaced and in line with each other.

4. If a part is missing it should be reconstructed whenever possible, identifying the other instruments used as sources. This is what an editor of an Urtext would be expected to do with a missing or damaged part of a manuscript.

5. Alterations which are known to be modern should be ignored or corrected without mention.

6. Large measurements need not be noted in figures since they can be accurately scaled from a full-sized drawing but small and important measurements, e.g. the thicknesses of jacks, should be written down. Case thicknesses should be drawn in the plan view as they exist from point to point and not rationalised or made uniform.

7. Construction marks and scribed lines should be reproduced on the drawing, and also lettering or handwriting if it can be rendered accurately.

8. Materials should be identified as accurately and as completely as is practicable.

9. In some cases the orientation, regularity or spacing of annular growth rings in timber is important or interesting and should be noted.

10. Some parts have important variations of thickness, especially the soundboard, and such variations should be detailed as completely as is practicable.

11. Whenever possible any restorational experience of apparently successful solutions of problems of pitch and stringing should be noted, with some guidance on its reliability.

12. The position of every original bridge pin, nut pin, tuning pin, hitch pin, balance pin and guide pin should be indicated on the drawing and every slot in at least one register should have its outlines or centre lines marked.

PRESENTATION

13. A plan view with the spine along the top of the drawing and a side elevation showing the instrument between the keyboard end and the bellyrail are normally supplied, the latter view usually making use of space on the drawing below the bentside. It is usually best to show the keyboard or keyboards on a separate plan view. If this is done the orientation of the keyboard relative to the general plan should be preserved since photographic copying machines pass master and copy together over a cylinder, accurately reproducing the width but producing a slight difference of length between the two. This difference may prevent a plastic copy being used as a template for both the keyboard and the registers if the drawing
shows the keyboard as though removed from the keywell and turned through a right-angle. In most cases the jackrail, jacks and keyboard can be shown in place on the side elevation without causing confusion. Most of the details of a lid can also be shown on this view though the lid overhang must be indicated on the plan. The side elevation of most harpsichords becomes a maze of dotted lines if taken beyond the belly rails. A perspective sketch of the structure below the soundboard is much easier to understand, in conjunction with the general plan. Other elevations and sections are not usually required unless some features are more complicated than usual, e.g. a double thickness bentsice.

14. The practice of superimposing component sections on the plan is very useful, especially with parts such as the bridge which change section gradually from end to end.

15. Explanatory remarks which refer to a local feature are best written on the drawing against that feature. However, a general explanation is usually better on a separate typescript because, firstly, it is smaller and therefore easier to read, secondly, it can be more easily up-dated and thirdly, it is then relatively easy to add or substitute versions in other languages.

16. Long scales for measuring purposes should be provided in both the lengthwise and transverse directions, preferably incorporated into a border pattern all round the drawing.

It may be mentioned that if overall X-ray photographs are used as a mechanical basis for constructing the drawing, it becomes more difficult to identify and eliminate distortions than if the drawing is constructed from rubbings or templates taken from the component parts of the instrument. However, the actual techniques of transfer of measurements and questions of accuracy could usefully be discussed between various draughtsmen.

The above recommendations are not meant to imply that working drawings are valueless unless they contain all the information that a builder desires. Drawings produced by museums with the limited object of documenting certain aspects of their instruments are very welcome, provided that they are accurate and scholarly, since these drawings will often supplement others which are more comprehensive.

Frank Hubbard has pointed out that reliance on drawings is a modern preoccupation connected with a desire for variety and experiment (Three Centuries of Harpsichord Making, Harvard 1965, p 215). The methods by which harpsichords were formerly constructed rely largely on linear measurements and a preferred order of construction designed to transfer critical dimensions from one part to another. These methods will repay study, but for builders whose models derive from various periods and various parts of Europe, drawings are almost indispensable.

We may soon see builders advertising harpsichords "conforming to the official published data on the harpsichord by X in Museum Y". Instruments made in this way by different builders should exhibit a much closer family resemblance to each other than we are used to finding at present among supposedly similar copies. Such a family resemblance, once a consensus is established, could for the first time suggest how harpsichord X sounded when new, and provide a welcome check on the validity of Museum Y's restoration.
In Communication 41 I summarised the characteristics of pegboxes associated with various numbers of courses. It occurred to me that it would be useful to support this with some more concrete evidence.

At the 1976 Lute Society summer school I spent some time going through the Lute Society picture collection, documenting the kinds of pegboxes I found there. 142 pictures were examined, pictures of all lutes with theorbo-like heads being omitted, as were pictures of very small lutes (mandorlas etc.).

Pictures in the collection are categorised by date. Pictures examined fall into the time periods early, mid and late 16th C, early mid and late 17th C and early and late 18th C (there is no mid-18th C class).

Many of the pictures examined are so indistinct that it is impossible to say anything definite about the stringing and/or the type of pegbox. For each time period I have divided the pictures into two categories: Distinct pictures which leave little or no doubt as to the shape of pegbox and number of courses, and doubtful pictures which need some guesswork in their interpretation.

Early 16th C lutes:
Distinct pictures-
two 5-course lutes; straight, bent-back pegboxes without treble riders
two 6-course lutes;
Doubtful pictures-
one 4-course lute;
five 5-course lutes;

Mid 16th C lutes:
Distinct pictures-
three 6-course lutes;
Doubtful pictures-
one 4-course lute;
one 6-course lute;

Late 16th C lutes:
Distinct pictures-
three 6-course lutes;
one 7-course lute;
Doubtful pictures-
three 6-course lutes;

Early 17th C lutes:
Distinct pictures-
two 6-course lutes;
four 7-course lutes;
three 8-course lutes;
one 9-course lute; straight, bent-back pegbox with treble rider
one 10-course lute;
one 5-course lute; straight, bent-back pegbox without treble rider
Doubtful pictures-/
Doubtful pictures-
one 7-course lute; straight, bent-back pegbox without treble rider
one 7- or 8-course lute; straight, bent-back pegbox with treble rider
one 9- or 10-course lute; straight, bent-back pegbox without treble rider
one 10-course lute; diapasons on a separate head with one nut

Mid 17th C lutes:
Distinct pictures-
one 7-course lute; straight, bent-back pegbox without treble rider
two 8-course lutes; straight, bent-back pegbox without treble rider
one 9-course lute; straight, bent-back pegbox with treble rider
two 12-course lutes; two S-shaped pegboxes with diapasons on stepped nuts

Doubtful pictures-
two 6-course lutes; straight, bent-back pegboxes without treble riders
one 8-course lute; straight, bent-back pegbox with treble rider
one 9-course lute; straight, bent-back pegbox without treble rider
one 10-course lute; - do -
one 10-course lute; diapasons on separate head with one nut
three 11-course lutes; straight, bent-back pegboxes with treble riders
seven 12-course lutes; two S-shaped pegboxes with diapasons on stepped nuts

Late 17th C lutes:
Distinct pictures-
nil.

Doubtful pictures-
one 8-course lute; straight, bent-back pegbox with treble rider
two 12-course lutes; two S-shaped pegboxes with diapasons on stepped nuts

Early 18th C lutes:
Distinct pictures-
one 6-course lute; straight, bent-back pegbox without treble rider
four 11-course lutes; straight, bent-back pegboxes with treble riders
one 12-course lute; two S-shaped pegboxes with diapasons on stepped nuts

Doubtful pictures-
one 9-course lute; straight, bent-back pegbox without treble rider

Late 18th C lutes:
Distinct pictures-
two 6-course lutes; straight, bent-back pegboxes with treble riders

Doubtful pictures-
one 13-course lute; straight, bent-back pegbox with bass bracket (treble rider apparently broken off)

Discussion
It is surprising how many lutes appear in pictures much later than the music we associate with these instruments - for example there is a number of 5-course instruments still in use in the first part of the 16th C - a period we associate with the 6-course lute. Even more surprising, a number of 6- and 7-course lutes are depicted in the mid-17th C - a period we associate with 10- to 12-course lutes and French tunings.

In the late 16th C, one of the most common types of lute is the 6-course lute with a treble rider, which may well have been tuned and played like a guitar.
It is interesting, too, that lutes with two S-shaped pegboxes appear on nearly half of the mid 17th century paintings but have nearly vanished by the early 18th C.

It should be noticed that a significant proportion of lutes with 8 or more courses have treble riders, from the early 17th C onwards. This is at variance with what I stated in paragraph A of Communication 41. I recant.

It is to be noticed that a significant proportion of lutes with 8 or more courses have treble riders, from the early 17th C onwards. This is at variance what I stated in paragraph A of Communication 41. I recant.

I am grateful to Eph Segerman for his additional comments on Communication 41, which appeared in Bulletin 5.

I do not agree that the illustration in Mace (1) is of an eleven-course lute. The number of strings shown on this lute is twenty-two. If, as Eph suggests, this is an eleven-course lute then the top courses must be double. All Mace’s music is written for 12-course lute. Nearly every piece involves diapason no. 5, i.e. the 12th course. Mace himself built the lute in the illustration. It is unlikely that he would have built an 11-course lute when his music is specifically for 12-course lute. It is possible that the illustration is inaccurate; the theorbo part is also one course short and the number of pegs does not tally.

The most esteemed lutanist who used the two-headed French lute was Jacques Gautier (d’Angleterre). His preference for the two headed lute is discussed in the Burwell lute book (2), Very little music by Jacques Gautier survives, the only certain compositions being those in the Dalhousie no 4 MS. These were written towards the end of his life and need a 12-course lute in D-minor tuning. The other pieces which are probably by him are to be found in Dalhousie no. 8 (12-course, flat tuning) and in Herbert of Cherbury’s MS (10-course, renaissance tuning).

It is therefore certain that the two-headed lutes of Mace and Jacques Gautier are 12-course lutes. The Burwell book and later French publications make it clear that the single headed French lute had 10 or 11 courses.

In the absence of firm evidence to the contrary, I would suggest that the double S-shaped pegbox, with stepped nuts for the diapasons, should be used only for 12-course lutes. 11-course French lutes should therefore have only a single head.

References:
(1) Thomas Mace, Musick’s Monument. London, 1676.
Classic Guitar Shape.

Noticing idly while at an exhibition that a guitar on display was lying on its side with the top machine, the edge of the upper bout and the edge of the lower bout in line on a bench, I was incited to check on the dimensions of several guitars and found as illustrated (not to scale) that the quadrilaterals $ABHG$, $GHFE$ and $EFCD$ are respectively five twelfths, four twelfths and three twelfths of the area $ABCD$. Is this a strange coincidence or is there a constructional reason?
We have been able to examine Christopher Page's translation of Jerome of Moravia's instructions for tuning the vielle (or medieval fiddle) that he is publishing in Early Music soon. It contains some points about playing which are consistent with a flat bridge but could also be interpreted in terms of some bridge curvature.

The instrument has five strings and he gives three tunings: d G g d' d', d G g d' g' and G G d c' e'. In the first the bourdon d string is off the fingerboard, in the second it is on the fingerboard, and in the third the first of the two G's is a bourdon off the fingerboard. He stated that a fifth interval was available to be fingered on each string but that the bourdon when off the fingerboard was only sounded open. Jerome mentioned that the accomplished vielle player knows "how to answer any note from any melody with the drones in the first harmonies". The word 'answer' could imply sequential playing of the melody and drones, and the plural 'drones' implies that more than one drone played simultaneously.

He then added that "the bourdon must not be touched by the thumb or the bow except when the other strings are played with the bow to produce the notes with which the bourdon makes one of the afore-said consonances, namely the fifth, octave, fourth, etc." From the pictures of these instruments we notice that the off-fingerboard bourdon string goes into a hole on the side of the pegbox. The location of this hole is generally lower than that of the top surface of the fingerboard. Thus if the bridge were flat, the bourdon would be played with the other strings if bowing were near the bridge, but it could be missed out if bowing were further from the bridge. Whether the bridge was flat or not, Jerome seems to imply that more than one other string played with the bourdon (ie. at least the 4th and 3rd strings) when it was chosen to be played. On this assumption the bridge could have been curved only on the right (or treble) side where, presumably, the melody would be played. The first and 5th strings could always be bowed without the others whether the bridge was flat or curved. The above arrangement (3rd 4th and 5th strings in a line on the bridge) would allow the second and third strings to be sounded individually as well. If we assume that the melody was always capable of being played on individually sounded strings then it would have a range of a 9th (g - a') with an added d in the first tuning, 3 octaves (d - d') in the second and an octave and a 4th (d - g') without a b and with an added G in the third tuning.

The second tuning differs from the first by adding a g' string and making the d string stoppable. Jerome stated that this "is necessary for lays and all other kinds of songs, particularly irregular ones, which frequently wish to run throughout the whole [Guidonian] hand." The range of the hand is 2 octaves and 6th, and it is clear that the d string has to be brought on to the fingerboard to get this full range.

To set up a bridge for this system, start with the strings in very shallow locating notches in its flat top. Then deepen the notch for the first string just enough so that the second string can be individually played. Then deepen the notch for the 4th string just enough so that the 3rd string can be individually played. Finally, deepen the notch for the 5th string just enough so that the 3rd, 4th and 5th strings can be bowed together near the bridge and that the 3rd and 4th strings without the 5th can be bowed away from the bridge.
Different bridges would need to be used for different tunings requiring string changing since action adjustment depends so critically on string diameter. A higher bridge placement for the second tuning than for the others would also be required if the tunings were expected to be absolute as compared to some local pitch standard rather than purely relative. This is because of the greater total range of this tuning and this increased range has to be transferred to the bass.

We know of no data that positively excludes completely curved bridges with notes ringing together after being actuated in quick succession. The iconographic data does exclude large curvature such as in the modern violin and viol families. We know of no data that excludes all of the fingerboard strings being in one plane, except perhaps in the difficulty of getting appropriate pitches for all of the strings when, as reported, such fiddles played in polyphonic music. We present here a compromise bridge-notching system which allows all of the strings Jerome said sounded together to be bowed together without inhibiting the melodic freedom inherent in curved bridges.

Jerome gave us no indication of how to tune the 3- and 4-stringed fiddles that appear regularly in the early illustrations. Since he implied that advanced knowledge was necessary to properly use the bourdon string it seems likely that a player without such knowledge could be expected to do without it. The next most expendable string would be the one next to it, G which from our above argument concerning his second tuning was not normally used in playing the melody. The subsidiary function of this string could explain the greater range in this tuning than our analysis of gut string ranges would allow.

There is an alternative approach to the 3-stringed fiddle. As we discussed in FoMRHI Comm. 36, Tinctoris mentioned a type of bowed viola with 3 single (not paired) strings tuned in fifths having a markedly rounded bridge. Though we interpreted this statement as an earlier description of the violin than has generally been thought of, Tinctoris implied no novelty for this instrument and it could well have been in existence for some time.

Occasionally, early illustrations give indications of what might be markedly curved bridges. An interesting relevant illustration is the miniature from the Peckover Psalter from mid 13th century France (available as a postcard from Blackburn Museums and Art Gallery, Blackburn, Lancs.). It shows David playing a harp with a musician playing an oval 5-string fiddle with 2 central C holes. Above their heads is a waisted 3-string fiddle with 4 C holes symmetrically arranged amongst the bouts. Both instruments are shown in the usual frontal view. The pegbox design of both fiddles is identical, like a rose with 7 petals, implying that they may be a matched pair. No bridges are evident, so either they were omitted or they are integral with the tailpieces. The bridge end of the tailpiece of the 5-string fiddle appears straight but that of the 3-string fiddle is curved, possibly indicating a curved bridge (integral or omitted). A proper survey of the illustrations of Medieval fiddles needs doing, looking for evidence on bridge curvature and relating it to other parameters such as shape and number of strings.

In summary the possibilities of curvature of the string bowing surface on medieval (and Renaissance instruments as well) are 1. no curvature, 2. slight curvature
and 3. marked curvature. Possibility 3 could have been used from the beginning of bowing on some instruments but more research is needed to confirm this. (There is no distinction between 1, 2 and 3 for the early 2-string rebec, so this suggestion refers to instruments with 3 or more strings.) Possibilities 1 and 2 are both possible with flat topped bridges. In 1 different notch depths are needed to compensate for different string thicknesses and in 2 they also provide the curvature. Jerome’s instructions do not discriminate between 1 and 2 for the 5-string fiddle and we have seen no distinguishing iconographical evidence on this instrument.

* Later instruments set up like this were the lyra da braccio and the lirone (or lyra da gamba). The early fixed-bridge viols (grosse-geigen) depicted by Virdung and Agricola were probably like this as well and thus could have been the lirone’s direct antecedent. The chordal style of playing on later viols as mentioned by Ganassi could be remnants of the ancestry.

SOME SPECULATIONS ON MEDIEVAL FIDDLTE TECHNIQUE

Many depictions of the playing of medieval and Renaissance bowed instruments show the bow near the middle of the string. This, as many have supposed, could be the result of inaccurate depiction since experiments with this bowing position result in a very thin wheezy tone.

Many depictions show the bow at a considerable angle to the string. Experiments with such an angle rarely result in any more than squeals, so this is also considered artist error.

There is a bowing technique which makes both of the above observations realistic. The bow can start near the bridge producing the usual bright tone but during the stroke the bow can move up the string with the tone projection not suffering as much as might be expected. There is a change of quality when the bow moves up the string and this could have been considered as an attractive type of tone shaping of notes. This suggestion implies that bowing of longer notes is primarily in one direction only.

This bowing technique is easiest when the bow is held at an angle to the string. Strings sound when the hairs are moving perpendicular to the string and they squeal when the direction of motion is at a different angle to the string. If the bow is held at an angle so that at the start of the stroke it touches the string near the bridge and then the arm moves perpendicular to the string keeping the bow angle, the bow hairs pass over the string in the required perpendicular direction, while the point of bowing moves up the string.
The left thumb of players of medieval fiddles does interesting things in the paintings. It often is bent over the fingerboard stopping one or two strings nearest to it. A tone above the open strings (about 10% of the open string length) is the usual but two tones (about 20%) appears as well. If we consider the first of Jerome of Moravia's tunings, a thumb stopping both the G and g strings at the tone above gives a D tonality for the drones. Stopping the G string in the third tuning at the tone and leaving out the bourdon gives a D tonality to the drones, and stopping it two tones up gives a G major triad including the bourdon. These are examples of what such a thumb stopping technique probably did then. Modern guitarists in the folk and jazz traditions use it as well.

At other times one sees the thumb pressing against the bourdon string. Jerome of Moravia mentioned the thumb touching the bourdon string and since he said that no more notes than the open string pitch were available, we presume that he was referring to a plucking action. Another possibility not mentioned by Jerome is stopping the string in mid-air with the nail, a technique probably used on the 'bowed lyre' and used today by Greek lyra and North-Indian sarangi players.

This could have been a technique too advanced for Jerome to mention. This statement is given credence if we consider the range of stopping of strings on the fingerboard. Jerome said that it was but a fifth, but the fingerboard hangs over the soundboard, offering an octave range. Constructional features of instruments either arise from utility or are incorporated because of continuing traditions which involved utility at some previous time. Since we know of no previous tradition which used higher positions regularly, we presume that the overhanging fingerboard was then used. Bermudo said* that "Whoever wishes to play good music and easily should not go beyond the seventh fret of the first course, even though he loses the applause of the villagers- the common people praise no one unless he goes over the frets." This shows that social distinctions as well as technique advancement operate to create differences between the statements of a tutor to a generally educated audience, and what competent players did. Improvisors on any instrument tend to explore all of the sounds that are technically possible to produce which do not violate their aesthetic traditions.

We thus expect that higher positions and thumb-stopped bourdons are good candidates for being probable aspects of advanced medieval fiddle technique.

The unison tuning of the first and second strings of Jerome of Moravia's first and third tunings suggests the possibility of bowing either one or both as an interpretative device, like contrasting solo and tutti. They were probably fingered together most of the time. The G and g adjacent octaves in the first and second tuning were probably also fingered together most of the time to maintain consonance.

* Bermudo, J. Declaracion de instrumentos musicales (1555) Translation by John Roberts.
What is a Musical Instrument?

What I will say is obvious; it has been often repeated, and it is universally hailed as truth. Yet either the telling is unsuccessful, or the substance goes against some human grain. Like "Darwinian" evolution it is often acknowledged, but rarely assimilated into thought.

A musical instrument is properly a tool for sound. It can be admired as a creation by the maker, as an object by the owner, or as a token of social intercourse by the player. But relating to musical sounds, it is only the exposed physical tip of a complex musical organism. When severed from that structure, it ceases to be truly a musical instrument.

We all agree. Why then do we make instruments and play music in a fog of indifference to subtle relations between instruments and music? Perhaps it's a matter of time, of repetition, until the idea becomes common thought. But perhaps there are ways of speaking and thinking that will spread this sensativity sooner.

A successful instrument is part of a musical culture, but its relation usually remains implicit, tacitly understood. This seems safe in a homogeneous culture, but we try to practise the musics of many centuries, many countries, all in the shadow of our modern symphonic tradition. Is it time to abandon our parochial simplicity of expression and spell out an instrument's relation to music whenever we speak of it? With this in mind, I offer some practical suggestions for evangelists in this matter:

1) "It's a good instrument". Good for what? Don't let the implication dangle out of thought. The better it is for this, the worse it probably will be for that.

2) Composition, instrument, and playing style combine to make "music". The music is lost when the elements are isolated. An interesting combination may pall when one element is changed. Speak in trilogies.

3) "In tune" is a vague expression. The different intervals of Pythagorean, harmonic, and equal-tempered scales are often not merely tempered imitations of each other, but specific intentions. How useless to tell a "blues" singer she is out of tune. Speak of the affect of a performance's pitch relations.
Our words describing tone have little to do with musical interactions. As in a pact with the Devil, an instrument can meet all the superlatives - clarity, brilliance, you name it - and still sound boring. We still can't describe what we hear. Stress the sensation, not the description.

5) Etc.

While it is difficult (not to mention cumbersome) to reform spontaneous speech in these ways, writers of brochures and articles are in a position to examine the viewpoint of their words and guide their readers' thoughts. Editors especially, can make their writers aware of the force and direction of their implications, suggesting clarity and encouraging subtle distinctions.

Detached from sources of authority in early music, we must be aware of unspoken tastes and unconscious tendencies if we are to go further along the way towards early sounds and styles.
THE WORDS "AUTHENTIC" AND "ORIGINAL"

There is a move afoot to try to ban the word "authentic" from the early music scene. The word is certainly misused and it would be easier to get the misusers to stop using it when everyone else stops using it then to get them to start using it more accurately. Before discussing our recommendations on this problem let us try to look at it from a much broader perspective.

Language is always changing and the usage of emotive words is always subject to both spreading and narrowing pressures. This is only human nature. All aspects of concerted human endeavour usually change as a result of a sequence of spreading and narrowing. For instance any new organisation quickly separates into a progressive faction that pushes for broadening its aims and activities in the directions of their interests and a conservative faction that wants to maintain its focus on pursuing the aims it was organised for. If the first group succeeds in broadening the aims, soon the limitation of resources usually tends to narrow the activities again, but shifted somewhat in the area of coverage.

The early music movement is currently under pressure by those trying to extend it towards greater acceptability to audiences and those trying to recreate what early music was (the individuals who try to do both usually fall between two stools). The former of these groups are the main misusers of the word 'authentic'. They are trying to satisfy their audiences' demands for both authenticity and entertainment. The more sensitive of these will often find the question of authenticity a source of embarrassment. The latter of these groups, performers, instrument makers and scholars all devoted to the concept of authenticity, also splits into two groups: those who seek to make their marks by creating new interpretations of the historical data, and those who seek to improve standards and extend data-coverage within already-established schemes of interpretation. These groups will argue about the relative merits of new speculations vs. long-established assumptions, all in the cause of authenticity.

Thus the pressures to expand the word's meaning (to tolerantly include all manner of practical compromises) comes from those who are anxious to enhance the enjoyment of their customers and audiences who want to believe that they are partaking in ancestral culture. The reassurance of the word to the customers and audiences is more important than retaining any scholarly meaning for it. The pressures to obliterate the word come from performers and makers who don't want to join in the deceptions of the above group and who have confidence that the quality of the art they offer will win approval without false labels. They are joined by the purist-scholars whose stand is that all claims of authenticity are necessarily false and that historical research in music need not be associated with fruitless attempts at faithful reproduction when all of the necessary information for faithful reproduction will never be available.

Now let us consider what the word means. Dictionaries offer looser meanings such as 'entitled to acceptance or belief' and tighter meanings such as 'of undisputed origin'. The latter tighter meaning would not let the word be used with respect to any current performance or recently-made instrument since there are details in each of these (in finish at least) which are only guesses as to original practices, and luckily, we cannot reach consensus on which details
are irrelevant. (We say "luckily" because if there was consensus, further research would be inhibited.) Thus since true authenticity is essentially impossible, it can be argued that it should be removed as an issue. A looser meaning seems to leave room for differences in judgement concerning entitlement to acceptance which then allows differences of judgement concerning which aspects of correspondence with the original are necessary which makes consensus in meaning impossible, thus making the word useless as the standard it pretends to be.

We believe that the strict meaning of the word can honestly be used with respect to modern performances and instruments, but only if restricted to those details which can be shown to correspond to early models. If the details follow various models and one wants to claim that a composite of them such as "ornamentation" or "appearance" is authentic, then all of the details implied need to be demonstrably authentic in themselves, and these components need to be consistent within the same tradition. These conditions can not often be met and it would be preferable to claim attempts at approaching authenticity as best as one can.

Some continental groups have been claiming that they are performing on "original" instruments. This usually has meant that some part of each instrument is at least 100 years old. Even the instruments with most parts dating from the period of the music being played have usually been extensively restored and revoiced by modern craftsmen, so that there is hardly any difference in sound produced between them and new instruments made by these craftsmen. The main advantage of this claim to these groups is in falsely implying greater authenticity in marketing their concerts and records. These claims are consistent with the commercial practices of the antique industry who, for instance according to German law, can sell as a genuine antique an item of which 10% dates from the appropriate period.

Recently some British groups whose instruments cannot even meet these criteria are being announced on the BBC as "playing on "original instruments". The description might have been intended to be 'original types of instruments' or 'original instruments plus accurate modern copies' so the added deception might have been a result of overzealous BBC editing. Alternatively the BBC may be trying to use the term "original" to distinguish early types of instruments from modern orchestral ones in baroque music performances. Unless this is made clear to the public they are being deceived. They normally would expect that an instrument described as original is one which could have been played in performances of the music shortly after composition.

We appreciate that the catch-all phrase "early instruments" implies lutes, viols, crumhorns and such and so is inappropriate for baroque orchestras. But the phrase "baroque instruments" is ambiguous enough to avoid dishonest implications. We suggest that all efforts be made to keep the word "authentic" meaningful by using it strictly with respect to details of both performance and instruments and if used more generally it either must demonstrably apply to all detail (and not just to details that the claimant deems essential) or it should be used in a way implying that it is a goal being pursued and not achieved.

We need to spell out what strict usage of the word means. Of course any historical statement cannot be absolutely proven in that the evidence can be misinterpreted or
faked. We also combine evidence from somewhat different sources assuming a correspondence which may not be valid. So a claim of authenticity can rarely be fully proved on the basis of the evidence. All we can expect is a reasonable argument on the basis of the evidence. What we cannot accept is an argument based purely on the lack of contradictory evidence or on the great variation in the evidence interpreted so that anything goes.

We suggest that the use of the term 'original instrument' should be restricted to one that survives complete and has been subjected only to the minor repairs that modern instruments are expected to need.

Of course, our saying so will not make anything happen or not happen. But if we got a consensus amongst the majority of the respected scholars in the early music field on the uses of the word 'authentic' and 'original' then we may be able to hold the line against the distorters. If we give up the words to them we will have to invent new ones to communicate these concepts. As soon as the new respectable words become widely known, they will be subject to the same inflationary pressures by the commercial exploiters. And as we all know, inflationary cycles do not do anyone any good in the long run.
Some instrument makers have access to standing timber and in case they feel like cutting it down themselves I have noted down some of the pitfalls pending advice from those more expert in the field.

The problem is not just tipping the tree over, which is quite easy, but it is what you do with it then. You need to work back from the facilities that you already have for moving and converting it, your bandsaw, car and trailer etc and see if you can extend these as far as the tree. If you can do the whole operation yourself, and like the heavy outdoor work involved, the thing is viable. If you have to pay someone else for any stage of the operation (transport, milling etc) then you may well spend more than the wood costs in a timber yard.

In England there are a lot of good hardwood trees, such as all the Fruitwoods, Holly, Hornbeam, Laburnum etc that will often yield a butt about 8" or 10" in diameter and about 5ft long, which is a size that can be lifted by two men, and is just large enough to yield a little timber. At about 2 cu ft its value is obviously low. It is best to start on this size of tree before moving onto anything larger, which has bigger problems.

The small electric chainsaws with 12" bars, though ideal for trimming logs in a workshop, are no good in the countryside. You need a petrol-driven chainsaw with a bar about 24" or 28" long. (These are really lopping saws, felling saws are larger) The Bar (which is the part that the chain travels around) must be longer than the width at ground level of the biggest tree that you intend to tackle, and of course trees do get much wider at the bottom. Chainsaws seem to be well-developed, reliable, quite easy to start, well-balanced, and marvellously fast-cutting. They are also expensive, rather dangerous, very noisy, and liable to damage. So you need to carry spare parts and tools, wear ear-muffs, and use with very great care. The main cost of running them is in the chains, as you will need to sharpen it after cutting down one hardwood tree (or several softwood ones), a file only does one sharpening, and a chain can only be sharpened about 10 or 15 times.

You need to carry with you:— Petrol/Oil mixture in a 2 gallon can (2 gall. to allow room for the oil). Oil for the chain in a gallon can with a screw top.
A spar Bar. A spare saw-chain. Tools to adjust the bar and saw-chain tension. Saw files and a file holder/guide tool. Wooden or plastic wedges. Measuring tape and chalk. A proper Felling Axe and a hand log saw (it is very dangerous to try to cut thin branches off with a chainsaw). Ear muffs, heavy gloves and strong footwear.

To fell a tree you cut a big notch in the side of the tree to which it will fall, and then you cut straight through from the other side until it starts to move. Then you stand back quickly. So far, so good. To saw up a fallen tree you need to consider which way the parts will move on being separated, and cut upwards or downwards to suit. It is handy to put some spare wood under the tree to stop it falling quite to ground level as you cannot cut through a log into the ground without damaging the chain. And if you are working on a hillside be sure to always stand on the uphill side of the tree, however inconvenient it may happen to be, for obvious reasons.

Trees that have already fallen are suspect, as they may be faulty and rotten already, but some trees fall in gales because their roots are not properly gripping the ground because of rocks, and they can be undamaged. A single dead branch usually means rot right down the centre of the butt.

Cutting a tree that is leaning against another one can be difficult. If it falls on the chainsaw despite your quick work with wedges, the saw will stop and be jammed in the cut. It is for this reason that country people going logging take two or three men, two chainsaws, a tractor and a wire rope. If you have your spare bar and saw chain with you it is possible to unbolt the machine from the bar and chain that are stuck in the tree, and bolt on your spares, which gives you a second chance. If that fails you have your axe. Be very wary about manhandling the tree as if you do manage to move it it may very well fall on your feet, which is not an accident that I would recommend anyone else having.

So you cut up the whole tree on site into usable lengths, logs, etc. If the butt is still too heavy to move you can stand it up on the stump and saw it lengthwise into two or three pieces. Chainsaws are not made for ripsawing and do not work well that way, but it is quite possible. However if there is a nail in the tree, and there often are in orchard trees you will be fated to hit it, and that will ruin your chain and cost you about £20 (1976 price).
Then you lift your wood into your transport. Wet wood of all types weighs about 65 to 70 lbs per cu ft, so try out a few calculations. Beware of dragging logs as this can push stones into the bark, which do not show up on metal-detectors, and will damage bandsaw blades. It is also surprisingly difficult to do as if you tie a rope around one end of a log it will wear through under the log after only a few yards.

When you have done a few small logs you may feel tempted to do a bigger one. If you have road access right up to the tree and can muster enough labour, rope, levers &c. you can load a butt weighing up to \( \frac{1}{2} \) ton or so onto a hired boat trailer, as they often come with a winch mounted on them, and drive it to a sawmill. This can be worthwhile if the wood is rare or valuable, but if it is not then it is more marginal financially.

I would not really recommend sawing down trees as a source of timber for an instrument maker. After all it is hard, heavy, dangerous and time-consuming work and it can cost you a lot of money. But if you like the work and have another reason to do it, such as you own a big orchard or wood that needs thinning sometimes then it can be worthwhile. However - Never, never go logging alone.
SOME COMMENTS ON COMM.39.

Donald Gill

1. The Luis Milan vihuela, Catalan-Alamany dictionary guitar and the Narvaez vihuela all have neck/body proportions reminiscent of an electric guitar. Do we take this seriously, as well as the apparent string lengths? In other words, should we make vihuela necks long enough to tie on ten frets, bearing in mind that some tablatures include fingering of the sixth course at the ninth fret? Such a neck has to be proportionately longer than a Baroque guitar neck because of the rather gradual curve into the heel, in contrast to the later guitar neck design. In turn this means a very small body for a 60 cm string length.

2. The "descant". Why assume this to be a vihuela and not, for example, a viol? In the context in Bermudo this seems a reasonable assumption and explains no mention of it elsewhere.

3. The tunings. My understanding of the instructions are that the 'quinta' of the guitar is the fourth course, as in Ca lxv, and thus the guitar would be tuned to g c' e' a' with a g' vihuela or d g b e' at the Comm.39 assumed pitches (one tone above the two tunings in Praetorius).

4. Nine frets on the vihuela? Bermudo, Ca lxv, says the guitar can have ten frets, like a vihuela, but the less skilled could fit five or six. I can't find the bit about Nine frets on a vihuela.

5. The 5-course vihuela. This music sounds best on a unison tuned instrument, just as the six course music does, and it sounds bad on a guitar with octave strings. This to my mind is another argument in favour of Fuenllana meaning what he said, but the tuning is a little awkward, not being that of the five course lute, as one might have expected.

6. The instructions in Baroque guitar books for tuning three different sized guitars to play together are for the small guitar to be a fourth above the middle guitar, not the bass one. See Colonna, Intavolatura di Chitarra Spagnuola. Some other sources are garbled.
DETAILED COMMENTS ON "INSTRUMENTS OF THE MIDDLE AGES AND RENAISSANCE" BY DAVID MUNROW: PART I.

Eph. Segerman

I shall here discuss points of contention in chapter 4 (entitled 'Strings', in the 'Middle Ages' section) of Munrow's book. It can be assumed that I either agree with unchallenged statements in the book or that I don't know enough about it to have an opinion. The points will be numbered so that a reader if he wishes can pencil these numbers into his copy of the book for ready reference to our alternative view. Following the number which identifies the point will be a number showing the page and then another number showing the column being referred to.

1,21,3. Whether the lyra viol was a distinctive instrument or a style of viol playing or both (as I suspect) is far from clear.

2,22,1. The illustration shows a non-Irish harp with metal strings, a rather unlikely medieval occurrence. Such modifications of early instruments to fit modern concert expectation without admitting it are to be deplored.

3,22,2. Medieval lutanists were just as lax as harpers were in developing a special notation for their music.

4,22,3. I know of no European historical precedent for using brays on a wire-strung harp. Wire was traditionally used only on Irish harps, and the only suggestion of brays on an Irish harp we are aware of is Montagu's identification (Plate 22 in his book) on a 13th century Lincoln Cathedral carving. I believe that what he calls brays are more likely just the usual brass shoes which protect the soundboard from being cut in by the metal strings. I have not seen a clear representation of brays on any harp before the 15th century (but I haven't seriously been looking for them).

5,22,4. I see no purpose for illustrating a 19th century Irish harp.

6,22,4. The use of 'yoke-plus-neck design to describe the classical lyre is most unclear. If 'neck' were replaced by 'two arms' it would readily apply to the ancient classical instrument. Necks appear on lyre-shaped fretted plucked instruments in the classical music period ca. 1800.

7,23,2. Psalteries and dulcimers without bridges were common and I've seen many more illustrations with tuning pegs on one side than those with tuning pegs on both sides. The painting on the next page illustrates these points.

8,23,2. Concerning the reasons for more than one string in a course, I can only respect the one of more pleasing tone. As for carrying power, doubling the amount of acoustic energy increases loudness only by a barely detectable 3dB, an amount hardly worth the effort of tuning extra strings. Insurance against breakage has never been expressed as a reason for having extra strings on an instrument; (retuning strings...
to compensate for breakage has been reported by Ganassi). An examination of
dulcimer-hammer-head shapes on the next page makes it clear that increasing the
collision cross-section by adding strings will not help precision. The precision
problem is one of not hitting neighbouring strings, and increasing the cross-section
makes things worse.

9. 23. 3 & 4. Early illustrations of psaltery playing usually have the hand not holding
the plectrum over the strings near the base, probably plucking there.

10. 24. 1 & 2. I see no point in illustrating the Chinese dulcimer.

11. 24. 3. The suggestion that the psaltery fell into disuse after the fifteenth century
is argued against by Mersenne's (1635) description of the one used in his day (p. 224
in Chapman's translation) which, relating to point 9 above, included a bourdon string
and was either hit with a hammer (tremolo style) or plucked with either a plectrum
or the fingers.

12. 24. 4. The statement that the lute in Europe developed a bewildering number of
relatives is not really true until the 17th century (see Spencer in October 1976 Early
Music). The misinterpretation of the Medieval evidence here probably is a result
of not understanding the Hornbostel-Sachs classification system (see Comm. 36)
which defines all fingerboard sound-box instruments as "lutes" without implying
derivation.

13. 24. 4. The numbered distinctions between the fretted instruments may not all have
been important to the original players of the instruments. For instance, gitterns
(Previously called mandoras) seem to have either fixed or movable bridges. In
distinction 4, replacing 'guitar' by 'citole' would be appropriate according to
Lawrence Wright's work (Galpin Society Journal 1977).

14. 24. 4. In distinction 2 the possibility of fixed frets slotting in rather than being
glued is not mentioned.

15. 24. 4. With respect to distinction 5 I am not convinced of the relevance of a waist
on medieval plucked instruments. Consider the three instruments illustrated on
p. 26. The citole shoulder points on the Antelami sculpture can easily be related to
the shoulder points on the Warwick Castle instrument which has the typical citole
taper in body depth. The latter resembles the Ormsby Psalter instrument in so many
ways (massive pegbox, trefoil tail ornament and shoulder points, that the added
pointedness in the lower bouts of the Ormsby Psalter instrument seems hardly an
important distinction. If the latter has a waist, does not the Antelami sculpture?
(My point here follows Lawrence Wright's understanding of the structure of the
citole.)

16. 24. 4. Concerning the three lettered types of fretted instruments the name 'guitar'
belongs with the lute in type a according to Lawrence Wright's work. The flat-backed
instruments in types b and c are citoles and plucked violas, and I would group them
together until we know enough about them so as to make distinctions which might have
been meaningful to their players.
17.25.1. Block frets such as on the Antelami sculpture illustrated on the next page are most probably fixed. Since the main purpose for moveable frets is probably to compensate for non-uniformity inherent in gut strings, one should expect an association of fixed frets with metal strings.

18.25.1. Restorers of paintings in the last few centuries have often painted in string lines which have faded, sometimes further obscuring whether bridges were fixed or moveable.

19.25.1. The strings were not always plucked with a plectrum. See the Cantigas illustrations reproduced on plates 10 and 11 in the Montagu book.

20.25.1. Playing adjacent strings with a plectrum is obviously easy. A melody on one string using the other (or others) as a drone is a clear medieval possibility. Some organum (one fast and one slow-moving part) is quite possible. I have played two proper medieval polyphonic parts on the gittern with plectrum using two dodges:
1. taking advantage of octave ambiguity in octave-strung courses, and
2. filling in non-dissonant notes on strings between the ones needed when the parts diverge excessively. (I am only suggesting this as a possibility not recognised in the book without offering supporting early evidence).

21.25.1. Even if the lute player confined himself to a single-line, this does not limit him to ensemble playing. Effective solo performances on single-melody instruments are familiar to us all. Dorfmüller's statement (Studien zur Lautenmusik ...1967 p. 104) that the iconographic evidence statistically proves that the lute was only rarely a solo instrument before 1500 ignores the purposes of the artists which rarely included depicting natural music-making environments in that period. The Tinctoris quote needs to be understood as lumping together both aspects of change in lute style during his time as chronicled by Cortese (see translation and interpretation of Pirrotta J.A.M.S. XIX 1966, p.153-158). According to Cortese the Germans introduced the new style of group polyphony on lutes in the last decades of the 15th century, while Petro Bono was the most praised practitioner of the previous essentially monophonic style. The change could well have involved conversing from plectrum to finger-style playing. Petro Bono probably played in and perhaps led an instrumental ensemble at the court at Ferrara, but his fame rested on his singing to his own lute accompaniment and his lute performances accompanies by his 'tenorista' (who probably played a plucked viola). A less important lutanist made do without a tenorista.

22.25.2. There are no surviving medieval lutes. The Crane references were to gitterns. Crane called them lutes in the generic sense (see point 12). All 15th century lute illustrations I've seen showing some of the back clearly show staves. I haven't seen backs on 14th century lute illustrations but strongly suspect stave construction there too since lutes were large and they would be very heavy carved from the solid.
23.25.2. Early lutes had four courses which only occasionally meant four strings.

24.25.2 & 4. There is no evidence for a change in lute tuning during the 15th century. A change in tuning is more probable during a transfer from one culture (Arab) to another (Europe), so I would guess that the third in the middle existed throughout Medieval Europe.

25.25.4. Depiction of frets in paintings has been a subject of much carelessness by artists and I suspect the true variation was much less than that which appears.

26.25.4. No more than 11 frets could have been tied on Arnault's lute and more than 8 is unlikely.

27.25.4. As shown by Wright, when structure such as small size, round back and sickle-shaped pegbox are discussed read 'gittern' for 'mandora'. The structure of the instrument associated with the name 'mandora' in the occasional early medieval uses of the name is not clear. From Tinctoris on, the association of the related names, tanbura, banduria, pandurrina and mandora with tunings in 4ths and 5ths is clear, but the almost 2 centuries gap in the use of the word 'mandora' in Europe makes relevance of this tuning to the early instrument unlikely.

28.25.4. There is reason to expect that medieval string players sometimes plucked and bowed the same instrument. If this were so would there have been any reason to call it by a different name?

29.26.2. When structure is being discussed read 'citole or plucked viola' for guitar.

30.26.2. According to Wright, the first mention of the gittern is late not early 13th century.

31.26.3. Wright's 'theory' is based on a better analysis of the data than a large faction of what is stated as fact in the book, and it is a pity that the author did not have enough time to thoroughly digest its significance and alter his text accordingly.

32.27.1. Two not one of Jerome of Moravia's fiddle tunings is reentrant (see point 40.29.1.)

33.27.3. The motivation for the invention and early development of bowing is shown by Bachmann 'Origins of Bowing' 1969, p. 57) to be for transcending the limitation of the human voice (the need for breathing) by producing unbroken melodic line, rather than for imitating the voice.

34.27.4. The use of the name 'vielle' to mean hurdy-gurdy dates from about 1600 (according to Marcuse) so 'later' means very much later.

35.27.4. It is unscholarly to ridicule early use of language. The scholar needs to try to understand it. This has not been seriously attempted here with respect to fiddle, crowd and rebec.
37.28.4. The 3-stringed-figure 8 fiddle-type instrument was usually played gamba-style no matter how small it was. The only other European types I've seen pictures of played that way are Spanish: the flat-ended 3-stringed 10th century instrument and the small 2-stringed rebab shown in the Cantigas.

38.28.1 & 2. The illustrated folk instrument is more akin to the Renaissance rebec which had the often flat fingerboard on a higher level than the curved soundboard than to the medieval rebec which usually had no distinction between the fingerboard and soundboard (the exceptions where a fingerboard is visible generally had more than 3 strings and they were probably played like liddles).

39.28.3 & 4. The angles of the pegbox and neck and curvatures of the fingerboard and bridge of the illustrated fiddle (as well as the position of playing) owe more to the modern violin than to the medieval fiddle.

40.29.1. The author picked the wrong one of the conflicting authorities on Jerome of Moravia's fiddle tunings. Marcuse got the second one right: d G g d' g'. This is the only tuning having all 5 strings on the fingerboard. (My information comes from Christopher Page who is writing an article on Jerome's writings on fiddles for Early Music).

41.29.1. I feel that it is highly unlikely that fiddlers changed tunings between pieces since the tone would suffer so by the large changes in tension. Changing tuning probably meant changing strings and bridge as well (the bridge needed fine adjustment of string height for effective playing).

42.29.1. I don't believe the breakage hypothesis on the string doubling (see point 8).

43.29.1. Rounded bridges on medieval depictions of fiddles and rebecs are rare indeed.

44.29.2. I agree on higher positions. There would have been little point in building fingerboards over the soundboard unless they were occasionally used there.

45.30.2. The crwth with bridge curved as shown in Besaraboff p. 315 can with practise allow each of the three courses to be bowed in adjacent pairs or all together. The 18th century crwth drawings show somewhat curved bridges. The illustrations of medieval bowed lyres are not reliable enough to distinguish between a flat or gently curved top surface of the strings at the bridge.