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FELLOWSHIP OF MAKERS AND RESEARCHERS OF HISTORICAL INSTRUMENTS

Hon. Sec.: J. Montagu, c/o Faculty of Music, St. Aldate’s
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FELLOWSHIP of MAKERS and RESEARCHERS of HISTORICAL INSTRUMENTS

Bulletin 73

October, 1993

RENEWALS: It's renewal time, I'm afraid. Please get your cheque books out NOW and get it into the post. As Barbara, Eph, and I get busier (I've just been elected President of the European Seminar in Ethnomusicology, and that's going to mop even more of the spare time that I haven't got), it gets more and more difficult to cope with renewals drifting in through the first three or four months of the year. Please try to get them in between now and the beginning of January when we set aside time for them. That's the bad news and the perennial nag.

The good news is that the rates are the same as last year (so they should be; we increased them then and that should be enough for a while). To remind you, they are:

For UK and for all countries by surface mail: £ 10.50
to which should be added if appropriate:

Supplement for airmail to Europe £ 1.50 totalling £ 12.00
Supplement for airmail overseas £ 3.00 totalling £ 13.50
Supplement for payments not in £ sterling £ 5.00 (US $ 8.50 approx)

and the address to send it to, is: Barbara Stanley, Honorary Treasurer FoMRHI, 21 Broad Street, Clifton, Beds SG17 5RJ, UK; cheques made out to FoMRHI, of course.

We're happy with your own cheques if your country permits it; don't go spending money on bank drafts in sterling unless that's cheaper than the £5 supplement for foreign currencies. Eurocheques work if they are backed with your card number. After having told you last year and the year before that GIRO doesn't work any more, we now hear that they have come to their senses and changed their minds and that they will tell us from whom a payment comes. This applies, though, only to foreigners; GIRO payments from people in England will still remain secret so you wouldn't get your Qs. But if you live abroad and are willing to risk their word that they will tell us who you are, then by all means use GIRO. The GIRO account number is 27 316 4406. The GIRO postal orders (the ones that come through the post with a little piece of pink card with your name on it) have always worked. And as far as we know, neither Eurocheques nor either sort of GIRO need the foreign currency £5 supplement. If it's cheaper for you to pay money directly into our account from your bank by fax or whatever, the account number is 14108260, Bank sort code 77.05.03, T.S.B. Bank plc, 2 Bucklersbury, Hitchin, Herts SG5 1BA. If any of you in one area find it cheaper to get together and send one payment for several people, you're welcome to do so (some of our Dutch members have done this), but for heaven's sake make sure that Barbara gets a list of all the people concerned; otherwise some people ain't gonna get their Qs. This applies to individuals, too. There are always one or two anonymous payments, which is nice for FoMRHI funds but rough on whoever sent them.

As always, if you can afford to add something for people who live in countries which forbid the export of money, or restrict it by charging grossly excessive amounts for parity (£12 is more than a month's income in some places), they will be very grateful. There are still many countries to which this applies, both east and west, and I'm always happy to hear of more people who'd like to read FoMRHIQ but can't for that reason, and to put them on our lists.

I remind you that Barbara asks PLEASE don't send your subscription registered or recorded delivery unless this is essential at your end; if you do, the postman won't deliver it and she has to trek down to the post office to collect it.
You will find an invoice tucked into this Q, both to serve as an additional reminder and also to make it easier for you to pay if you can just hand it to your bank (or if you're lucky to someone who will pay for you) and leave them to get on with it.

Barbara also asks me to remind you that if you have already paid for 1994, or of course if you are one of the people who can't pay, then please ignore the whole of the previous page and ignore, too, the invoice.

The invoice also has room for address corrections etc, and please would our German members who haven't already done so, give us their new five-figure zip codes (assuming that their post office is still delivering to those for whom we only have four figures!).

LOST MEMBER: I had a very quick response for Michael Ransley – many thanks; his new address is in the Supplement herewith.

Can anybody please do the same for Jim Downie, last heard of in Aberdeen?

FURTHER TO: Bull.72 p.2: The Royal Mail was 'very concerned to hear that yet again you have had to complain about envelopes and their contents becoming separated' and not only apologised but sent us a cheque to pay for the ones they trampled on and the postage to replace them and others. So the Customers' Charter is working to that extent, and so far I've not heard of any troubles with the July mailing. Let's keep our fingers crossed.

Bull.72, p.5: David Hunt responds to what I said about the Liverpool Museum:

Your unnecessarily offensive review of the Liverpool museum exhibition and collection catalogue does no justice to FoMEHI and is yet another example of the petty journalism and misinformation which continues to deter many of the finest instrument makers from joining.

Liverpool's objectives are threefold and it has never been suggested that they would be concurrent.

Firstly to mount a temporary exhibition for visitors to the museum of part of the museum's collection that is normally in store. The "bally-hoo" would be more accurately described as advertising to attract the general public. (Would you prefer that they were excluded?)

The second objective is to produce a catalogue of the entire collection of musical instruments (not of the exhibition) for the benefit of the more professionally interested. This catalogue is not aimed at the general public and has not yet been published, which is why you have not yet received a copy: publication is however imminent.

The museum has not "dug out some..." - the third and perhaps the most important objective was to have all of the musical instruments in the collection examined by appropriate specialists and to carry out any required conservation work.

Whether or not the museum's collection of instrument's does rank in the top 5 is no doubt the comment which offends, but I would suggest the ranking does not interest Liverpool at all, but was merely an advertising 'hype' to attract some members of the public to inspect something which they were not aware that they might find interesting.
I would however suggest that the Museum and Pauline Rushton in particular have set standards which other collections (including the Bate) would do well to note. It is now the museum's policy not to restore any of its musical instruments to working order and despite having no in-house musical instrument expert, Pauline Rushton and the Museum are setting the standards of professionalism which others could note. The museum has learned from their own experiences over the last 30 years that putting musical instruments into playing condition — especially keyboard instruments — directly conflicts with a museum's prime objective of the conservation of information. It is sad that it takes a non-musical specialist to set the standards to which others might aspire.

I don't think it's unfair to use the phrase 'dug out' for material that's not been seen for many years, much of it not since the War. And to restore or not restore is a highly contentious subject on which many of us hold strong views on either side. I would make only the point here that if you don't restore to playing condition you have merely got a piece of furniture, not a musical instrument. If, like the V&A, you're in the business of conserving pieces of decorative art, well and good; that's what they're there for. But if you want 'conservation of information', the most important information about a musical instrument is its sound, and that only comes with playing condition and by having 'an in-house musical instrument expert' like the Horniman and Fenton House in London, both the Edinburgh University collections, both the Pitt Rivers and the Bate here in Oxford, and pitifully few others in Britain. You might like to note the last paragraph of the next comment, too.

Bull.72, p.6: Sean Rawnsley writes:

I was interested to note your mention of the Accademia Bartolomeo Cristofori in the last FOMRHI bulletin.

Last February I went to Florence at the invitation of the ABC to measure and draw an anonymous Viennese fortepiano, with a view to collaborating on the construction of a copy. Since I have still (August) not been paid for this work I have, needless to say, abandoned all hope of any further collaboration.

I would advise anyone planning involvement with Italian institutions (see also your comments on Milan's Centro Studi Marangoni) to have deep reserves of patience and persistence! I understand the restoration workshop at the ABC is now independent — maybe this will improve matters.

Re: your remarks on the Liverpool Museum (Merseyside Museum), I am rather inclined to agree with you since although the information they have is forthcoming, it is sadly lacking in any scholarly detail. They have a very fine Hubert clavichord in their collection but next to no information about it — one general photograph and rough dimensions and scaling. The person who supplied the information is curator of costume and textiles!

And I've had a letter from the Centro Studi Marangoni (also Bull.72 p.6) which bears out what Sean says: Due to some organising difficulties, the exhibition of stringed instruments that we were planning in Milan, could not take place. So if you were looking forward to that big prize for your violin, don’t hold your breath.
Quarterly No. 72 arrived in good time, just as usual. Letters posted in Germany with the old 4-digit code still arrive in one or two days. The propaganda campaign of the German post office seems quite excessive to me; the money could have been better spent for other things, like keeping down the rates. On page 2 you complain about members who haven't sent in their new 5-digit codes and on page 3 you still dispurse the old 4-digit code for Moeck; that seems like chutzpah to me. My new postal code is D-79600 Cell.

The Great Bassoon How has brought about a discussion which I consider highly valuable, and long overdue. But I am convinced that it can only be detrimental to our cause when religious prejudice is brought into the discussion. Comm 1174 would be a fine contribution without the word Calvinist, and I wonder if the author really considers that to be an essential point in his argument. This seems to be a case in point where a little editing could go a long way toward improving our publication. See Comm 1172.

We'll see what Eph says about editing in response to this and to Graham Lyndon-Jones in the last Q. It would be a fundamental change of attitude – from the beginning we've worked on the principle of let members say what they will, and let fellow members slap them down, praise them, or what you will, in the next issue. We don't print everything. Leaving aside the unfortunate Sverre Kolberg contribution, which Eph thought was either Cary Karp or me pulling a spoof, both Eph and I have sent things back for rewriting or reconsideration or for single-spacing when an article longer than one page comes double-spaced. What I'm not prepared to do, and I doubt whether Eph is either, is to edit something for a member, and particularly not to retypew it for them. We reckon that if we can understand it (and there've been arguments about that in the past and doubtless there will be again) and if it expresses a member's views, then he or she is entitled to have it read. But you are the members, and if you would rather that we did change our attitude, and that every Comm got scrutinised, then say so. It would change our character and probably mean that sooner or later we wound up as a refereed journal and all that pretentious nonsense, in fact as precisely what we set out not to be back in 1975. We thought then, and I certainly think now, that we have enough of these. What we need is a vehicle for quick exchange of information, quick response, flying kites, snippets of useful information. And that's what we've been since 1975, warts and all. The floor is open to you, all of you; tell us what you think.

Comm 1172: This follows directly from the last sentence. I wanted to respond to Graham that yes we do encourage writers. You don't have to be able to write wonderful English. You do have to be able to type (or find someone who can) except for very short bits for insertion in the Bulletin, mainly because we print what you send and we are going to reduce it to half size, and the average handwriting doesn't like that. Provided that you have something to say that looks useful or worth saying, we don't give a hoot about your grammar or your spelling. And you're probably tired of me saying this, but almost everybody has got some useful tips and worthwhile ideas – let's have them.

A Comm herewith by Graham Lyndon-Jones on an Organ Loft in Anterp: Graham says that the pictures for the Antwerp Comm should reduce and reproduce nicely; there's a new machine
which makes 'blocks' at no more than the cost of an ordinary photocopy. Thus colour photos etc with half tones become black and white dots. The Comm has arrived only in the nick of time, so there's no time to ask him for more details for this Bull, but I hope these will be forthcoming and meanwhile, when you see the results, if you like them, if you can get access to such a machine, we could carry more illustrations.

REPRINTS: There are two coming up (both authors want to revise them a little). Brian writes:

I need some ideas on what you would like to see reprinted in the Quarterly. Please look through the index to see if there are any interesting comms. that you would like to see reproduced. Although I can suggest some articles myself, I would much rather have some feedback from you! Please send your comments to me at the address below. Thank you.

Brian Ackerman
42 Clavering Road
London E12 5EX
tel/fax 081-989 2583

He asked me, too, about Comm numbers; should reprints have the original number, or should they have a new number? My feeling is a new number, especially if they've been revised, plus a note of the old one; otherwise I think it would get confusing. Again your views are solicited.

STOLEN INSTRUMENTS: Tom Wess was burgled recently and the burglars took two instruments: a bentside clavichord, the sort of instrument that Michael Thomas also made, with THOMAS WESS on the name board and, he thinks (it was a long time ago) 1961; it is painted black outside, red inside, 4+ octaves B–D, fret-free. The other was a demiporco psaltery. Since he made both for his wife, Joan, they are of great sentimental value and he'd be very grateful if anyone who sees them would get in touch. His address is Old School House, Burton, South Wirral, and the phone number is 051-336 5727.

SMALL FINDINGS: Donald S Gill writes:

As a part time, small time instrument maker I have had two problems. One which has always been addressed by FoMRHI and is now virtually solved by the Haags Gemeentemuseum publication was where to obtain drawings of instruments. The other is where to obtain small amounts of materials. There was a useful booklet "Directory of suppliers to craftsmen musical instrument makers" published by Scottish Development Agency in 1975 but this is now very out of date. I did receive a letter a couple of years ago saying they were considering an update but have heard nothing since. Since the failure of Whistons I have spent a year trying to find reliable sources for small amounts of brass, steel, odd sizes of screws etc. Can we do anything about this in FoMRHI? Would it be worthwhile asking those members willing to do so to send in for publication lists of the suppliers they use in the same way that lists of instruments/plans are published? Alternatively I would be willing to receive the lists myself and consolidate them into a single list to avoid duplication if this were more convenient. Or has someone else a better idea?
I think I'm commenting on too many things, but this sounds an excellent idea and precisely the sort of thing that we ought to be doing. Please do send lists to Don. Note that he is Donald S.Gill, the woodwind maker in Reading, not the cittern etc chap in Yorkshire.

**BRASSWARE FOR KEYBOARD INSTRUMENTS:** David Law is producing a range of brassware cast in 70/30 brass by lost wax. Some of the patterns are taken directly from the originals on old instruments, with the help and permission of the owners (John Barnes for instance) and curators (Jeremy at the Bate...) while others are recreated from measurements and photographs from workshop records, and from published drawings. Other items have been created for use on new instruments to match old designs, and some pieces are those that over the years have been made in the process of restorations, for example a taper fit cup 'foot' made for a viennese grand of c.1810, which looks great on 'sheraton style' clavichord stands.

The present range, which is constantly being increased, includes patterns found on harpsichords by Ruckers 1638, Tisseran 1700, William Smith c.1720, Italian 'GZ 1622', Garnier 1747, and 'Anon 1623'; and spinet fittings after Hayward c.1680, and Keene & Brackley c.1715. Other patterns in preparation include Taskin, Kirckman and an Iberian piano from the third quarter of the eighteenth century. Other useful though not 'authentic' items are a pivoting propstick support, clavichord tangents in two lengths cast in a hard brass which are threaded (and therefore adjustable), and a recessed slotted plate for anchoring transposing keyboards - useful when altering kits and other recent instruments not originally built to transpose.

For catalogue and prices, contact David Law, Ash House, East Street, Long Compton, Shipston-on-Stour, Warwickshire CV 36 5JT, UK (0608-84496). From later this year the range will be available in North America from Whitechapel Brasses, PO Box 136, 3650 West Highway 22, Wilson, Wyoming, 83014, USA (call toll free 1 800 468-5534), who sell high quality brassware of all sorts.

JM adds: This is an exception to what I said above about editing. Dave sent me this on disk and I pulled it straight in to this Bulletin and I did edit it very slightly, adding a space after a full stop or comma in a few places. You can always send things on disk if it's easier (you'll get the disk back). I can read either size, 3.5" or 5.25", either HD or DD (whatever happened to SD?), DOS only (not Mac), WordPerfect 5.1 and a few other programmes which WordPerfect can pull in, including ASCII. It's quicker and easier for me to pull in from disk than cutting and pasting with scissors and glue, especially as to cut and paste I have to measure what you send and leave (I hope) enough space for it, which gets really complicated when it runs over onto the next page (eg David Hunt above), both for spacing and for cutting. Eph will say what he can read.

**MUSEUMS:** Arnold Myers writes:

Since the last listing in FoMRHIQ, Edinburgh University Collection of Historic Musical Instruments has published five further workshop drawings. These are of a 17th century 9-course lute (Buchenberg), an 18th century 6-course mandolin (mandurina), two 19th century guitars (Fabricatore and Lacôte) and a cornett (probably 17th century). Full details are given in the complete list of EUCHMI drawings in this issue. Makers and researchers will be glad to notice that there have been no price increases for the older drawings listed.
He has also published two more fascicles of the EUCHMI Catalogue: E ii Bassoons (£3) and H iii Trumpets and Trombones (£4), each plus £1 p&p in UK and £2 abroad; same prices for copies on disk; specify whether you want WordPerfect or ASCII. More details in the next Q.

COURSES: You know about Jane Clark's Playing Scarlatti Weekend here on October 30/31 and Alan Davis's Recorder Playing Weekend, November 20/21. I did manage to contact our favourite oboists, though just too late for the last Bulletin - I ought to think further ahead. Lorraine Wood and Dick Earle will be running a Playing Baroque and Classical Oboe Weekend at the Bate on February 26/27. As always it will include reed-making as well as playing. Cost is the usual £20 (£15 Friends of the Bate and students).

If you want to know more about the history etc of instruments, I have at last got the University's Continuing Education Department to notice that the Bate Collection exists and belongs to the University, and there are two one-day courses here, one probably too soon to be any use to you. The first is on Saturday 23 October, when Martin Souter will be talking about and demonstrating Four Centuries of Keyboard Music, and the second is on Saturday 5 March, when I will be talking about and demonstrating Shells, Tusks, and Horns, subtitled Trumpets and Horns from Caveman to Baumann. Both days are open to anyone; each costs £17.80, and bookings go to the Music Course Secretary, OUDCE (with a cheque made out to OUDCE), 1 Wellington Square, Oxford OX1 2JA, not, please note, to the Bate. You and any of your friends are of course welcome.

West Dean College has a Viol Consort Weekend 14-16 December with Alison Crum, mainly on 17c English music, and a Renaissance Weekend 28-30 January with Nancy Hadden on vocal and instrumental music of Orlando de Lasso and his contemporaries; all voices and most renaissance instruments welcome but only at modern pitch A-440. Cost for Lassus is £134-140 according to the standard of accommodation required, or £85 without accommodation, and unlike the Bate you must book in advance with full payment 6 weeks before the course begins. They've not given me prices for viols, but I imagine that they are similar.

An anonymous note (probably from Bernard Brauchli; it looks like his printer) tells us that the recent Magnano Clavichord Symposium was a great success, with over 25 papers, which will be published next spring by the Istituto per i Beni Musicali. There were also concerts by many eminent players, and on the third evening over 20 clavichords by makers attending the symposium were heard in succession - an unique opportunity to compare instruments by many different makers (no shawms and bagpipes going at the same time, like at the Horticultural Hall!). A second symposium is already being planned - information from Festival Musica Antica a Magnano, via Roma 51, I-13050 Magnano (VC), Italy.

ANOTHER SOCIETY: John Downing thought that you might be interested in the Reed Organ Society. It's been running since 1981 so I'm surprised we've not heard of it before. It publishes a quarterly ROS Bulletin and a membership directory. There's a fairly complicated membership form, but what's important is that the subscription is $17.50 in North America, $25.00 elsewhere (US dollars only - their banks are even more extortionate than ours on foreign currencies) and the address is James Quashnock, ROS Membership Secretary, 3575 Highway 258 East, Wichita Falls, TX 76308-7037. They've also reprinted a couple of reed-organ catalogues and a book on the History and Development of the American Cabinet Organ.

A NEW SHOP: I have been sent a note saying that a new shop called Orphee has been opened by Richard Charbit in Paris, specialising in antique musical instruments, at 8 rue du Pont Louis Philippe, 75004 Paris, telephone 42 72 68 42, open Monday to Saturday, 1.45-7.15 pm.
CODA: So far that's it, though I'm working a few days ahead because there's a busy week coming up, and more will probably arrive between now and the deadline I gave you. Do please remember to renew before the deadline (see next paragraph). If your renewal arrives after the January Q has gone out, we can't promise that you'll get your Q before the April one goes out. In other words, if it takes you more than two months to renew your subscription, it may take the three of us more than two months to process it. A bit rough, I know, but there it is – the pressure of the work that we all get paid to do increases all the time.

DEADLINE FOR NEXT Q: January 1st is a Saturday, which means they'll take the following Monday off, too, so there may not be any post between Christmas and Twelfth Night (here's the old buffer complaining that the country's going to the dogs). Get things in before Christmas if you can, but I fear that we'll have to say January 6th for the deadline. As you'll be writing anyway with a renewal cheque, it's an opportunity to send us a Comm or a note for the Bulletin isn't it? Isn't it? Have a nice winter.

Jeremy Montagu
Hon Sec FoMRHI

Figure from Comm 1199 p. 49
Woodcut from De Re Metallica. Boring elm log.
Workshop Drawings

Workshop drawings are published by the Edinburgh University Collection for the information of historical instrument makers and researchers. They are intended to allow detailed study of the construction of historic instruments.


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


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

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

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

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

Send orders to : The Curator, Edinburgh University Collection of Historic Musical Instruments, Reid Concert Hall, Bristo Square, Edinburgh EH8 9AG.

31st July 1993
FoMRHI Comm. 1183

Jeremy Montagu

Review of: The Woodwind Quarterly, ed Scott Hirsch, 1513 Old CC Rd, Colville, WA 99114, USA. $36 for four issues in USA, $46 abroad and exceptionally they say that personal cheques in foreign currency are accepted (they must have a better bank than most American organisations).

Woodwind Quarterly has now produced its second issue. It's concerned with all woodwind, of course, not just early ones, but if the first two issues remain typical there will be good representation of our area. It is bedevilled by misprints, though the second issue is somewhat better than the first in this respect (not as much better as it should be, considering the editor's apologia for poor proof-reading in no.1 in his editorial in no.2). The whole thing is computer set by the editorial team, and although they are happy to accept material on disk, somehow misprints creep into that material, too (so I'm told by authors who have suffered). It's much more substantial than FoMRHIQ; each issue runs to over 120 pages, plus a full advertisement section and so on, and photos are reproduced no worse than in most books nowadays. Once they get the proof-reading sorted out it will be a fully professional job. The founder and editor is Scott Hirsch and he's in our List of Members.

The first issue began with two articles on modern flute head joints. Then came an interview with one of our members, oboe-maker Marsha Taylor. I know that a lot of people like such interviews, but they always read so stiltedly and I'm never sure whether it's the questioner or the answerer who comes out silliest in the end. An interesting article by Bart Hopkin describes what he calls membrane reeds, the vibration of a membrane such as a balloon being the initiator of the sound. After having tried to make such a thing, as a new invention and one of his experimental instruments, he then found that people were using something very similar in Indonesia. This was followed by a reprint, with very slight changes, of Paul White's controversial article which first appeared here. It was a pity that he had not retained the things that did need saying, while eliminating the personal remarks that caused so much offence. An article about gun drills is quite interesting; these have been referred to several times recently, but I've never been sure what they are until now. An article on shakuhachi making is well illustrated and, since it also deals with the use of a cast bore inside the bamboo, may well be controversial (not unlike Paul White's Heckel bores inside Denner or Port- haux bodies). An article on moisture meters could be useful to makers of any wooden instruments, though I wouldn't normally pay much attention to anonymous articles; if the author won't put his name to it, is it worth reading? Susan Berdahl has an article on the Haynes dynasty of flute makers. Finally Jan Bouterse describes three Haka recorders, with information for makers, including a number of hints as well as the usual measurements etc.

In no.2 the first article is on bassoon refinishing which should certainly not be applied to original early instruments because of the materials and techniques used. The second is on a new fingering system for flute and saxophone. The third is on a new type of clarinet barrel. The next is an interesting historical article on Kohlert bassoons. The next, by Scott Hirsch, describes a homemade and effective dust extractor he devised and made after becoming conscious of being allergic to wood dust; something on these lines could be useful to many makers. The next, by Bart Hopkin, who is also one of our members, is the first of two on the basic principles of air column shapes for wind instruments; it is a reasonably clear and simple exposition of a highly complex subject by someone who is experienced in making a wide variety of instruments, often of unconventional shape and design, so he does know what he's talking about – he's not just a theoretical acoustician. The next article is on one of the better known forms of the AmerIndian flute and its reconstruction; interesting to me as an ethnomusicologist, like the membrane reeds and the shakuhachi in no.1, but probably not to most of our readers. Nor, I sincerely hope, is another by Scott Hirsch on acrylic woodwind stabilisation. On the other hand, the article by John Coltman on the intonation of antique flutes, the result of a study of a number of important instruments in the Dayton Miller Collection, is highly rele-
vant. The following two articles are on modern pads, and the last by Philip Levin is on the comparative advantages of cork and string for lapping joints.

If you're concerned with woodwind in general you should look at a copy and consider subscribing, and bear in mind that the tools and technologies covered in WWQ are, for most makers, equally applicable to antique and to modern woodwind—a lathe is a lathe and a drill is a drill, and there are many workshop hints and tips here. And bear in mind, too, that you can pay for your subscription by writing articles and, if you have enough of them, workshop tips.

Continuation of the following

ly! Nor was Tulou, who was also involved with the early days of the Boehm flute.

This book is a very considerable achievement, a major piece of scholarship and a triumph of research. It should be in every library with any pretension to organological scholarship. It is a mine of information about French woodwind makers—they all made all the different woodwind, not just flutes—even if the main concentration is on flutes. There are a number of inventories of instruments in makers' hands on death or other occasions when inventories were made. There are marriage contracts and descriptions; the guest-list is often interesting—when other makers turned up one can assume that they were associated or at least on friendly terms; as far as one can make out from this book, they were probably all cousins! There is also a useful date-number concordance for Louis Lot flutes.

There are obviously other links between the early French makers, and we may look forward to Tula Giannini's future work on the Hotteterre's and exactly how they and others all linked into this present lot. It does make one wonder whether it could be worth probing family trees of Stanesby, Bressan, Astbury, et al, or was it just a French peculiarity that not only did they all come from the same village but all marry each other?

Continuation of Comm. 1185 from p.30

grotesques in the form of caryatids in a very believably Venetian style and, just as in so many side tables of the period, the back legs are left plain. Clinkscale offers several guesses about the instrument: that the legs are not original, that the naturals are (or were) black, the sharps white and the action Viennese. This last can be ruled out since the definition of Viennese action given in the glossary equates it with the Prelzungenmechanik which is impossible to reconcile with the construction of this instrument. Thus every one of Clinkscale's conjectures is either wrong or at best doubtful. This ought to be a salutary lesson. Far too much space is taken up with square bracketed entries like these. If the author would zap them all her book would be very much improved.

What one desires most of all from a reference book is reliability—dependable, factual reporting backed up by careful, thoroughly researched biographies. This has not been achieved. But make no mistake—following in a trail set by Donald Boalch and with the imprimatur of Oxford University Press this book has every prospect of becoming a standard reference work, to be consulted perhaps even more frequently than Makers of the Harpsichord & Clavichord. How sad therefore that it should be blighted by so many errors and worse still, by a doubtful methodology. We must look forward to a much revised second edition that the author has promised and hope that the publishers will not insist upon the usual twenty year gestation.

I have given Tony Bingham’s address in full because this is sufficiently specialist a book that you are unlikely to find it in the High Street bookshop. It is fairly densely written but then it is a highly complex subject; the extent to which the French flute-makers intermarried is almost unbelievable - if you are looking for an incestuous trade this was it!

One of the great early baroque flute makers, Pierre Naust, married Barbe Pelletier, who was a cousin of the Hotteterres and the Thibouvilles and others. Their daughter Jeanne married Antoine Delerable who had been Naust’s apprentice and became his successor, and after he died, Jeanne married his nephew, and also apprentice, Thomas Lot. Her grandfather had been an earlier Thomas Lot whose first wife had been Marie Delerable. And so it goes on. To have disentangled these complex relationships, with very clear family trees and clear exposition, including details of the evidence for all these relationships, is a major achievement. It is, I think, going to take most of us quite a while to get all the links sorted out, but even at first glance some things fall into place.

For example, Delerable (his only surviving instrument, a four-piece flute, is now in the Bate Collection) and Thomas Lot (the Bate has a flute of his, and an oboe) seem to have used the same poinçon, a dancing lion (it looks to me more as though it were dancing than rampant), and by that I don’t mean a similar design but the same piece of hot metal. If Friedrich von Huene’s drawings, reprinted in Langwill’s *Index*, are to be trusted, Naust’s lion was similar but he used a different piece of metal (what, if any, was the connexion between Naust and Boekhout and Borkens, and two unknowns, Castel and Heise, who also used a similar lion?).

If, as Tula Giannini suggests, it was in the Naust workshop that the four-piece flute was first developed (ie the body split between the two hands), and she shows, on plate 4, three Naust flutes, one all boxwood three-piece in Berlin, one boxwood and ivory three-piece in the Paris Conservatoire, both what one calls the Hotteterre model, and a boxwood and ivory four-piece in a private collection, then he could be considered even more important as a maker than any of the Hotteterres. Incidentally, one of the few infuriating things about this book is that the full captions to the plates are all together at the beginning, and the plates themselves have just a one-line brief description; it’s maddening to have to keep going back and forth for captions as well as forth and back for notes, which are at the end of each chapter, and which are often long and detailed and so do have to be read. It means a finger of one hand in the caption list and a finger of the other hand in the notes, and nothing for a cup of tea or the telephone.

As for the Lot family, they were firmly established as woodwind makers in La Couture, certainly by 1650 with Pierre Lot, and Jeanne’s Thomas was already the third with that first name. Tula Giannini has been able to distinguish the makers’ marks of at least Thomas Lot II and III; it was Thomas III, Jeanne’s Thomas, who was the best known.

An elder brother of the first Thomas, named François, heads another family tree (with several other Thomas and at least three other François) which takes in a few other familiar names such as Noblet, Martin, Herouard etc. This tree leads us down to Louis Lot who was thus a great-nephew of Thomas III (Jeanne’s Thomas) and who married Caroline Godfroy who was the daughter of Clair Godfroy aine.

Still with me?

This, of course, brings us into the introduction of the Boehm flute in France. Godfroy’s son and son-in-law went into partnership and were the first makers of the conical Boehm in France, and Doras published the first tutor for it to coincide with its production. Doras does not seem to have been one of the fami-
BOOK REVIEW

MAKERS of the PIANO 1700-1820
Martha Novak Clinkscale O.U.P
1993 403pp £45.00

Since its first appearance in 1956 Donald Boalch's *Makers of the Harpsichord & Clavichord* has remained an essential and invaluable reference wherever historic keyboard instruments are studied. Continued demand provoked a second edition which appeared, with many revisions in 1974 and a third, under the guiding hand of Charles Mould, is even now on its way to the printers. Although many suggestions have been made over the intervening years for extending the scope of the work to include early pianos, both Boalch and Mould have resisted the idea and the forthcoming edition will be very much true to the original conception. Including the early piano would give a more complete and fully rounded picture of the life and work of men like Silbermann and Broadwood, yet the early pianos and their makers being so numerous, the whole balance of the book would be destroyed. Martha Novak Clinkscale has addressed this vacancy with this very welcome addition to the literature. How will *Makers of the Piano* compare?

Comparison is certainly invited. Martha Clinkscale's book is very obviously modelled on Boalch and relies heavily on his pioneering effort for much of the biographical information on the early makers in that cross-over period up to 1790. The arrangement is very much the same too. The makers' names and dates are followed by a biographical sketch and this is succeeded by a list of all the surviving instruments known to the author. But in truth Clinkscale's intention is to provide rather more than a list, and it is in this area that the biggest innovation has occurred. Each instrument is allotted a separate close-printed paragraph with information on the date of manufacture, serial numbers, makers' inscriptions, case dimensions and materials, stringing and scaling, keyboard compass, octave span, the materials and dimensions of the key covers, the action type, the handstops, knee levers and pedals, the past ownerships and finally, the present location. This is a truly prodigious undertaking but Martha Clinkscale is nothing daunted. With the aid of her computer she intends not only to update the material for subsequent editions (she speaks of a second edition even in her introduction), but to go on and produce a companion volume taking the history of the piano to 1860.

When one considers the amount of work involved in such an ambitious project it would be surprising if a few mistakes did not occur and it would be quite churlish to go through the work gratuitously picking up on small errors. I intend no such thing. If Clinkscale's work proves to be as stimulating and widely consulted as Boalch, a few small faults would be a
small price to pay for such a banquet of information. Regretably though the faults are not few and I am sorry to say that if anyone buys this book hoping to discover fresh information on the makers they will be sadly disappointed.

Nearly all of the biographical information has been taken from standard reference works. The new Grove is a major source though its all-pervasive presence is not immediately obvious as the citations are to individual contributors rather than to the dictionary collectively. Boalch, as we have mentioned, is the chief source for many of the less well known makers. For Viennese piano builders Helga Haupt’s long-published work is the invariable reference; for Broadwood, Wainwright; for Stein, Hertz; and so on. Nothing very wrong with that you may think until you realise that good and bad sources have been conflated quite indiscriminately and that the various elements in the text are not easily tracked down to their origins. When Boalch draws upon several sources for a biography the references appear at the appropriate point in the text so that it is always possible to determine (at a glance) where to look for further information. Not so with Clinkscale whose method is to deliver the material in her own prose and to furnish only generalised references at the foot of the column. This is a very poor method in an academic book.

One of the particular joys of Boalch is that in many places he quotes verbatim from old newspapers, trade directories, parish rate books and church registers. Christie’s auction records from the 1790s and other such primary sources. Clinkscale’s material by contrast, is drawn almost wholly from secondary sources which are often in themselves poorly footnoted. Examples of the frustration that this may lead to could be quoted from almost anywhere in the book but here to illustrate are two notable examples. The first can be found in the entry for Johann Schmidt, an instrument maker who settled in Salzburg in the 1780s. Clinkscale repeats the biographical information found in Boalch which is drawn from Gerber (1814) and Fetis (1860). Schmidt, according to this, settled in Struhlingen after a period of study with Stein, and there (according to Clinkscale) Schmidt’s instruments “were discovered by Leopold Mozart who purchased a grand as a wedding present for his daughter, Nannerl”. Quite frankly I am flabbergasted. Where did this story come from? I can find nothing in the nine volume edition of the Mozarts’ correspondence that suggests any such thing. On the contrary, a careful reading of the letters which passed between Maria-Anna in St. Gilgen and her father in Salzburg shows that it is the previous Salzburg organ builder, Egedacher, whom Leopold disparages when things go wrong with her piano. (See letter of 8th April 1785: der Fehler is nicht an der Arbeit, sondern an dem Holz, weil der Egedacher ein Kaprizioner alter Narl ist.) Furthermore, the Mozart family piano (first mentioned in a letter of 4th December 1780 and presumably the one seen in the della Croce family portrait done at this period) is nowhere to be found in the sale of goods after Leopold’s death and its disappearance could be easily accounted for if we presume that “Nannerl” took it with her to St. Gilgen. If so it was made about four years
before any wedding present was needed. These deductions
however do not entirely rule out the possibility of Leopold’s
acquisition of a Schmidt fortepiano for his daughter so it
would be very interesting to know on what documentary
evidence this tale is founded. However, with Clinkscale’s
rather cavalier attitude to footnotes and sources it is no
easy matter to check up on this fascinating, if rather
doubtful story. Clinkscale’s statement that Leopold
discovered Schmidt’s instruments in Struhlingen surely
inclines one to scepticism.

Take another example: John Broadwood. The only source cited
by Clinkscale is Wainwright’s Broadwood by Appointment, a
book of no great academic exactitude, so I presume it was
from there that she produces the preposterous statement that
“John Broadwood was an apprentice of Americus Backers”. This
would appear to be a total anachronism. Backers’ arrival in
London was in 1763 at which time Broadwood was already
working for his future father-in-law, Burckat Shudi. How can
he have been an apprentice to Backers? And what kind of
apprentice? He was over thirty years old at the time. This
statement is not only incorrect but self-evidently so. Sadly
it also finds a place under the entry for Backers where the
error is compounded even further. We read, “In 1776, he
[Backers] with his apprentices Robert Stodart and John
Broadwood invented the English grand action”. Yet immediately
underneath this is the description of the 1772 Backers piano
in Edinburgh, which Clinkscale reports (correctly) has
English grand action; apparently four years before it was
invented! Gaffes of this magnitude are the sort of disasters
that every author dreads and it gives me no pleasure to point
them out.

In fact none of these errors need have occurred had the
author taken the trouble to consult some of the early
sources. The above example is an excellent illustration of
why she ought to have done so. The earliest written source
for this material is Notes and Observations written by James
Shudi Broadwood about 1832. In these he says: “The Grand Piano
[was] invented by Americus Backers, a Dutchman who resided in
Jermyn Street about 1776” (We should remember that
J.S. Broadwood was a small child at that time so with no
written evidence to go from he was probably fishing round for
an appropriate date and came up with about 1776— but which
verb does it refer to?) He says further that “Backers’
mechanism . . . has stood the test of competition and is used
by all the makers in England and on the continent where it is
known as Mechanique Anglaise”. He nowhere suggests that
anyone else was involved in the invention. After
J.S. Broadwood’s death his son, Henry Fowler Broadwood,
decided to have the notes printed (privately) but first made
amendments to his father’s text, and among the things he
wished to amend was the date of Backer’s invention. “This is
a decided clerical error; the date is 1767; the last two
digits should be transposed”. He then adds, “J.S. Broadwood
does not here mention what he afterwards told me, that his
father, John Broadwood, then with his apprentice, Robert
Stodart, in the employ of Shudi, used to go of an evening to
Jermyn Street, to assist Backers in bringing his mechanism to perfection". It will be seen that in these extracts all of the elements in Clinkscale's garbled text appear in a quite different light. Neither Stodart nor Broadwood was apprenticed to Backers. The date 1776 is not to be taken at face value; careful reading shows that neither of Broadwood's descendants actually says that the date of the invention was 1776. Only H.F.Broadwood, writing in 1860 when all of the eye witnesses were dead, makes any claim that Broadwood had even the smallest part in the invention of the English grand action and, if we choose to believe him, we must take the whole of his evidence and place the business in 1767.

Clinkscale's dependence on secondary sources and her failure to critically scrutinise this material seriously undermines the credibility of all her biographical texts. The study of the early piano cannot be advanced by the continued repetition of hearsay, garbled lives or the careless juxtaposition of mutually contradictory statements. Indeed it is somewhat surprising to find Oxford University Press bringing out a book containing so many faults that really ought to have been discovered at the proof reading stage. What can we say for example about the following pair of statements? "In the early 1780s Buntebart had been a partner of Johannes Zumpe" which, if we cross check with the entry for Zumpe reads, "his partner from 1768 to 1778 was Gabriel Buntebart". (It is the second statement that is correct.) It is not the error of a few years that is so important here but that the author should be so careless as to contradict herself and this is not an isolated instance.

She does it again in that same Zumpe file when she describes Zumpe as "probably London's first piano maker". This is contradicted in two places: first under Frederick Neubauer where Clinkscale correctly states that he advertised himself as a maker of pianos in 1763, some three years earlier than any similar evidence for Zumpe; and again under John Harrison where a "piano" is recorded from 1757. Clinkscale makes no attempt to resolve these contradictions. In fact London's first piano maker was none of these but Roger Plenius, otherwise famous for the ill-fated Lyricichord. This is not obscure information. It is clearly stated by Rosamund Harding, yet Plenius gets no entry from Clinkscale. Harding unfortunately is not very reliable and as usual quotes no source (in fact she probably copied it down from Rimbault) but a little persistence leads one back to Rees Cyclopaedia and its musical articles written by Charles Burney. The context there enables us to deduce that Burney not only saw this piano but played it and he gives a brief summary of its characteristics based on a comparison with an earlier, Italian-made piano from which it was copied. From information contained in this first hand account and from known facts about Plenius' life it is easily deduced that his piano was made between 1748 and 1755.

Although the title is "Makers of the Piano" and not "Pianos of the Makers" it is in fact the latter that appear to be the main focus of the book. The author's aim is to record details of every surviving piano from the period in question - in
this instance 1700 to 1820 — a task of monumental proportions and of course impossible of achievement. This first edition has 403 pages of which 70 are taken up with a rather grandiose bibliography and a brief glossary which is admirably exact but not scrupulously adhered to. As a measure of the progress made to date we could notice that of the 300 plus pages of text a mere twenty four are taken up with the pianos of John Broadwood — 102 of them squares— at approximately nine per page. One may be assured therefore that if the response to this first publication is encouraging, and if the author is willing to go on entering the data, the section on Broadwood alone could soon run into a couple of hundred pages. Given the repetitive nature of much of this data one may well wonder at the wisdom of this. Do we need all this information? Is it really advisable to publish a whole paragraph on each instrument?

The convention is itself already under strain because in very many cases the data available is inadequate. Working from museum checklists or old catalogues it is inevitable that there will be many instruments identified only by the name of the maker, a date of manufacture (often approximate), and little else. Regretably Martha Clinkscale adopts a general practice of interpolating conjectures enclosed in square brackets, to make up for this shortfall. So for example, if details of an early square piano by Clementi are in short supply Clinkscale is quite happy to enter her guesses: NATURALS [ivory] SHARPS [ebony] ACTION [English double] without explanation. The validity of such an entry might be questionable even when we are dealing (as here) with a well known maker whose instruments are very numerous, but how ought we to view such guesses when the maker is very far from well known? Such a case is Johann Christoff Krogmann who worked in Hamburg in the 1780s. Data for only one surviving instrument is readily available yet on the basis of this Clinkscale has extrapolated data for two other reportedly extant instruments which neither she nor any of her correspondents has examined. To take another example we could turn to Alexei Nechayer of St. Petersburg. Nothing at all is known about this maker and only one instrument is recorded. Yet the author has not shrunk from making conjectures about the naturals, the sharps and the action [Viennese?]. On what basis does she make these guesses? Does she have some specialist knowledge of Russian pianos?

Just how ill-advised such conjectures might be can be instanced by comparing a set of Clinkscale's square-bracketed guesses with an actual specimen which your reviewer has seen. This is a square piano in the Germanisches Nationalmuseum in Nuremberg inscribed Luigi Hoffer Venezia; a particularly interesting specimen since very few Venetian pianos are known from this period. The compass reported is 4 octaves F — f'''. This is in fact a mistake transcribed from the museum checklist from which we deduce that Clinkscale has not seen the instrument: it is actually a 51 note FF-f'''. This can be determined by examining the balance pins. The keyboard itself is entirely absent but the balance rail is integral to the structure as in a clavichord. The front legs are carved
Real Instruments and Fake Putti

Freiberg cathedral (20 miles SW of Dresden) has a unique (?) feature – not the usual angelic orchestra in fresco or bas-relief, but free-standing cherubs holding actual instruments. There was a description of some of these in an article in 'Concerto' (no. 53, 1990) by Thomas Flemming, put together from writings and photographs by the late Peter Liersch, an instrument restorer.

Herr Liersch had no encouragement from either the church or state authorities, but managed to do some work as and when scaffolding was erected beneath the dome of the funeral chapel (Begräbniskapelle). At one time he even secretly removed some instruments and had them X-rayed before returning them! More recently however, Herr Flemming found less difficulty.

Most of the statues stand on the capitals, at a height of about 22 m, from which spring the supports of the dome. Some are on cubic pedestals, while others are suspended even higher up. No complete list of instruments is given, but included are: 'kleiner Bassgeige' (almost certainly a cello held by the player-cherub as if it were a double-bass), four long trumpets, two sackbuts, and 'various other objects', three cornetts, three bows, a triangle, a timbrel, a 3-string piccolo violin, violin, viola, citterns, lutes, harps, shawms and straight cornetts. Four of the stringed instruments have labels and indicate that they are from the Randeck school of violin making. The date for the assemblage is given as 1588 (cf. the Linarol violin in Vienna 1581). Attention is drawn to the notion of a 'complete orchestra', but I think that whatever means were employed to obtain perfectly good instruments for such a purpose, it was a largely random mix, and the artistic effect must have been given some priority.

Some of the details, pegs, bridges etc are substitutes for working components, and to me, the harp looks suspiciously like those played by statues elsewhere.

The instruments have suffered from interference from time to time; in 1960 everything was given a coat of varnish and 3 bows were replaced in 1967.

There is clearly something of a time capsule here, with some further research waiting to be done.

Reference

Thomas Flemming 'Die Akte Freiberg' (The Freiberg File) Concerto no. 53, May 1990 (incl. 10 photos)
An Interesting Organ Loft in Antwerp

Organs are interesting enough in themselves but possess the extra appeal to musical iconographers. Many have decorated casework with paintings, bas relief or carvings featuring musical instruments. One such is the organ at the cathedral of S. Paul in Antwerp. A photograph in F. Peeters and M. A. Vente's *The Organ and its Music in the Netherlands* shows a line-up of various instruments including a curtal, the top end only of which is visible. It looked very much like the open bass in Berlin (654), and it occurred to me that there might be just a chance that real instruments might be involved in the same way as in the music room at Highnam Court, Gloucestershire and at Freiberg in the Cathedral. So when on the way home from Nürnberg, I stopped to have a closer look.

I was disappointed to find building work in progress, the entire cathedral being filled with scaffolding, and therefore closed to visitors. However, I was able to reach a platform on a level with the carvings some 60 feet above floor level, just close enough to touch some of them had I wanted. The organ itself had been totally removed except for what looked like a 32' open flue rank. Everything was covered in a very fine Pinatubo-like white dust. It even got into the camera.

It was immediately obvious that no actual instruments were present. Well modelled wind instruments were mixed with a crude conventionalized harp. A violin, lute and drums fall about half-way between these extremes. The whole assembly is obviously for viewing from below at a great distance. Four panels of instruments are separated by three bearing inscriptions with attendant angels and gold-painted drapes.

The curtal is a "bass", 1050mm long, and has a lighter coloured diagonal band at its mid-point. It has what seems to be a hole for the left little finger. Surprisingly there is no key or other metal-work, or any sign of there ever having been any. A small wooden plug is inserted into the crook socket. Perhaps a gilded crook may have been present originally. There is a depression carved into the solid bell, for the benefit of viewers leaning over the parapet. The tenor shawm (Altpommer) also has a slightly hollowed bell, but otherwise is realistically shaped. It also is larger than life size. Close inspection was harder, because of the zig-zag plan of the loft and arrangement of the scaffolding, but it looks as though the shawm is broken. If the foot was in line with the top it would make a more satisfactory angle with the violin. The violin and lute are strung with parallel strings, the latter having 11 pegs, the peg-box being in line with the neck. The accompanying photographs show the general arrangement of the instruments. The carved music books have just three or four enormous notes on each page. Verses from Psalm 148 flank a central inscription:

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SOLI DEO, MATRIQUE DEI
ET B.P. DOMINICO.
HONOR ET GLORIA
ANNO 1.6.5.4
Exstructum Anno 1824 Reparatum
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The instruments are arranged as follows:

<table>
<thead>
<tr>
<th>Curtal and Harp</th>
<th>Music book, Shawm and Violin</th>
<th>Timbrel, Drum and recorder</th>
<th>Book and Lute</th>
</tr>
</thead>
</table>

Graham Lyndon-Jones
The organ loft at the Cathedral of St. Paul, Antwerp
CIMCIM (Comité International des Musées et Collections des Instruments de Musique) met in Antwerp this year and, as I was not involved in all the working groups, I was able to take one morning off and visit the Royal Art Museum, where I spent most of an hour standing in front of the great Hans Memlin triple

I had seen the painting once before, in 1989 when ICOM, the International Council of Museums, was meeting in The Hague and again CIMCIM visited Antwerp, but that time on a day trip so that we only had a short while in the Art Gallery. I had, of course, known it previously and indeed had used it in my *The World of Medieval & Renaissance Musical Instruments* (plates VIII & IX and the dust wrapper), but I had not realised until we were in Antwerp how large it was; the figures are all-but life size, and indeed although one refers to the three parts as panels, they are separately framed as each one large painting, rather than all being hooked up together like a normal triptych. We had many questions about the paintings on that trip, and it was Laurie Libin of the Metropolitan Museum of Art in New York who pointed out that it was a painting and not a photograph. Nevertheless, there are so many questions that arise when one looks at the instruments in detail that it seems worth writing this Comm.

The first instrument, starting at the left-hand end of the series (our left; the triptych's right --- this is so complicated a way of describing it, let us name each panel by the central instrument; this is the lute panel, the other being the organ panel), is the psaltery --- I am assuming that you are all familiar with the triptych or have access to one of the many reproductions of it in books, whether mine or anyone else's. The psaltery has already been the subject of two previous Comms, the first two above, Ed Kottick's in April 1979 (Q 15) and Eph Segerman's in April 1982 (Q 27). As Ed Kottick pointed out there are many problems (a phrase which will recur throughout this Comm) with the psaltery. One is the number of strings, which (leaving aside for the moment the extra, shorter, strings in the bass) come to 61. If there were one string per note and chromatic tuning, the compass would, as Ed Kottick pointed out, be 5 octaves which just would not work; no way could strings on an instrument of that dimension cover so great a range. Yet the strings are more or less equally spaced and there is no suggestion of double or triple courses. In addition, there is a considerable problem with the location of the strings. There are 14 strings on the upper part of the body which has straight sides — ie these are all the same length and therefore, if they are to be tuned to different pitches, must be presumed to be of different gauges. Assuming that you have an illustration before you, the 5th string runs over the upper edge of the upper roses, the 11th string over the lower edge; the 20th string comes at the top of the middle rose and the 29th at its bottom; the 46th string comes just below the top of the bottom rose and the 53rd just above its bottom, and here again we have the problem, at the porco's snout, of similar lengths.

As Ed points out, none of these strings lie in grooves, nor are there any pins to provide a sharp cut-off where they cross the shoulders; there are no bridges, the shoulders acting as such. The hitchpins on the angel's right seem to be down towards the bottom of the sides. The wrest pins on the left are more problematic because they seem to be up at the top of the side wall, almost level with the soundboard, in the bass, but down towards the bottom in the treble; this may due to an error in perspective. Ed describes the wrestpins he used on his reconstruction, which were tapered harpsichord pins; the painting looks a little more as though the pins might be wood (the same applies to the harp); this would help to solve the weight problem which he mentions. They might of course be bone; all that one can say for certain is that they are pale in
A number of bone pins of very much the same apparent size, apparently for a psaltery because they were drilled at the square end (though see below on this), were found archaeologically in what was known to have been a medieval harp-maker's house in Oxford a few years ago.

These 61 strings are not the only strings. There are also 22 shorter strings running about two-thirds of the way across the soundboard, and I would say pinned (ie hitchpinned) on the soundboard although Ed describes these pins as the wrestpins. I think that the wrestpins for these strings are with those of the main strings on the left side of the instrument. These strings are referred to by both Ed and Eph as four-foot strings; if so, why are they two-thirds and not half the length? Could they not just as easily be quints? After all, we have no idea how the main strings are distributed, whether we have an impossible five octaves or whether, more probably, we have paired courses for \( \frac{3}{2} \) octaves chromatic or triple for \( \frac{7}{6} \) octaves diatonic with both types of B. So why be so certain that the sympathetics (they appear to be lower than the main strings and thus less accessible to the plectra) are octaves rather than quints?

The plectra, by the way, are held quite loosely between index and middle fingers. The left is well away from the thumb and the right probably is also. They are the pen part of quite thin quills, much thinner than any that could be used as pens unless for something like a mapping pen, but without the tuft of feathers that are often seen, usually on rather thicker quills; what they resemble most closely are those imitation plastic quill toothpicks.

Ed Kottick strung his reconstruction in brass; Eph provides details for stringing in silver without saying why he presumes silver rather than brass. I'm ashamed to say that I made no note of the colour. Eph also has some interesting suggestions for the construction.

The next angel plays the tromba marina and is the subject of our third previous Comm, by Philip Davies in October 1985 (Q 41). The instrument has two strings, the longer passing over the usual trembling bridge and then to a little nut in the soundboard, the shorter just going to its tail nut without a separate bridge. Philip measured the strings, on a photograph, and produced a ratio of 0.56 so that if the longer were tuned to C, the shorter, if the other factors of tension, mass etc, were the same, would be B\#. Improbable as this seems, his table of available harmonics gives a very useful range, the overtones of the B\# string fitting very nicely into the gaps in the C series. There are seven frets (the player is fingering at the 7th) which should mark the points at which to touch the string to produce the natural harmonics. Philip's measurements place them correctly for the longer string, though less so for the shorter. I cannot confirm his measurements, for one is unlikely to be popular with museum guards if one starts to put a tape measure on a fifteenth-century painting! They do correspond with my impressions looking at the picture, for example that the shorter string is not half the length of the longer and that the seventh fret is in the wrong place to give an octave (2nd harmonic) on the shorter string.

The instrument is bowed in the normal way for a tromba marina, with the bow above the stopping hand, but the instrument is held up in the air as it commonly was during the Middle Ages.

The two tuning pegs are frontal in a peg plate within the curl of a violin-type scroll.

While there are some unusual features, there is nothing improbable about this instrument and it is clearly a tromba marina played in harmonics, unlike some other instruments of this shape, which often appear to be some sort of long trapezoidal fiddle which is fingered normally rather than in harmonics, or even plucked, like the one in the Westminster Abbey Chapter House which I published a few years back in *Early Music* (May 1988, fig.3).

Would that we could say the same about the lute, which comes next. To start with, the frets are equally spaced. The fret spacing on the tromba marina is quite possible, with a wider gap between the 7th and 6th than between the 6th and 5th (remember these are harmonic markers and therefore should be further apart than those nearer the nut, the reverse of stopping points). So, why should we say that the lute is not possible? If the tromba marina frets are acceptable, what justification is there for saying that those of the lute are not? But if it were played at these
frets, the results would be distinctly odd. If the tuning were the same as on the normal renaissance lute, the left hand fingers are stopping a minor triad on adjacent strings, which is wholly practicable on a plectrum lute. The plectrum is held similarly, though rather more tightly, to that of the psaltery, with the thumb even more clearly well out of the way.

We can see only one side of the pegbox, of course, and on that side, the treble side, there are, to my eye, six pegs, as one might expect. However, there are only six strings - ie all courses are painted as single. Lynda Sayce, an eminent lutenist, on the other hand, is sure that what we see is three peg heads and three shanks, so that there are only six pegs in all. She thinks, too, that the head isn't long enough to carry more pegs than that. So if she is right, there only are six strings, just as they are painted. The question is then, how were they distributed? Were there six single strings? Three double? But there is no suggestion in the painting that the strings are in pairs; they seem to be equally spaced. Or was one peg hidden, so that it was a standard four-course lute, three double and one single? But there are only six strings painted!

There seems to be a double fret where the neck joins the belly and there are no frets on the belly. The lowest string goes to the bridge but does not tie over it (we shall meet a similar problem with the harp wrestpins); the other strings are obscured by the angel's right hand at this point.

As Laurie said, it isn't a photograph, but there are so many things adrift of the probable that it isn't a safe model, either. If some things seem obviously wrong, it is dangerous to assume that others may be right merely because they correspond with one's previous assumptions. On the other had, when many things seem to be right, it is equally dangerous to assume that others are wrong merely because they do not correspond with our previous assumptions.

As Laurie said, it isn't a photograph, but there are so many things adrift of the probable that it isn't a safe model, either. If some things seem obviously wrong, it is dangerous to assume that others may be right merely because they correspond with one's previous assumptions. On the other had, when many things seem to be right, it is equally dangerous to assume that others are wrong merely because they do not correspond with our previous assumptions.

Next comes one of the three trumpets, and we will, if you don't mind, leave it so that we can take all three together.

The last instrument in this wing of the triptych is the shawm which looks to me OK. It appears to correspond in most respects with a number of other illustrations of the treble shawm, with the fingerholes covering less than half of the tube length. It has very heavy walls at the bell end, but there's nothing inherently improbable about that; the greater mass there should ensure a louder sound. The only slightly odd thing is that the little-finger hole is neither offset nor duplicated.

So on this panel, the lute panel, we have two instruments which, to our present range of knowledge and within our present prejudices, seem reasonable, the shawm and the tromba marina, two with a number of queries, the psaltery and the lute, and one, the trumpet, in abeyance.

The central panel has six crowned angels, three standing on each side of Christ, each trio singing from a single book. The books are what one might call book size, quite thick, three or four inches or so, heavy enough that one is supported by three hands and the other by four, somewhere round octavo in format and certainly much smaller than those vellum sheets of music that one sees in antique shops, ripped out of choir books.

The right panel, the organ panel, starts, at the end nearer the centre, with the straight trumpet. I do not intend to get into buizine\clarion etc terminology, which is complex and usually indeterminate, so let us merely refer to the three trumpets as straight (this one) or folded (the other two), and distinguish the folded ones as the the lute trumpet and the organ trumpet, since one is on each panel.

On all three the mouthpiece is held to the lips with the left hand, on this one and the folded trumpet beside it (the next angel) with the fore and middle fingers on the cup and the stem of the mouthyard between those fingers. The lute folded trumpeter holds the stem of the mouthyard between the thumb and three fingers, with the little finger rather daintily in the air as genteel ladies used to hold a teacup, the thumb and forefinger an inch or two below the mouthpiece.

The straight trumpeter holds the tubing down towards the bell with the right hand with the usual back-hand grip, the thumb pointing away from the body. This is the standard way of holding a long trumpet because you can take the whole weight with one hand this way,
whereas with a forehand grip (thumb towards the body) the bell sags towards the ground. The first folded trumpeter, on the lute panel, has the right fingers apparently coiled round a stay about two thirds of the way down the loop, though there is no stay visible. The mouthyard and bellyard are held between the thumb and the fore and middle fingers; the middle yard is held between the ring and little fingers. Again the grip is back-handed so that the whole weight could be supported with this hand. The organ folded trumpeter again has the right hand back-handed, but nearer the bottom of the loop (the loop is shorter on this trumpet than on the other) with the thumb on the bell yard and the fore-, middle, and ring fingers on the mouth yard. There is no possibility of a stay since one can see between the hand and the middle yard. One would rather doubt the presence of a stay on the lute trumpet, and the fact that the fingers are curled does not mean that its presence is essential.

The construction of the trumpets is, as is normal, in sections, with a ferrule supporting some of the joints, and a boss, or ball, supporting the others. Unlike later trumpets which (see Eric Halfpenny's articles in Galpin Society Journals) normally alternate long and short ferrules, all the ferrules on all three trumpets are so short that in my notes I called them collars. They consist of a ring, presumably rolled metal since it is thicker than the rest of the ferrule, surmounted by a crown of sheet metal. I call it a crown because it has a series of points rather than just having a straight upper edge like modern ferrules. The way that folded trumpets are made is with three straight yards joined with a U-shaped bow between the mouthyard and the lower end of the middle yard and another bow between the upper end of the middle yard and the bellyard. One assumes that the rolled ring protects or strengthens the end of a section of tubing, the upper part of the ferrule, culminating in the crown, being there, soldered along the tubing, to give added support. These ferrules are too short to act as sleeves covering a butt joint, and I presume that they are strengthening the end of the female section of a telescopic joint. The curious thing is that on the lute folded trumpet the ferrules seem to be on the bows, whereas on the organ one they seem to be on the yards. On the lute one, the crown on all four ferrules points up or down towards the bow, whereas on the organ one the crown points along the yards with the ring towards the bows.

The female tube is always the one that carries a ferrule because that is the one that needs supporting. On later trumpets (Eric Halfpenny's seventeenth century ones, for example) it was normal, in effect, to alternate male and female so that one stem of the bow was male and the other female. On these instruments, it is clear that the trumpet on the lute panel has all the straight yards male whereas that on the organ panel has both stems of each bow male and all three yards female. A very odd arrangement, for one would expect any trumpet maker to use the same system on all his instruments.

There are other differences also. The straight trumpet has, starting from the mouthpiece end, a collar, a boss, a collar, a boss (at the beginning of the bell flare), and a collar part way down the bell flare. The use of a boss to support the root of the bell is normal and persists to the present day with natural trumpets. The organ folded trumpet next to it has one collar on the mouth yard, then the two collars for the lower bow, then a boss roughly in the middle of the middle yard, which is an odd place for one, then the collars for the upper bow, and finally a collar, not a boss, at the root of the bell flare. The trumpet on the lute panel has the same distribution of collars (save for their reversal of sense) but no apparent bosses, though these could be obscured by the hands. The collars are all gilt, as is a pattern on the mouthpiece of each trumpet. The organ folded trumpet has a gilt bell Garland; the bells of the other trumpets may have also, but they are at the wrong angle to see. Plate IX in my Med & Ren is misleading, as is the museum's own postcard; the museum's photographer chopped the end off the bells, but they are there in the painting.

It has been a general assumption, with a few strongly dissonant voices, that when a trumpet mouthpiece is held to the lips in this way, it is because the trumpet is a draw-trumpet, trompette de menestrel, or tromba da tirarsi. The mouthpiece is held to the lips and the rest of the trumpet is pulled out and pushed in along the mouthpipe, the long stem of the mouth-
piece. As a player who had such an instrument made many years ago, I'd say that this is a fairly hazardous operation, the considerable weight moving forward and back along the mouthpipe leading to wobbles on the lip and therefore cracked notes and, unless one is moving fairly slowly, as much of this music seems to have done, a bit risky to the teeth when moving back in a hurry. The presence of a slide, of course, means that the mouthpiece must be narrower in bore than the mouthyard within which it slides. Of these three trumpets, the lute trumpet might have a very slight alteration of diameter at the first collar, but if so it is pretty minimal. The straight trumpet shows no difference at the first collar, but there is a possibility at the boss below this. There is no apparent difference of diameter on the folded organ trumpet.

On the one hand we have Laurie Libin's warning, it is not a photograph. So maybe they are draw-trumpets even though one cannot see differences in tube diameter. On the other hand, we have my own experience, as a nowadays infrequent and ageing player, that when one is out of practice or one's teeth are no longer all one's own (and who can produce evidence of angelic dentistry or the assiduousness of their practice?), playing on any sort of trumpet, whether there is a slide or not, especially in the upper part of the range, is much easier if the mouthpiece is steadied on, or even pressed to, the lips with the free hand. So maybe these, and others, are not draw-trumpets after all. Personally I am sure that the draw-trumpet did exist; there is to my mind enough evidence in its favour, both musical and iconographic. I'd like to believe that the three Memlinc trumpets are draw-trumpets, but whatever my wish may be, certainly there is nothing to prove it.

Next comes the portative organ. There are 32 pipes, arranged in 16 pairs. They seem to be slightly scaled; at least the four longest pairs seem a little wider than the next ones and the four shortest seem a little narrower than those before them. Again, it didn't seem politic to put even a plastic caliper gauge on the painting, and the reproductions are seldom large enough to make this practicable. The pipes appear to be metal; they are the same colour as the trumpets, which I assume to be silver for the trumpets and perhaps the usual sort of pipe metal for the organ. They could, of course, be painted paper; even though angels are stronger than mortals, one assumes that what Memlinc was actually painting was an earthly model, and 32 metal pipes, presumably 2-foot, or perhaps even 3-foot (they look a fair length), would be quite a weight. I remember years ago, when I was asked to adjudicate a Crafts Council Exhibition, advising rejection of a metal-piped portative because, I said, a portative should by definition be portable and this one was so heavy I could not even pick it up!

The keys are T-shaped buttons, arranged in two rows. The lower row is continuous as one would expect; the problem is that the upper row is, too, at least for the first five keys which are all that one can see. As with the psaltery, there is the problem of range. 32 pipes chromatic is 2\(\frac{1}{4}\) octaves; 16 pipes is two octaves diatonic with both sorts of B. If one rank were stopped, one would like to suggest that one row of keys and one rank of pipes was open, and the other row of keys and rank of pipes was stopped, thus sounding an octave lower, each of them diatonic with B\(\text{b}\) and B\(\text{b}\), but unfortunately all the pipes are clearly open. So that idea won't work. Memlinc obviously went wrong with the base of the organ; the arch above and to our left of the angel's knee has obviously been repainted; even in my plate IX this can be seen. So maybe he went wrong on the upper row of keys, too.

Otherwise this looks like a perfectly practicable machine, and certainly enough people have built copies of it; we used to use one in Musica Reservata which belonged to Jantina Noorman until she sold it to Howard Brown. The bellows had as much breath as Jantina so that both phrased naturally together.

Next we have the harp. One of the many minor points which build up the feeling of accuracy in these paintings is that, rather unusually, the number of wrest pins and the number of strings is the same, 20 of each. I can't begin to count the number of illustrations where they differ! The belly or soundboard pins are all brays, those right-angled pins whose other end just touches the string to make it buzz, adding a very considerable richness to the sound and making it quite a lot louder.
The wrest pins are tuned from the side that we can see, the angel's left, for what we see is a row of square pegs (unless, of course, they are square pegs in round holes - do you think that this picture might be the origin of that saying?). The strings seem to run up to the centre of the pin and then stop; there is no sign of any coil of string being wrapped round the peg, the same deficiency as with the lute bridge. We are, today, accustomed to having the square end for the tuning key on one side of the harp, with the string wound over the rounded point of the peg on the other side. Indeed, when I was shown the bone pins I referred to above with the psaltery, I had assumed that they could not be harp pins because they were drilled at the square-shaped end. I shall now have to tell the Museum of Oxford that I may have been wrong because they could, like these, have been harp pins which were tuned on what we would think of as the wrong side of the harp.

The only other problem that I can see is the question of what's holding it up, but angels may have their own devices — after all, what are they standing on? I suspect that a harp-maker may see other problems; the first time I met him, many years ago, Tim Hobrough gave me a prototype reconstruction of this instrument in exchange for a copy of my Med & Ren because his design for it had not worked - the spacing and scaling did not pan out properly and, except for appearance, which was what I wanted as a lecture illustration, it was a write-off.

Finally we have the fiddle. As it happens I bought a reconstruction of this instrument a few months back at an auction in Bath, made by Bernard Ellis; the only difference between them is that my pegs are dorsal, whereas Memline's are frontal, my fingerboard is very slightly longer, my tailpiece is tied to a tail button, my bridge has curved ups and downs, rather than Memline's square teeth, and mine does not have the four decorative patterns in the corners of the belly.

There are five pegs, going into the peg board from the front, with trefoil heads. All five strings are on the fingerboard (no off-the-fingerboard bourdons) and the lowest is clearly thicker than the others. The nut is the raised edge of the peg board, unlike the lute which has an inserted bar. The bridge is a comb, with the strings resting on the teeth of the comb, and it is placed very high, slightly above the centre of the rather serpentine sound-holes. The neck is clearly wedge-shaped and the flat fingerboard projects over the belly, though only a very short way. There are seven frets, the seventh on this projection. The first fret is very close to the nut, looking less than a quarter-tone away from it; thereafter they are equally spaced, giving us the same problem as the lute. The long flat tailpiece is tied round a projecting spur at the base of the soundboard.

The bow is very neatly made. The frog looks to be an integral thickening of the wood, but the hair is raised from the stick at the point by inserting a small wedge-shaped piece of wood between the stick and the hair. The angel's thumb is on the front of the frog, on the hair. There is no indication of how the hair is fixed to the stick nor how it is tensioned. It seems possible that the little wedge at the point acts like a clip-in frog. The fiddle seems to be one of the most practicable instruments in the whole painting and there doesn't seem to be any problem involved at all, other than the fret spacing. Even the playing position, with the fingers on the highest string and the thumb blocking a drone chord on the others, could work. The harp looks equally OK, so again, on this panel, we have two apparently practicable instruments.

With the organ we have much the same problem as with the psaltery - how many notes? And what notes? The trumpets in both panels are teasers - drawn or not drawn?

Whether you will now be any the wiser, having ploughed through most of six pages of this, I don't know, but I think that you now have some information you didn't have before, plus some hypotheses and speculation which you can treat as you consider they deserve. As always I would welcome response and comment.
TIMBER - SWELLING and SHRINKING

One workshop is in our garden where general woodworking and other allied tasks proceed: essentially this is a place where dust and other debris by-products arise in considerable measure. Indoors is the second workshop reserved for instrument and bow making at what, to me at any rate, are its more exciting stages and where the related timber is stored. Apart from differences in debris produced within the two sites, the humidity and temperature indoors remains at a reasonably stable 50-60% and 20°C throughout the year. Outdoors the other workshop experiences great fluctuations of both humidity and temperature spanning the same period. Moving between the two environments the swelling and shrinking of wood can be marked, and end products ruinously affected in the absence of a keen awareness of how striking these changes can be. Alteration in size and shape takes some time to be manifest if timber is moved between one environment and another, as the following shows.

Fig.1  
Fig.2
Description

Fig. 1 shows but one possible variation of a device which I find relevant in the instrument-making field. Its origins are from rather hazy recollections of a magazine item of a few years ago in some other context. Thus A is a "G" form of spruce, held separate from a composition board B only by a single distance piece of around $\frac{5}{8}$" thick. Similarly a straight piece of spruce C is set at an angle to the top limb of A. It too is retained in position by means of a single comparable distance piece at its upper end.

Dial surface D of perspex or similar material is attached likewise to the base board by means of another block of greater thickness, keeping the dial in a plane parallel to that of A but in isolation from it. Fig. 2 shows the neighbouring ends of A and C. Each is fitted with U-section brackets of plastic or metal. A pointer bearing closely placed parallel metal pins link the two brackets. Relative movements as at X and Y will thus result in swings of the pointer needle as shown at Z.

The spruce, having been cut on the quarter, has grain lines running through the thickness of both A and C, and along the length of separate limbs of A but across the width of C. Such a grain orientation eliminates twisting of the active elements of A and C.

Operation

When the wood swells each of the right angles of the G form extends by a small increment 80 giving a total of 480 over the 4 right angles. Thus the upper tip of A, with its linking U-piece sweeps a short distance along an arc upward and outward to the left, as shown by Y. Simultaneously this will pass the other link carried by limb C which in turn is swelling along its length by a small amount in the opposite direction to the right, shown by X. These contrary movements occur when the wood of A and C swells, while an opposite sequence of changes and sweeps takes place when the wood shrinks. It will be apparent that the small but observable movements can be enhanced i) by making the limbs of the G form of reasonable length, ii) by setting the linkage pins close together with the siting of the U-pieces to match and iii) by making the pointer of considerable length. A suggestion of suitable sizes would be:

| Limbs of G form: | Lengths 3.75", 11", 6.5", 18", 6.5". |
| Limb C         | Length 7". Angle 25 degrees to horizontal |
| All limbs of A and C | Width 2" |
| Link pin separation: | Distance 0.3" |
| Pointer        | Length 10" |
| Dial calibration | Degrees |
| Mitred joints  | Glue -- white wood glue. |
| Wood surfaces  | Remain clean and untreated. |
Significance
In the outer workshop pointer rotation varies with fluctuations of conditions from mid winter to high summer. In the author's case variation is found to spread over an arc of 0-90°. Apart from this fairly dramatic change, the fact that water uptake and its release, takes a considerable time to occur, the device gives a constant reminder of how timber remaining in a particular workshop is behaving. Understandably not all wood species behave equally in the same surroundings, viz. a viz. the change of volume and mass and the time lag involved.

Experiment Outline
Two cuboid sets of different wood species were prepared, all pieces being of the identical size. Individual blocks were each suspended on a short length of gut to allow ready access of air to all surfaces. One set a) remained in the outer workshop, while set b) was placed for the same period in the inner studio, then "before and after" measurements of weight, length, breadth, and height could be taken and comparisons drawn. Woods used in the example given below were pear, spruce, oak and maple. Charts 1-4 indicate sample alterations from a common damp start in the space of one week. Parallel opposite results arise if the samples change place so that swelling and shrinking are initiated in the contrary direction.

Some Observations
The bar graphs summarise what happened within one week as each piece settled to its new environment. a) Chart 1 shows detectable % age changes in length (along the grain). For all pieces this was less than ±1.1% and which in practical terms is barely significant.

![Bar graph](image_url)

% age Change along length of grain.

<table>
<thead>
<tr>
<th>Chart 1</th>
<th>Outer Workshop</th>
<th>Inner Workshop</th>
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<tbody>
<tr>
<td></td>
<td>Pear Spruce</td>
<td>Maple</td>
</tr>
<tr>
<td></td>
<td>Spruce</td>
<td>Oak</td>
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<td>Oak</td>
<td>Maple</td>
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<tr>
<td></td>
<td>Maple</td>
<td>Pear Spruce</td>
</tr>
</tbody>
</table>

Pear Spruce Oak Maple | Pear Spruce Oak Maple
b) Charts 2 and 3 show %age changes in measurements at $90^\circ$ to annular rings compared to those in line with annular rings. Here the changes are spread over a 2% to 4% range. Greater alterations occur in line with the annular rings than across them. This suggests, for example, that a spruce front would have thickened/thinned by about 2.7% and by about 2% across its front over the week of the test. It is this latter shrinkage and swelling which could initiate cracking troubles.

c) Chart 4 indicates changes in mass of the test pieces over a ± 30% range which appears quite striking.

**Chart 2**

<table>
<thead>
<tr>
<th>Outer Workshop</th>
<th>Inner Workshop</th>
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<tbody>
<tr>
<td>% age Change in line with annular rings.</td>
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</table>

<table>
<thead>
<tr>
<th>Pear</th>
<th>Spruce</th>
<th>Oak</th>
<th>Maple</th>
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<tbody>
<tr>
<td>-2</td>
<td>0</td>
<td>-1</td>
<td>-3</td>
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**Chart 3**

| % age Change at $90^\circ$ to annular rings. |

<table>
<thead>
<tr>
<th>Pear</th>
<th>Spruce</th>
<th>Oak</th>
<th>Maple</th>
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<tr>
<td>-1.5</td>
<td>1.5</td>
<td>-2</td>
<td>-3</td>
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</table>
Conclusions
Plainly the bringing together of instrument parts should be conducted when conditions are stable over a considerable period, and having due regard for the likely humidity and temperature status of the instrument during its probable life. In this way variable environmental stresses are not built into the structure to a severe level.

Makers of string instruments are aware of the influence of changes in thickness and in mass when it comes to the business of tuning the separate elements of an instrument where particular resonances or tonal aims for the total corpus are being sought. Yet it is so easy to overlook the humidity/temperature/time trap which is attendant upon instrument making.

True the writer is a sucker for gadgets, not necessarily "high-tech" ones at that; but it is by taking special heed to the swelling and shrinking history of the separate parts of an instrument that some trouble could be avoided. Cracks and flawed body tuning can be devastating for the instrument maker and all others associated with a particular instrument. However, a cherished violin, cello, viol da gamba, or other constructive effort can emerge with minimum tendency to impending defects. So that odd looking gadget on the wall may just jog us enough to ensure that changes from one location to another are not to be overlooked in a particularly fickle climate.
Dear Jeremy,

I am sure that You are one of the most generous persons in Oxford, although there are some doubts about Your mathematical and logical qualification and it is small wonder that my "assays" prove to be "over Your head". Nevertheless, if my works do not contain serious errors, then they mean end of traditional musicology. Discovery of the group of equation of Pythagorean system of tones means for music the same that Boolean discoveries for computing techniques, or discovery of periodic law for chemistry. Apart from discursive successes, all essential statements of my investigation obtained corroboration by means of simple and well reproducing experiments. They open way to further investigations for many scholars and promise many discoveries in psychology, aesthetics, philosophy, etc. In particulars, there are many highly important applications for ethnomusicology, general musicological analysis, decipher of early and exotic musics, history of mathematical and musical sciences, etc.

Unfortunately present Russian circumstances create almost insoluble problems for publications and other kinds of scientific communication. In spite of them, as long as I have got my FOMRHI, I shall be calm about future of my investigations. The question arises in this connection: how many fellows we have? More easy job does not exist than to count friends in course of evil life. During last years sole of our members expresses social as well as human interest to my activities and to my person. This member is Uta Henning and all you may be sure - She is the True fellow.

Today I "do hunger and thirst" after competent reader as well as after congenial editor. There is small basis to pin my hopes on musicologists because of some formal peculiarities of my articles. Meantime it seems improbable that in Oxford do not exist logicians and semioticians which were able to absorb my reasons. "I would not, brethren, that ye should be ignorant of this mystery," that our post ceased now to act in both its directions. For this reason, Jeremy, I ask You to search such people which are able to display interest to my works. Excuse me for my imposition, because You (= FOMRHI) remain now my last connection with scientific world. You have communications 301, 1055, 1068, 1083. English version is now ready of "Relative syntax of two-dimensional mode" and I prepare English version of my last article "Musical texts and systems". They will be available from my daughter (Tanya Raudonikas. 784 Manning Ave. Toronto, ONT. M6G 2W6. Canada; apart from this she still remembers my tel.No.). Now I at least can ask You about something and nobody knows that will be tomorrow. But let's save tomorrow for afterwards.

With trust and hope,
Yours

P.S. You may try to write for me upon address:
191 065. St.-Petersburg. Russia.
There are following articles of F. Raudonikas about this matter:

1. Classification system of pitches with various absolute height.  
   Fokirhi, October 1980. (No. 21) Comm. 301.

2. The Pythagorean system of musical tones.  

3. The logarithmic calculation in traditional notation.  

4. On meaning of pitch-symbols.  

5. Dynamis in the Old Greek theory.  


7. Syntax of the relative two-dimensional mode.  

8. Essays of Pythagorean system.  

Fokirhi - abbr. of "quarterly of the Fellowship of Makers and Researchers of Historical Instruments." (in English)

PM - abbr. of "Problemata musicologica" i.e., common title of annual collections of scientific works of Leningr. St. Inst. of Thea., Mus., and Cinem. (now Russian Institute of the History of Arts) Cited collections have following subtitles: PM 2 - Aspects of music theory; PM 5 - Music, language, tradition; PM 7 - The problem of musical communication. (in Russian)

The generalizing work is prepared for publication under title "The Pythagorean musical syntax". (in Russian)
An important skill for a politician is to be able to invent wordings that are sufficiently ambiguous so that conflicting special-interest groups can interpret them differently, more in their favour than would be the case with precise wordings. This can induce agreements which would otherwise be much more difficult. If the differences of interpretation are ever put to the test, the conflicts would resume. This will often not happen, and more people are kept apparently happy than if precise wordings were used.

This is obviously the intention of Peter Bavington with his use of the term 'authentic performance' in his point 1 of Comm 1174. He is using it as a vague term to cover the current early-music package of performing style and instruments. He knows full well that the term will be interpreted by the general public as implying historically accurate performance backed by the authority of scholarship, while he wants us to accept it as implying no more than whatever the early musician feels he or she needs for the full expression of musicality. This is just as morally shady as a car salesman leading the customer to believe that the used car being sold has only been subject to normal use when it actually is a rebuilt wreck. The customer may well enjoy driving the car and not notice the difference, but if he or she ever finds out the truth, fury at being cheated would be completely justified. This is an abuse of a customer's moral right to be told what it is that is being bought.

Peter's misuse of language here not only cheats and abuses the public, but it does the same to scholarship. The research and analysis of scholarship is the only way we know of getting closer and closer to objective or absolute truth. This is the basis for the authority of scholarship. But scholarship can never claim to have reached that goal. Anyone that implies to the public that scholarship has determined the truth, or deceitfully implies that what scholarship says is different from the actual state of scholarly knowledge (i.e. the best that scholarship can offer at the time), is undermining the relationship between scholarship and society. People like Peter, by this conveniently sloppy use of language, are doing both of these when they lead the public (including musicians) into believing that what early musicians are doing is historically valid.

I agree with much of what Peter writes in point 2. What historical scholarship can possibly tell us about any particular repertory is the most probable types and average levels (plus deviations from the average) of performance factors such as pitch, tempo, loudness, embellishment, improvisational alteration and addition, phrase length, articulation, ensemble constitution etc. These can only be no more than a framework within which one needs musical imagination and choice to create a performance. A musician is free to accept any number of these historical guidelines (or none at all) and the performance can be musically valid as judged by its ability to please an audience (I particularly enjoy performances of early music by the Swingle Singers). All I ask for is honesty in stating what one is trying to do. I applaud the courageous honesty of the musicians that are mentioned by White in Comm 1160. They are offering their concerts on the basis of superior musicianship rather than attempting to be as historically accurate as possible. They lost a few bookings but are still doing well, with wide appreciation of that superior musicianship.

I know of no 'historically accurate performances' (which follow all historical guidelines) and very few 'historically accurate instruments' (and here we must include more ephemeral components such as strings and reeds). And deciding whether it is worthwhile to try to approach these as goals can be motivated by historical curiosity as well as by pleasing audiences. A combination of these, often articulated by early musicians, is to stay within historical bounds and yet deliver a performance that moves audiences. This is accepted as a challenge to one's musicianship. Historical study does not enable musicians to perform more musically. They don't deserve such an insult. They can perform musically without it. It only enables them to perform more historically.

Peter's point 3 is true in what it says, but the implication that he is leading to, as expressed in the first sentence of point 5, is most pernicious. There he says that 'all attempts at historical reconstructions are doomed to failure.' This condemns all scholarship to failure because it can never deliver absolute truth. This is an absolutism that condemns everyone to hell because no-one can be 100% virtuous. The apparent implication is that if we cannot be completely virtuous, there is no
I agree with Peter's point 4 first paragraph, and with the second, that a musician should not be ashamed of using non-historical practices—unless he or she claims otherwise, explicitly or implicitly. With respect to his third, I will argue that makers do not only 'exist to serve musicians and, through them the art itself'. There is also a responsibility to the art itself without the musician as an intermediary, as well as to the craft and to society as a whole (past, present and future). 'A fruitful dialogue based on mutual respect' is the best relationship between maker and musician, with each willing to learn from the other. And by all means let us have a 'broad Church' with everyone taking from history what we want and ignoring what we don't want. All I ask is that we be honest with ourselves as well as others about what we are doing, and do our best to prevent recording and programme promoters and media mouthpieces from claiming any more historical accuracy than actually is being offered.

FoMRHI Comm 1192
Ephraim Segerman

Response to Wood's Comm 1175 Criticising Criticism of Early Musicians

Wood represents a considerable number of orchestral early musicians who believe that their performances do not deserve to be criticised on the basis of historical accuracy. I sense an echo of Bavington's absolutism when Wood writes "There used to be endless arguments about the exact nature of authentic musical performance. Nowadays we know that this cannot be pinned down." I am sure that no-one believes that any writings (or even a recording) can pinpoint the exact nature of any music performance. So what were the arguments about? My guess is that they were about different opinions on what musicians thought sounded 'right', with some of these opinions believed by their holders to be based on historical evidence. Why did the arguments stop? Wood implies that it was because none of the opinions was convincing enough to vanquish the others. My suggestion is that the issue became merely 'academic' and irrelevant because of practical needs of the music industry. The early-music orchestras, for commercial reasons, had to be orchestras in the modern sense, with everyone playing in the same style at the same pitch and attractive tempi, conforming to all modern standards of 'quality' and precision. They had to have a consistent 'sound' varied only by instrumental mix, articulation and dynamics, and they settled on a consensus of what most of the musicians felt was 'right'. Argument after that standardisation was just a waste of time.

Wood continues: "What is necessary is to educate one's musical perceptions by assiduous study of sources and then to get on with it." She is apparently referring to subtleties of instrumental note production such as blowing somewhat strong on the lowest note of the oboe, and not about authentic style of playing. The sources have much information about the latter, but it is hard to understand the real meaning of what was written. One needs ruthlessly objective scholarly analysis to provide true historical guidance on this. Musicians are very rarely able to do this because what sounds attractive to them unavoidably prejudices their judgements. An excellent collection of original source material is in Robert Donington's book The Interpretation of Early Music. He was not always as objective as he could be (e.g. he made a hash of his chapters on tempo). But if we accept this book as the gospel (as the baroque early music people have tended to), how often does the early-music orchestral player reread sections (such as ornamentation, for example) to develop a more historically enlightened performance? I don't blame them for not bothering to do this. As pointed out above, it would probably be a waste of time.

One area in which orchestral early musicians are free to pursue historical accuracy is with their own instruments. The string players don't bother to do this, as evidenced by their using unhistorical stringing (see Comm 438 and The Strad Vol 99 (1988) pp 52–55, 195–201, 295–299), bows (see Comm 409, 438 and 550), fingerboard length (see Comm 525), etc., but I accept that others like Wood can be more independent of modern traditions. I would be very interested in whether her experiments with reeds for oboes in the Eate explored pitches other than a'~415 Hz, and reed designs similar to those described in Comm 504 for c.1800 oboes. A Comm on this would be very welcome here so
that we all can share the results of her investigations. I would be very happy to have the questions I raised about oboe reeds in Comm 1147 answered.

While we are on the subject of early woodwind reeds, I am puzzled by the penultimate paragraph of Barbara Stanley's Comm 1142. She implies that the classical reeds measured up by White and reported in Comm 927 are irrelevant with respect to the instruments involved in the controversy, but White presents a convincing argument (to a non-bassoonist at least) for their relevance. I would like to see a Comm here giving her arguments for her position, as well as giving the rest of us some idea about what the results of the experiments with 'historical' classical reed designs were.

Wood quotes Fischer's view that "a good Ear, improved by Practice is preferable to all Rule or Direction". I agree, but insist that he was referring to an Ear filled with real 18th century sounds, and which must be very different from an Ear filled with 1990's sounds. The most important and difficult job of musical historical scholarship is to reconstruct as much as we can of what the ears of past times heard and appreciated. Those of us who are trying to do this can't help but feel a bit annoyed when lots of other people have naively convinced themselves that they already know the answers. The standards in historical scholarship are much higher than they think.

I am sure that Jeremy is happy to be corrected about the numbers of people who can earn their living only from playing early music, and not using hand stopping of horns in baroque music. I do wonder though about how much Wood's string-playing friends base their arguments about bowing, phrasing and vibrato on early evidence. I don't see why we should expect people who are supposedly devoted to historical accuracy to have an entire spectrum of chins off and on when they all don't have the extra clothing around their necks (but can have as much cloth there to replace it as they want). I don't see them playing mostly in first position in earlier non-solo baroque music, when there shouldn't be any need for chins on.

The variation in fingering of woodwind instruments is agreed by all to be historically true, but no-one has denied White's claim that Grazzi had never consulted those relevant early bassoon manuals. We wouldn't expect him to follow all of the basic fingerings given there in performance, but not knowing them when he played various original Grensers deprived him of evidence that would have been useful in evaluating their condition. With the fuss this incident has raised, I doubt whether any other woodwind specialist will let a lapse like this occur again. I think that this is constructive. Grazzi plays beautifully, and I am sure that neither his musical reputation nor his livelihood will suffer because of this fuss.

I see very little forward movement in the modern orchestral field, and little more in the early-music orchestral field. Positive and creative relationships between players and makers are very much there though, in solving problems individual musicians have. That is fine with instruments that have no value for historical research, but the situation is different with instruments which have this value. Defending that value when musicians want to treat such instruments in the same way as those without this value is not mud slinging.

If players are really interested in exploring more historical accuracy, they will need to do this as an exercise outside the commercial music world, develop a respect for the standards of historical scholarship and extend the positive and creative relationship to include performance-practice scholars (rare amongst the musicologist fraternity) as well. But to be positive and creative, we must freely enter into debate, giving and accepting constructive criticism that is objective, to the point, and not personal. That is not mud slinging either.
The Sharp-Eared Minority and the Effects of its Power

In Comm 1065, Catch wrote "consciously or unconsciously, the ear can hear what it wants, or expects, to hear". In my Comm 1090 I wrote "there are some who can, many who convince themselves that they can, and some who make believe they can". These statements are illustrated in a new study by Behne & Barkowsky, music psychologists at Hannover Conservatory. They studied whether people can hear the difference between analogue (LP) and digital (CD) recordings. Their study was reported on in the 31 July issue of New Scientist. Laboratory tests show that CD's have noise levels 20 to 30 decibels lower than LP's, with better channel separation and dynamic range.

These psychologists played 6 classical and jazz recordings to each of 160 subjects. During each playing they alternated several times between LP and CD recordings of identical performances. Each change was clear with one fading out and the other fading in. The subjects were hi-fi sales staff, hi-fi audio designers, music students, professional musicians, frequent concert goers and people with no special interest in music.

The people in the last category did as well as those in the other categories in identifying which was which. This indicates that the requisite hearing sensitivity is probably innate, with little improvement with experience. In total, 4 (2.5%) got all 6 right and 17 (10.6%) got 5 out of 6 right.

The psychologists also played a single CD recording with the fades out and in as if it was an alternation like in the other tests. Behne wrote "An astonishing number of them heard differences which in fact could not exist. Hi-fi expertise didn't result in higher caution. It was the laymen who tended to hear no differences".

I am reminded of what a highly respected violin repairman in the English Northwest told me as I was buying some of his tools when he retired. When he had fussy customers asking him to reset their soundposts, he often took the violin into the back room, put it down, made himself a cup of tea, drank it, picked up the violin, took it back up front and said: "I'm sure you will find it better now". They almost always did.

The point in raising all this is to discuss the current tyranny in our musical culture of the small minority who can hear the difference. I am writing now of hi-fi but of precision in various aspects of musicianship such as rhythm and intonation. Those who can hear the difference are proud of this enhanced perception and convince the others that they must be right. They are. But the rest of the population (the vast majority) are not wrong. They are also right, but in a different way – to them there is no difference, so why should it matter? But the sharp-eared minority get themselves into positions of power in the music world (critics, producers of records and music programmes, teachers of music, etc.) and they make people with normal ears feel that they are inferior.

It is professional suicide for normal-eared people in the music business to admit that they can't hear the difference (i.e. are not discriminating), so they try like hell to be able to. Some partially succeed, and have to work so hard to keep up the standards that they have no concentration left to do anything musically imaginative. This is a problem shared with those that can hear it innately as well. The others remain in less exposed positions, a large fraction of whom convincing themselves (and many others) that they can hear it, and the rest, more honest with themselves, fake it.

In the old days, before the sharp-eared mafia took over with their strangling obsession for 'standards', music-making was more relaxed, and people with normal ears could become widely recognised as inspired musicians. They could afford to take creative risks in their performances. Those with sharp ears were not in charge. They could be arrogant and complain about the sloppiness of the other musicians, or they could be tolerant and be more interested in the creative contributions of the others than in their lack of precision.

The principle of historical reconstruction of musical performances to scholarly standards is probably usually inconsistent with modern 'musical' standards.
WHERE HAVE ALL THE CREATIVE AMATEURS GONE?

A profession is an area of employment where qualification requires extensive (usually formal) training. The general public knows well what the practitioner is supposed to be able to do. The training is comprehensive enough so that a member of the public can go to any practitioner and either get what they want or be referred to another practitioner with the appropriate specialism to get it from. The professional gets respect, financial reward, and (hopefully) satisfaction from practise of the profession. The criteria for success in all aspects of training and practise are meeting standards set by the profession and the public, and not by the practitioner. Professionalism involves acting according to the expectations of others. Uniformity is encouraged and individuality discouraged. In early music, whenever there is a conflict between commitment to historical accuracy and to audience appreciation, the latter always comes first.

An amateur does not have to fulfill the expectations of others, and rarely has the extensive and comprehensive training that a professional has had. As a result, not being thoroughly indoctrinated into the traditional ways of thinking in the field, and not having to live up to its standards, he or she has much greater freedom in the exercise of individuality and imagination. Whether the amateur utilises that freedom, and whether the results are of any interest to others, are quite different matters. Everyone likes to be appreciated and most like cooperating with congenial colleagues, but the main driving force for the amateur is fascination with, and commitment to, the activity itself much more than to the results of the activity.

During the limited travels of my youth, I found considerably more amateur activity, and public interest in that activity, in Britain than elsewhere. Of particular interest was a much higher level of amateur musical activity than elsewhere. Since I was convinced that there was much more expression of individuality and imagination in early music historically than modern players were doing with it, this made Britain a particularly attractive place for me to participate in the developing of early music and of our understanding of it.

When I first came to Britain in 1963, I found that creative amateurism in the early-music movement. There were two schools. In one, people were being creative in a modern way, inspired by historical models. In the other, which included myself, we tried to discover more about what historical models were. Lots of people with diverse backgrounds were doing historical research and exploring how the results looked and fell on instruments, and how it generally sounded. We liked almost all of the results of our research but some, like thick all-gut bass strings, took some tolerance and effort to get used to and enjoy. After all, that is just what is needed to learn to enjoy any unfamiliar music (like music of other cultures and much modern classical music). When I was involved in the formation of the first Early Music Forum (NWEMF), I introduced the word 'forum' in the name. A forum is a place for debate, and the debate in mind was how we can explore the different possibilities of how the music might have sounded, as well as trying to make sense of what the research turned up that didn’t immediately make sense.

Things have changed since then. There is no more debate about the original nature of the instruments or the music. There is no exploration of the different possibilities of what early music might have sounded like. The field has become musically professionalised. The amateurs, mesmerised by the recordings the professionals make in profusion, only aspire to be pale imitations of the professionals. They have forsaken both individuality and imagination. The only historical research of interest is the flood of new repertoire that the musicologists are churning out, and the stories that they can tell in programmes and record jackets, included to lead the public to believe that the performance has the authority of being fruits of historical scholarship. Everyone is quite sure about what early music was like, and any new research into what it originally was like that claims otherwise must either be wrong or irrelevant.

Of course, the above is only how it has felt like to be one of the survivors of the small band who were doing the research and exploring, and who is still doing it. The cool facts are different. The vast majority of people who joined the early-music movement always did so because they liked much of what they’ve heard of it, wanting more of what they liked, and were able to happily ignore that which they didn’t like. They had no commitment to history, only to what they enjoyed. That
hasn’t changed. All that has really changed is that these people have switched from considering that the researchers were their leaders to considering that the professional musicians are. They always were imitative amateurs. The creative amateurs have left the field in frustration because of being censured for being outside of the growing consensus of what was felt to be historically ‘right’.

My main activity has always been scholarly research. There are professional and amateur researchers, but there is no such thing as a professional scholar. Extensive training is not required for scholarship. All that is needed is at least average intelligence, imagination, and the mental disciplines of objectivity, logic and fairness. A few basic rules help maintain these disciplines. Though comprehensive knowledge in the field is not necessary, one needs to make a comprehensive collection of the evidence relevant to the particular topic one is trying to contribute to. And one is required to show that what one is saying is better than what has been said on that specific topic before.

Though I am a professional physicist (with a crystallographic specialism), I can only claim to be an amateur organologist and musicologist. That is because I don’t have a comprehensive knowledge of either field, and there are certain things that a professional could rightfully be asked to do that I can’t. Yet my scholarship in these fields is as competent as any. The professionals are more reluctant to accept my results than they would if I was one of them, but they eventually do.

Another open area for creative amateurs in early music (besides scholarly research) is exploring the full range of the expression of individuality and imagination in performance that is suggested or not excluded by historical research. In each repertoire, each aspect of performance style usually had a considerably wider range than is generally imagined nowadays, and sometimes modern interpretations do not fall in this range. All that is needed is the mental discipline of reserving judgement on how good it sounds till after deciding what to do, practicing it up enough to give it a fair hearing, and sharing the results with one’s colleagues. This gives history a chance when contrary to modern expectations.

Enterprising professional musicians might occasionally find the results useful in their work, but this is not a good reason for their getting involved in this exploration. A notable cautionary tale involves Franz Bruggen, who started to incorporate historical practices into his performances when he was already the most celebrated virtuoso professional recorder player around. This led to the rapid demise of his recorder-playing career and his becoming a conductor. Professionals are not allowed to violate modern intonation standards, no matter how authentic these violations are.

If professionals do get involved in this project that puts history before audiences, it would be constructive only if they can adopt the true amateur spirit.

The same applies to instrument making. If this is not immediately obvious, think about it.
When I came to examine the reproduction of historical woodwind instruments some years ago, I had no knowledge of the technology needed and took as my starting point the technology at the former LCF, finding it consistent with the practice of a least 6 makers who taught there.

I, however, was not interested in making but copying as I had noted that extant originals seemed to out perform many so-called copies, the alterations being regarded as corruptions.

I found no magic tricks in my studies only refined working tolerances choice of materials and finishes. I therefore wondered if manual manipulation was the correct approach as it was very prone to inconsistency. It seemed clear to me that some form of mechanical process was needed which would eliminate the human error from copying. I was aware of CNC engineering but though it far too expensive with millions of pounds involved in the cost of mainframe computers, tape data storage systems and ultra-expensive machines not to mention elaborate software.

What I have discovered is that the cost of the equipment (especially the computer) has plummeted in price while increasing many fold in capability to the point where the reproduction of historical musical instruments seems to be the only thing left on the planet not manufactured under CNC control as illustrated in previous comm! I consider this to be inconsistent with the concept of copying a process where no originality is needed and no deviation desired. This is in no way to decry craftsmanship but it is a thing I am not interested in; I only wish to 'copy' existent woodwind instruments of the 17th and 18th Century.

One of the most attractive features of CNC is its repeatability for it renders the concept of the one-off to the pages of history; any 3D object can now be reproduced to high tolerance and this data stored for future are any number of times!

Indeed, CNC machines can make shapes easily that are virtually impossible by other means which could lead to some very interesting experimental instruments!

Likewise, the use of this equipment could lead to much greater understanding of how instruments work, there being a definite lack of usable information in this field! However my first concern is with ruthless authenticity in the reproduction of historical instruments.
RELEVANT CNC!

Eph' is right about CNC when he made the assumption that it is not relevant to historical instrument reproduction. That is exactly my point! Nor is it relevant to any given engineering product whether it be a mould for a turbine fan blade for a tornado jet fighter (3 axis milling) or a boat propeller out of one solid billet (5 axis milling). It is merely a case of getting hardware software programmes and machining tools together to cut out the shape, its function being irrelevant!

CNC engineering is concerned with producing a shape in a piece of material to great accuracy with great repeatability. The computer is not sentient; it does not know if it is turning a car engine piston or a recorder head joint.

I consider that engineering tools and software are reasonably tailored to our requirements, which is very fortunate as this is not the case with most industries, which is why I wrote the papers on this aspect of CNC.

An example of research to adapt CNC to its requirements would be the Apparel Industry where a £8m government-funded project involving 5 Universities and 42 companies centred on De Montford University formerly Leicester Poly called CIMTEX.

Its most successful project has been in software for prototyping garments; the effects of this is to cut prototyping of garments down from weeks to days and is generally considered to be one of the most significant advances in CAD technology in recent years.

This project has also helped produced cloth cutters up to 20 times faster than manual means, 6 - 10 m per minute compared with 0.5 m per minute!

It is a shame that no such exploratory view exists in the world of historical artifact reproduction.

Perhaps the most striking CNC story was that of the machine that take an architects drawing of steel girder frames for buildings, a CAD data disc plus a 20 ton punnet of steel and produces a kit of girders that can be assembled on the building site! This equipment includes a punch that makes 38mm o holes through 30mm steel in one cut which is some CNC sledge hammer!

Its increase in efficiency 8:1 against manual means. Viability? From 6000 tons of steel per year to 8000 tons.

Ease of introduction? Caunton Engineering production increased form 1.6 tones per week in February 1992 to 2.19 by June 1992. Flexibility? ... its gives us the flexibility to process a variety of material sizes and types in smaller lots, one-offs if necessary! Although these facts are fascinating, this technology is not relevant, which is why I did not write about it. Nor did I mention vacuum cleaner production or car part production. But I do think it would be nice to have a machine that one can give a disk of CAD data and a log of wood, press a few buttons and wait for it to spit out an instrument in an eighth of the time it takes to make manually to an accuracy of 0.003mm in all dimensions.

Clearly this machine will not drop on the mat as this Q has, but will need research and development. What I hoped was that the FOMRHI Membership would be capable of COMM that would help further this idea, this being the case with Comm already made! What other gems lay ungathered?

BARRY JEFFERIES
Positioning Pivot Holes in turned rings

Given a turned ring on an instrument and a key with the pivot hole drilled in it then, knowing how deep the key is to be set in the ring, whereabouts on the ring do you start drilling the pivot hole? The geometry of this problem was worked out for me by Diana Wilkes while on a course at West Dean College. I have found it useful so here it is.

In the diagram

- \( O \) = centre of the ring
- \( R \) = Radius of the ring
- \( X \) = Distance of the centre of the key pivot hole below the outside of the ring
- \( AB \) = Centre line of the pivot

\[
\cos \theta = \frac{R - X}{R}
\]

\[
\text{Angle } AOB = 2\theta = 2 \cdot \cos^{-1} \left( \frac{R - X}{R} \right)
\]

Circumference of ring = \( 2\pi R \)

So

\[
\frac{2\pi R}{360} = \frac{AB}{2 \cdot \cos^{-1} \left( \frac{R - X}{R} \right)}
\]

\[
AB = \frac{2\pi R}{360} \cdot 2 \cdot \cos^{-1} \left( \frac{R - X}{R} \right)
\]

\[
= \pi R \cdot \cos^{-1} \left( \frac{R - X}{R} \right)
\]

\[
\text{e.g. if } R = 30\text{mm and } x = 2\text{mm, } AB = 22\text{mm}
\]

so start drilling 11mm round the ring from the centre of the slot for the key.
A SIMPLE WAY TO HOLD WORK ON A LATHE.

Michael Ransley.

If your lathe has a morse taper it is very easy to use the method illustrated below to hold work.

Plain or blank morse tapers can be bought from model engineer supplies or good tool shops.

If the end that sticks out from the lathe is tapered, turn it to a cylinder, then drill a hole up the middle to take a screw.

Then bore out bits of wood to fit over the shank that you've turned. Put the wood onto the shank, it should be a nice squeeze fit, face off one end of the wood, then turn it around and face off the other end. Then put the washer and screw on. The wood can now be turned down to suit the socket or bore.

I have two of these tapers, one large one for big instruments and one smaller for small ones. I keep an Allen key next to the lathe to tighten the screw and some spare washers and screws as these are easily dropped on the floor and lost forever.

This method of holding work on the lathe is not at all authentic. Instruments were probably always turned between centres on pole lathes. This method has several advantages over modern methods, but I thought that other makers might like to know about using a blank morse taper.
Authentic Methods of Making Woodwinds. Michael Ransley.

When trying to make instruments that are supposed to be similar to those of earlier times it seems sensible to try to learn the techniques and methods that were available then.

An obvious example of this is the use of aniline dyes to stain instruments. Aniline dyes were not invented until the 1840s. They quickly became popular for dying cloth because of the bright colours it was possible to achieve. This is the exact opposite of what we want, yet it would not surprise me to discover that several "post-modernist" makers use these aniline dyes.

We know from comm 131 that the old makers did in fact use nitric acid to stain their instruments. The book De Re Metallica by Georgius Agricola, pub 1556 is very interesting and contains woodcuts of nitric acid being made. Although this book is mainly useful for studying 16th century mining techniques, it gives a very good insight into the period and contains dozens of interesting woodcuts.

Another area for attention should be that of keywork. Despite a useful comm, No.254 by Robert Bigio, many makers today produce keywork that is not very like the old keywork and usually doesn't even work very well. Often an argument for sloppy keywork today is that the originals are sometimes very crude. Surely we should be trying to copy the best examples? The best keywork I have seen works well and looks good. The poorest examples are usually those that have been replaced at a later time and are not worth copying. A very useful source of information is the facsimile of the section on jewellery making in the Encyclopedie of Diderot et D'Alembert. As well as having illustrations of the hand tools used then, the book also contains illustrations of workshops and various interesting machines of the 18th century.

The conclusion that I have come to after several years of trying to learn the old methods is that it is possible for the individual maker today to work professionally, using the techniques that were available before the 20th century. I am confident that my instruments are more like the old instruments because I try to use or at least be aware of the path of using lazers to cut out my brass and CNC lathes to make my reamers. The more complicated your machine the more likely it is that the original design of the instrument will be compromised so that it can suit the machine. Even with a CNC lathe, making a "D" shaped reamer out of silver steel is still very laborious. I know of makers that even though their precious reamer isn't quite right, are reluctant to make a new one because of the work involved.

In the Staatliches Institut für Musikforschung, museum in Berlin and in the Germanisches National Museum, Nuremberg, examples of wooden reamers and socket tools with a metal blade can be seen. These tools were used specifically for instrument making. My experience of making and using this type of reamer and socket tool suggests that this is a far simpler way to go about doing it. There are several advantages. They are very quick to make and adjust and with care can last for several instruments.
But the best thing is that these reamers have to work and cut well otherwise the strain on them quickly makes them fall apart. This is in contrast to metal "D" reamers which can be cutting quite badly and compressing the wood. Wood that is compressed in this way can look impressively smooth and shiny, but a lot of strain has been put on the wood, perhaps causing it to crack later. There is also the risk that wood compressed in this way will expand later, especially when it gets wet, which will mean that the instrument will have to be re-reamed, but the reamer will not go back in easily.

I am sure that metal reamers can work well if care is taken over their design and for very narrow bores like the top joints of oboes they would be much better than wooden reamers.

Metal reamers were used in the old days, but as far as I know they were always forged and not turned. In the woodcut by Johann Christoph Weigel, circa 1698, of an instrument maker, examples of this type of reamer can be seen and similar ones used by cooperers for fitting a tap to a barrel can still be seen today on flea markets. These were made by blacksmiths and I would like to know how easily a blacksmith experienced in this type of work could make such a reamer to specific dimensions. These forged reamers are similar to "D" reamers, except that they are not a "D" shape (ie ½ round) but more of ½ an ellipse. This is the reason that they work more easily, because the back of the reamer is not "binding".

**Gun drills and boring.**

I would be interested to find out how the barrels of guns were bored out in the old days. It must be quite exacting to bore a hole of ½ an inch diameter or so, straight for 5 or 6 feet up the bore of a musket? Did they have something similar to the gun drills talked about by Julian Goodacre? Using gun drills has revolutionised boring for many bagpipe makers today. These drills go very straight, don't bind, don't need clearing and leave a good finish. The time saved on this process means that more time can be spent on something else, like tuning. So even if the pipe makers of the 16th century didn't have gun drills and compressors, perhaps this is a good example of modern techniques being put to good use?

In the book, Woodland Crafts in Britain, by Herbert L Edlin, you can see a photo of a man in Herefordshire in 1900 boring out an elm log to make a water pump, using a large hand auger. This photo shows exactly the same method being used as the woodcut 350 years earlier in De Re Metallica.

Probably the old makers had quite simple easy to make equipment and lots of skill. I would like to hear more about this subject from other makers.
In the section on Jewellery in Diderot et D'Alembert.

Woodcut from De Re Metallica. Making nitric acid.
The Sizes and Pitches of Praetorius's Sackbuts

I have suggested (Early Music 13/2 (May 1985), p. 261-3) that since Nuremberg sackbut makers made their instruments for sale throughout Europe, they were designed for the highest pitch standard that their customers used. This was Venetian standard, about a semitone above modern. For other standards they provided tuning shanks and crooks for insertion between the mouthpiece and body of smaller instruments, and tuning slides or alternative bows for larger instruments.

Plate VI of Praetorius's Synthagma Musicum II (1619) depicts a sackbut labeled as Octav-Posaun. Plate VIII depicts four sackbuts: 1 and 2 are labelled as Quart-Pusaunen, 3 as Rechte gemeine Posaun and 4 as Alt-Posaun. The pitch table for a set of sackbuts gives the lowest normal pitches (shown as white semibreves) as EE for the Octav Posaun, GG and AA for the Quart Pos., E for the Gemeine ... Posaun and B for the Alt Pos. The pitch at the first position (with the slide nearest the mouthpiece) is the nominal pitch of the instrument, and in this period, that usually was a fourth above the lowest note (with the slide out). Praetorius wrote the the Alt was an octave higher than the Quart, which was a fifth below the Gemeine. The position indications on the drawing of the smaller Quart indicate that it was in D. We can then presume that the nominal pitches of the five sackbuts Praetorius depicted were AA, C, D, A and d. Speer (1697) gave the nominal tunings of the three smallest as D, A and d.

The lengths of air column of the five sackbuts on the drawings were measured by the following method. Lines were drawn down the centres of the tubing where it was straight. Perpendicular to these lines were drawn lines through the ends of the instrument and through the centre of the tubing at the centre of each bow. For calculation, it was assumed that each bow was a semicircle of diameter equal to the distance between the parallel lines through the straight pieces of tubing going into it. This would be an underestimate of the length of tubing in each bow because its shape is a bit more squared than a semicircle. But we know from acoustic theory that the effective length of tubing in a bow is less than its curve through the centre of its tubing, and we hope that this largely cancels out the effect of the semicircle assumption.

The total length then would be the sum of lengths of straight-tubing lines between perpendicular lines plus, at each bow, the distance along the perpendicular line between parallel straight-tubing lines multiplied by .571 (i.e. π/2 - 1). This latter factor subtracts the excess of measuring both the straight-tubing lines to the centre of the bow and adds the length of the semicircle. Each component length was measured to the nearest ½ mm on the reproductions of Praetorius's plates in Crookes's translated edition. (In the complex three-loop bow at one end of the Octav, the shape was assumed to be three semicircles with two small straight pieces inbetween, with the angle of the latter with respect to the other straight tubing taken into consideration.)

The depiction of the Gemeine Posaun shows the mouthpiece out of the instrument plus a semitone shank and a tone crook. To measure the length of air column, the mouthpiece needs insertion, and the depth of penetration was assumed to be the same as in the Alt. Its length was measured without including either the shank or the crook. The total lengths measured, including mouthpieces and bells, were 340mm for the Octav on Plate VI, and on Plate VIII they were 368, 332, 207 and 1544mm. The scale factors were measured to be .0580 Brunswick feet per mm on Plate VI and .0472 Brunswick feet per mm. on Plate VIII. The scaled lengths then were 19.7, 17.6, 15.7, 9.8 and 7.3 Brunswick feet, or 5.63, 4.96, 4.48, 2.79 and 2.08 metres.

The relationship between the wavelength of emitted sound and the length of tubing is complex (including how it is lipped), but the ratios of these between instruments of similar design and different lengths should be quite close. The wavelength ratios for the different pitches to convert the lengths at the tunings given above to the Gemeine are 1/2, 3/5, 2/3, 1 and 4/3. Multiplying the lengths by these ratios gives 2.81, 2.98, 2.99, 2.79 and 2.77 metres.

There are two distinct groups of lengths here, distinguished by whether or not the sackbuts have tuning slides, differing by 7%, with the variation in each group being in the region of the ½% calculated maximum expected error in the measurements. This shows a remarkable degree of consistency, which implies high accuracy in the drawings. To explain the difference between the two
groups, the drawings could well be of the instruments as they were stored (plus the mouthpieces of all except the Gemeine inserted for realism), rather than as they were played. Then the tuning shank or crook of the Alt would not be inserted and the tuning slides of the two Quarts would probably still be in playing position at Praetorius's pitch standard since last played. The Octav bow for his standard either was too big to fit with the instrument in the case or was not as good looking as the splendid basic Nuremberg one.

The difference of 7% is just the 3/4 semitone difference we would expect in the pitch standards of Praetorius’s Cammerhon (a’ = c.430 Hz) and Venice (a’ = c.465 Hz). Praetorius commented (S.M. II, p.232) that to play at his proper pitch standard, the first position of a sackbut had to be 2 fingers out (about half a semitone) from the stop. Such a floating first position would be unnecessary when one has a tuning slide, and the position indications which appear on the drawing of the D Quart show no such floating position.

The tuning slide of the D Quart sackbut does not look like it has been extended by 1½ semitones, but ½ semitone is possible, with the added semitone in a larger replacement bow elsewhere in the tubing where it would not effect fitting into a case. The other Quarts probably benefited from such a larger bow as well.

Conclusions and Discussion

Praetorius’s drawings of sackbuts are remarkably consistent in relative size, and therefore his length information is apparently quite accurate.

There are four pitch levels possible from the choices presented by the semitone tuning shank and tone tuning crook shown with the Gemeine sackbut: the highest with no tuning bits, one semitone lower with just the shank in, another semitone lower with just the crook in, and yet another semitone lower with both crook and shank in.

The measurements indicate that the Alt and Octav sackbuts, as depicted, were at the highest pitch level. Also, both Quart sackbuts were at a pitch level about 1½ semitones lower than the highest. The Gemeine sackbut could match this pitch with the semitone shank in and a floating first position about ½ semitone out. This floating first position was indicated as necessary to play in his proper pitch (Cammerhon) by Praetorius. I associate this pitch with that standard. The highest pitch, without tuning shank or crook in the Gemeine sackbut, is agreed by most authorities to be at about a semitone above modern, and many would agree with my association of this pitch level with Venice, the major source of woodwinds for wind bands in Europe at the time. I also associate the pitch with both the tuning shank and crook in the Gemeine sackbut (using the same floating first position) as Praetorius’s preferred Catholic Church tone, a tone lower than his proper pitch.

A very popular belief nowadays is that Praetorius’s Cammerhon was essentially the highest of the above pitches. It has been widely disseminated by publications of highly-respected wind-instrument specialists (e.g. Haynes and Baines), and many of their followers are convinced that this was a general standard for all instruments in the Renaissance. To come to this conclusion, these specialists violated the rules of scholarship by ignoring the most powerful piece of evidence available, the set of pitch pipes that Praetorius himself used to communicate what that standard was to his readers as unambiguously as he could (S. M. II, p. 232).

They have presented no evidence that cannot be reasonably interpreted while accepting the standard given by the pitch pipes, as I have here. If we try to interpret the sackbut evidence presented here according to their faulty hypothesis, the pitch level of the Quart sackbuts would be one semitone (1½ semitones minus ½ semitone for the floating first position) below Cammerhon. This pitch has no place in Praetorius’s scheme of pitches.

I wonder how soon any of these specialists will fulfill their responsibilities to scholarship and to their followers, who look to them to provide the best information that scholarship can offer. To do this they need to take a fresh close look at the evidence available, and either show how all of it can reasonably be accommodated by the hypothesis they have been backing, or publicly acknowledge that there are other hypotheses that can do this.
Meantone Fretting by Computer or Calculator

I've recently needed to calculate a 1/5 th comma meantone fretting for a cittern and used my computer. You may be interested in doing a similar calculation, or if you want me to do it for you, send me the specifying information. This is: (1) the string stop (L), (2) either the n of 1/nth comma type of meantone or the number (m) of cents flat the fifth is from true, (3) the sequence of diatonic, chromatic and compromise fret spacings required, and (4) how much between chromatic and diatonic each compromise spacing is.

To get from n to m, I use the formula $m = \frac{1200 \log(81/80)}{\log 2}$, so $m = 21.506/n$ (* means multiply, / divide, etc.). It doesn't make any difference whether one uses logarithms to the base 10 or to the base e, as long as only one is consistently used. The frequency ratio for the diatonic semitone is $d$, and that for the chromatic semitone is $c$. Then the logarithms of these as functions of $m$ are:

$$\log(d) = \log2*(8 + m/240 - 5\log3/\log2) - \log2*(0.0751875 + m/240)$$
$$\log(c) = \log2*(1 - 7\log(d)/\log2)/5 - \log2*(0.0947375 - 1.4m/240)$$

For equal temperament, $n = 11$, $m = 1.955$ and $\log(d)/\log2 = \log(c)/\log2 = 1/12$.

For each fret, I put a 0 for a chromatic spacing, a 1 for a diatonic spacing and an appropriate intermediate number for a compromise spacing. Call that number $x_j$, where $j$ is the number of the fret spacing and fret. When, as is usual, the $j$ th fret is compromised while the $j-1$ th and $j+1$ th are not, $x_{j+1} = 1 - x_j$. Whatever one does, the sum of the $x_j$'s over an octave must be 7.

The frequency ratio for the $j$ th fret is $r_j$. Its logarithm is:

$$\log(r_j) = (1 - x_j)\log(c) + x_j\log(d).$$

We want the distance from the nut to the $j$ th fret ($Y_j$). It is: $Y_j = L - (L - Y_{j-1})r_j$, where $Y_{j-1}$ is the distance from the nut to the previous fret. Of course, the nut is the 0th fret and $Y_0 = 0$.

I have three columns: The first is the sequential numbers for the frets (the $j$'s). The second is the type of spacing before that fret (the $x_j$). The third is the distance from the nut ($Y_j$) given by:

$$Y_j = L - (L - Y_{j-1})\text{antilog}(\log(r_j))$$  (the antilog is the base (10 or e) taken to the $\log(r_j)$ power)

Don't round off the fret distances from the nut (the $Y_j$'s) until all the frets are done because errors are cumulative. The check that shows that everything is working properly is when $Y_{12}$ is half of $L$. 


Violin Makers in Milano - XVIIth and XVIIIth Century

As a violin maker born and living in Milano, Italy, I was at any time astonished by the absolute lack of information regarding the violin makers (and more generally the makers of all kind of instruments) who worked in my town starting from the mid XVIIth Century. During the years in which I had the chance to study in the University and in the Violin Making School, I began to develop a particular interest for milanese lutherie, so that during last years I devoted some time to archive researches. As obvious, at the beginning this was an occupation for free time, lastly my wife had to check my work to avoid an huge increase in my "free time". Now I am planning to publish the first results of these researches, that remain a work in progress, and I suppose can be of some interest to the FoMRHI readers to have a first look on that; furthermore, I hope that somebody of them will help me in a particular field of this research.

In this Commentary I will omit to report the exact references for the informations: I perfectly know this is unusual, but I don't want to take up too much paper. Anyway, the principal sources are the Parish Books of Santo Stefano (Baptisms, Marriages, Deaths, Stati d'Anime) for the makers of Contrada Larga, and the same Books of the Parish of San Protaso di Monachos for the Landolfi and Mantegazza. Other Parishes in which I found something are: S. Sisto, S. Satiro, S. Tecla, S. Giovanni Laterano, S. Maria alla Porta, S. Bartolomeo, S. Gottardo, S. Maria Beltrade, S. Maria del Giardino, S. Stefano in Nosiggia, SS. Cosma e Damiano, S. Nazaro e Celso. In some of these and in other Parishes a lot of work has to be accomplished yet. A general registry in Milano started from about 1811. Before, the town government had registers of births and deaths, but during the Second World War a bumb destroyed a part of the State Archive of Milano, so that the births registers burned; the deaths ones are not complete, and they are an important source as well, though for some makers I could find no registration at all.

The Makers' condition

Until the end of the XVIIIth Century in Milano the manufacturing and trading organization was based on the presence of corporations: those were very close organizations, recognized by the town government, in which any man who wanted to start an his own activity had to be admitted before. The violin makers, as many instrument makers, were part of the wood workers corporation called Scuola di S. Giuseppe dei Legnamari. The statutes of the Scuola stated that a man who wanted to be admitted in the master number had to submit to a long (about six years) apprenticeship in the workshop of a master. After that period, he had to pass an examination. Then, after paying a discrete sum of money, he could open a his own workshop. The
only exception to this procedure was for the case of the sons of a master, who had the opportunity to open a new workshop or take over the father business at his death with less difficulties. The wood workers corporation was already existing during the XIVth Century with rules not very different. It was suppressed in 1779, when the Austrian Government stated to change the trading laws founding the Chambers of Commerce. By the way, it is interesting to note that the corporation system was operating in all the northern part of Italy, and in Cremona as well, with similar laws.

In my researches, I found just two documents regarding the corporation related to violin making, but they are both really important: the first is a denunciation signed by Carlo Giuseppe Testore and Antonio Maria Lavazza, dated 1703, in which the two makers accuse the bachelor of the corporation to have admitted as a master in violin making a man called Francesco Bresa without their approvation, that was necessary for the admission according to the corporation complicated statutes. The second document is a list of the Officiali of the Scuola for the year 1762, from which we learn that in that year the corporation was divided in 19 sections, three of which were the arts of bowed instrument making ("Violini, ed altri Istromenti d'archetto"), plucked instrument "and other instrument" making ("Chitarre, Leuti, ed altri Istromenti da suonare") and harpsichord and spinet making ("Clavazzini, e Spinette"). The Officiali (a sort of responsible) were respectively Carlo Ferdinando Landolfi, an unnamed Gio Battista, and Francesco Birger.

Due to the rigid organization of the corporation system, the instrument makers had to work together and to learn one from another. I am trying to understand these connections, but at the present I can just note the presence in the same time and in the same place of some luthiers.

The Grancinos

It is said there were a lot of makers in this family, but it is not known how many they were. I found no evidence of the Paolo Grancino who was a pupil of Nicola Amati in Cremona according to the Hill statement. A note written in the XIXth Century by the Chief Archivist of the Common Archive in Milano report of a Gio Grancino who worked in the year 1648, but no source is indicated for this information. What I reconstructed is a tree like this:

```
ANDREA ? - before 1673
I
GIO 1637-1709
I
GIO BATTA 1673- ?
I
MICHEL ANGELO 1698- ?
```

Surely the family was related with a famous musician, Michel Angelo Grancino, born about 1605 and dead in 1669, organist and chapel master in the Duomo: he was the godfather of Gio. It is possible that the father of Andrea was a Giovanni who died very old in 1659. Another fact that has some importance is that in 1662 died a Francesco Grancino, aged 75, whose funeral had the
presence of the musicians of the Court and of the Cathedral. The Grancino family owned a house in Contrada Larga and used to have one or more servants. They sold the house and moved about the year 1717. The name Grancino/Grancini/Granzino is not very common, but other people with this name lived in other Parishes near S. Stefano. At the present I found no evidence for the involving of any of them in violin making. Anyway, Gio Batta had a cousin, also called Gio Batta, son of a brother of Gio, who lived very near Contrada Larga. If the makers with the name Gio Batta were really two, it is possible that they were them.

The Pasta

Thanks to the researches of Duane Rosengard and Phil Kass, we know that Bartolomeo Pasta was a pupil of Andrea Amati in Cremona in 1660. In 1673, he lived in Contrada Larga together with his wife Dorotea. The Priest noted for both of them the aging of 35, but reported of no sons. In 1686 Dorothea died after a delivery, and Bartolomeo got married with a younger woman, Cecilia. In 1692/93 the family moved into the house in which the Testore family went to live as well, but after one year the Pasta changed their address again and went to Contrada di S. Antonio. In 1697 the family still lived in the Parish, but starting from the year 1700 they are no more registered in the Status Animarum. Bartolomeo had at least 8 sons. It is said somebody of them went to Brescia to work in instrument making; from a Stato d'Anime we learn that a son called Angelo Maria moved to Bergamo in 1692 (he was born about 1670); another one had the name Gaetano, was born about 1679 and was still in Milano during 1694.

About a Cristoforo Pasta who possibly worked in Contrada Larga in 1666: about the year 1692 a man called Gio Batta Pasta got married in S. Stefano. He was the son of a Cristoforo. This name was used by Bartolomeo as well for his 4th son, born in 1681. The dates and the use of the name let us suppose the possibility that Cristoforo, if existed, was a brother of Bartolomeo.

The Lavazza

Two are the makers of this well known family: Pietro Antonio and his son Santino. Pietro Antonio appears in the Parish Books of Santo Stefano in 1684, when his youngest daughter, Anna Maria, born just 8 days before, died. At that date the family lived in the Stretta of the Strada Cantarana, a small street very near Contrada Larga, where the family transferred before the April 1687. The new address was in the house of Signor Clerici, where on November 3rd, 1689 Carlo Antonio Santo was born. In 1690 the Lavazza moved their address to the house of Signor Baldassar Dugnano, where in 1698 lived Pietro Antonio Bellone as well. In this house both the makers died: Pietro Antonio on January 16th, 1718, aged 80 according to the Priest's note, Santino on September 5th, 1726, 37 years old. He was unmarried, so he had no sons who could take over the workshop.
The Testore

The first record I found of this family is quite important: on January 27th, 1684, Carlo Giuseppe Testore got married with Lucia Presbler, from the well known family of luthiers. I could not to discover the birth date of Carlo Giuseppe, but am almost sure that he was born in Milano. In 1684 he already lived in the Parish of Santo Stefano. The makers of the family are as follows:

<table>
<thead>
<tr>
<th>CARLO GIUSEPPE</th>
<th>ab.1660-1716</th>
</tr>
</thead>
<tbody>
<tr>
<td>CARLO ANTONIO</td>
<td>1693-ab.1765</td>
</tr>
<tr>
<td>GIOVANNI</td>
<td>1724-1765</td>
</tr>
<tr>
<td>PAOLO ANTONIO</td>
<td>1700-1767</td>
</tr>
<tr>
<td>PIETRO</td>
<td>1732-?</td>
</tr>
</tbody>
</table>

There is some evidence that the Testore were at any time in friend relationship with their relatives of the Presbler family. Another interesting fact is the marriage of a son of Carlo Giuseppe with a woman from the Taneggia family, probably a cousin of Carlo Antonio Taneggia. Pietro adopted a son, Angelo Villa, who became one of the most famous singers at the beginning of XIXth Century.

Other Makers in Contrada Larga

As usual, besides the important names, when in a place such a craftsmanship grows up a discrete number of apprentices and makers of little importance begin to be involved in the art. Some of them are known for their instruments, while other are just names.

Pietro Antonio Bellone, whose label says "detto il Pescorino" ("called Pescorino", a dialectal word that means something like "the small fisherman"), lived in Contrada Larga in 1673 together with his parents. In 1690 he lived in the same house of Bartolomeo Pasta, in 1697/98 he moved into the house of the Lavazza. In 1700 he still lived in Contrada Larga, but in a third house. Before 1709, probably immediately after 1700, he departed from the Parish and I could find no more records regarding him or his family.

Giovanni Vassallo, or Vassalli, was married with a woman called Anna Maria Antignati, possibly a relative of the famous family of organ builders. He was born about 1700. In 1736 he lived in Contrada Larga, but had a business in coach rental, or possibly was just a coachman. Starting from 1750 he is defined violin maker in the Parish books. He died about 1766, his wife on December 10th, 1767.

Carlo Antonio Taneggia, of which some instruments are known, was born in Contrada Larga in 1681. He died before 1750. In the Status Animarum dated 1726 he has a list of apprentices in his workshop, but is not defined violin maker.
Antonio Compostano is the first man noted as violin maker in the Parish books. He was born about 1665, probably the son of Giacomo Antonio Compostano, a man who lived near Contrada Larga. In 1690 he lived together with his wife Caterina in the house after the Grancino's one; in writing the Stato d'Anime the Priest wrote as a headline over his name: "Bottega di Violino". In 1693/94 the couple moved to the Luogo Pio della Divinità, at the beginning of Contrada Larga. There Antonio died on May 30th, 1711. He had just one son, who died three weeks after his birth.

Ferdinando Alberti is known particularly for his basses. It is said that he took over the Grancino workshop, but I found no reason to state that. His labels report of two addresses for him: Contrada Larga and Contrada del Pesce, a small street near the Duomo. In fact, I found no records of him in Santo Stefano archives, but in the Duomo books he is noted for at least 18 times. He never got married, living with the mother, already widow in the first book, and a sister. Beginning from 1744 he lived in the same house, where he died on May 1st, 1769.

The Presbler

Strange enough: in looking for this family I found an enormous number of birth and death records with this name in five different Parishes. Being stranger, the name was usually misspelled in a lot of ways, such as Plepser, Plespler, Prepisler, etc. Lucia, the wife of Carlo Giuseppe Testore, had two brothers, Valentino and Giacomo Filippo. They both had 7 sons, so that is quite difficult to reconstruct a family tree for the next generation. Anyway, two men named Francesco are recorded in the Parish of Contrada della Dogana, but at the present I can say nothing more.

The Landolfi

As I wrote before, Carlo Ferdinando Landolfi was the Officiale of the violin making section of the wood working corporation in the years 1762/63. He was not born in Milano, where Landolfi was not a common name. The first record of his presence is in 1751, when he lived with his wife in Contrada Santa Margherita. Before 1765, he moved three times, always remaining in the immediate neighbours of that street. During that year he disappears from the Stato d'Anime in Milano together with his wife and the son Pietro Antonio. They probably went to Baveno, a village on the Lago Maggiore, outside the Austrian possessions, where Carlo Ferdinando owned a house. There lived another son of him, Ferdinando, who was never recorded in Milano. In Baveno Carlo Ferdinando died in 1784, "about 80 years old" in the opinion of the Priest. His son Pietro Antonio died in 1795, "aged 65". At the present, it is impossible for me to fix the birth dates of both, but they probably were about 1715 and about 1735. The Landolfi were makers and dealers. They surely had business relationship with Giovanni Battista Guadagnini also when he departed from Milano.
Giovanni Battista Guadagnini

It is well known that Guadagnini lived for a period in Milano, from 1750. I am indebted with Duane Rosengard for the information that in Milano were born three sons of him. At the present, I found nothing more about him. I would just notice that he arrived from Piacenza, so that he was possibly not able to open a his own workshop due to the corporation statutes. It could be a coincidence, but in the year of his moving to Milano Carlo Ferdinando Landolfi signed his first labels and appears in the books of the Parish of Contrada Santa Margherita. More researches required!

The Mantegazza

With the Mantegazza family we reach the XIXth Century, and the end of the "classic" period for violin making. The first maker in the family was Pietro Giovanni, who was born about 1730 immediatly outside the town walls. He got married in 1761 and went to live in Contrada dell'Aquila, a small street very near Contrada Santa Margherita, where the family lived at least for 25 years. Pietro died in 1803, "aged 74". He had two sons who took over the workshop: Francesco (1762-1824) and Carlo (1772-1814). It is possible that a third brother worked with them, Antonio, who died at the beginning of 1790 aged 23. I could not work in the archive of the Parish in which Pietro Giovanni was born, due to a recent fire. It is said that he worked together with a brother, Domenico. He was never registered as living in Contrada Santa Margherita or in the immediate neighbours, but I can say nothing more.

As I stated, this is a work in progress, and I will continue archive researches. I have a lot of informations regarding XIXth Century violin makers as well, and I will write on them nextly, if FoMRHI readers are interested in. But I need your help. I know a lot of instruments (violins and other) made in Milano, but I need to know more. If you have a Milanese instrument, or know somebody who has one, please inform me. I am particularly interested in labels (original, fake or uncertain) of all the makers, as well as in the knowledge of instrument by unknown (to me) luthiers.

In my PC I have small files devoted to harpsichord and organ builders and to wind instruments; if you are interested in that and will help me, I will surely devote some times to research for makers of those instruments as well.

I wait for your comments, with thanks.
The second edition of The Oxford English Dictionary gives three meanings for this word:

1. A little cat (animal);
2. Catgut for a violin etc.;
3. A kind of surgical knife.

The usual supporting quotations are given. The preferred spelling is catling (six examples); only one example is given for catlin, and none for cat(-)line. There is no reference to any nautical use of the word, however spelt.

The terms used by seamen are given as catfall, cat- rope or cat-back rope (a number of examples are quoted). A 17th-century "Sailor's Word Book" defines these as "a line for hauling the cat-hook about", but the term "cat(-)line" itself appears to be unrecorded. It is not in Admiral Smyth's "Sailor's Word Book" of 1867, which agrees with the terminology of the OED. On enquiry, the National Maritime Museum has been unable to find any nautical use of the word.

The peculiar construction of modern "catline" strings is based solely on the ingenious conjecture of Segerman, published in "Early Music" a decade or more ago, that catlings (2) were so called because they were made in the same way as a rope used in the cat-tackle. If so, it is rather strange that the word cat(-)line is not found in the OED and that it has no example of catlin(g) in nautical use. One would suppose that a term would have to be in fairly familiar use to be transferred to a fiddle-string.

This etymological difficulty is fairly obvious and it may well have been raised and answered elsewhere; but if so I have missed it.

Does any reader know of any explicit nautical use of the word "catling", however spelt?

Can any reader tell us whether the strings called "catlings" in England had names in other languages (particularly Italian) which had any known or possible connection with the mariner's operation of "catting the anchor"?

I thank Mr. Brian Lavery, Head of Ship Technology at the NMM, for answering my enquiry.

30 August 1993

John R. Catch
Equal Tension Stringing of the Irish Harp

This Comm. reports on some experiments with an Irish harp strung and tuned in accordance with the proposals for equal tension stringing previously outlined in Comm. 1112.

The Harp

The harp used for the tests is of recent construction and modelled on an original harp once owned by Cornelius Offogerty (1661 - 1730). The original harp is of the 'low goed' type and furnished with 35 strings, the shortest string being 6..._... long and the longest measuring 92cm.

Construction of the experimental harp follows traditional practices with the three main components joined to each other using mortice and tenon joints held together, without glue or fasteners, by string tension alone. The sound-box is of massive proportions with a soundboard thickness of about 15mm. The soundbox material is yellow poplar or tulip tree (Liriodendron tulipifera L.), a wood that resembles the more authentic willow in its physical characteristics and which is readily available commercially in the large dimensions necessary to build a harp of this size.

The shaping, fitting and assembly of the components of an Irish harp is a bit of a juggling act, and in this case, the 'as built' length of the front pillar turned out to be shorter than that of the original. This resulted in a rotation of the harmonic curve relative to the soundboard and a slight shortening of the longest strings. As the longest string measures 88cm this represents a maximum error of less than 5% for the longest five strings.

Stringing and Tuning

Referring to plot #2 in Comm. 1112 indicates that the Offogerty harp might have been originally designed for a tuning that was diatonic plus at least two accidentals per octave if equal tension tuning is assumed.

A more precise examination of the tuning possibilities may be undertaken using the Irish harp tuning guide described in Comm. 1122. Plotting the original string lengths of the Offogerty harp against the string diameter curves, the best match is given by a plot where all the intersection points except these of the shortest string, string #20 and the five longest strings, fall within a boundary set by curves #9 and #11 - curve #10 being the mean. The remainder of the intersection points approximate closely to the mean with exception of four points having a maximum deviation of 12.5% below the string tension mean value.

The tuning given by this plot covers a range of four octaves C - c''. The lowest octave is diatonic with one accidental (B flat), the middle two octaves are diatonic with three accidentals (C sharp, F sharp and B flat) and the highest octave is diatonic. The choice of accidentals was influenced by contemporary accounts of harp tuning in the 16th /17th C.

Tests with various gauges of brass wire indicated that a string tension of 12Kg was about right for this harp - this tension giving a firm feel to the string when plucked without producing changes of pitch. Also, this level of tension causes the frame of the harp to twist towards the strung side - a characteristic feature of the extant Irish harps.
For equal gauge stringing at 12Kg tension, the diameter of the brass strings was calculated as 0.82mm (0.032"). For the five longest strings, the string diameters at 12Kg tension were calculated to be 0.89mm, 0.94mm, 0.96mm, 1.02mm and 1.07mm.

Graph #1 shows the theoretical curve of string length against string pitch for a constant string tension of 12Kg per string. Actual string lengths of both the original and the experimental harp have been added for comparison.

As the longest strings on the experimental harp are, as previously noted, shorter than those on the original, the calculated string diameters giving a tension of 12Kg are as follows: 0.94mm, 0.95mm, 0.96mm, 1.02mm and 1.12mm.

The experimental harp was strung with bright annealed brass wire of diameter 0.82mm. As larger diameter brass wire of the correct gauge was not to hand, the four longest strings were all made from 1.02mm diameter soft copper wire and the fifth longest from 0.82mm brass wire. This compromise resulted in calculated string tensions for the test as follows: string #31 - 10Kg, #32 - 13.5Kg, #33 - 13Kg, #34 - 11Kg and #35 - 10Kg.

Harp Testing
With the harp tuned as indicated in Graph #1, the individual strings were sounded using a plectrum (my nails being kept short for lute playing!). The striking position for all but the 12 highest pitched strings was kept around 5cm to 7cm above the soundboard. The shortest strings were struck about the middle, the striking point for these strings being non critical regarding tone quality.

The sound of this harp during testing was loud and resonant with even the lower tension foreshortened bass strings sounding well. The strings of the upper half of the compass sounded bell like (somewhat like clock chimes) while those of the lower half sounded more brassy and harpsichord like in tone quality. The change in sound character was fairly abrupt around the mid point of the compass. As might be expected, the shortest strings produced a small sound, a kind of 'plink' or tinkling sound.

While the overall response and sound of the harp was judged to be satisfactory, considerable difficulty was encountered in keeping the instrument in tune. Indeed, for the period of the trial, it was felt that the harp never was precisely in tune. Perhaps this was due to my lack of time and perseverance in pursuit of perfection in this matter. On the other hand, part of the problem may also have been due to the prolonged undamped sympathetic vibrations of the harp strings causing subtle discordances.

Conclusion
While the experimental harp, for the reasons given above, did not conform exactly to constant string tension conditions, the tests were sufficient to confirm that equal tension stringing, as proposed in Comm. 1112, is a practical possibility. Hence, if early Irish harp geometry was determined...
on the basis of constant string tension (perhaps with the harp maker using some form of monochord as a calculating device), then it would be possible to determine from this and a knowledge of the physical limitations of the strings how each harp was originally designed to be tuned.

Of course, all sorts of other tuning arrangements are possible within a given frame geometry by varying string gauge, tension and materials and it is impossible to establish with any certainty how these early harps would have been tuned.

It might be noted that the shortest strings on the surviving Irish harps are very short regardless of harp size (measuring between 6 - 8cm approx.). Given the 'small' sound of these strings one might wonder why the harp makers did not design the harp frame to make these strings longer - an obvious solution adopted by the European harp makers. Perhaps the Irish Celts preferred the contrast of the 'tinkling of the small strings .... under the deep notes of the bass' or might this be an indication that some form of standardised design principal, such as equal tension stringing was being used by the Celtic harp makers?

Finally, the tuning arrangement derived for the experimental harp is rather irregular when judged by modern standards. Again, it is impossible to determine if such a tuning would have been used. However, comparison with the Irish harp tuning recorded by Praetorius (see Comm. 1112, fig 3) indicates that such a tuning might be quite feasible and indeed is considerably less complex than the Praetorius tuning with its re-entrant tunings and partially chromatic compass.

Figure 1 of following Comm. 1205

THE DALWAY HARP - HARMONIC CURVE
Corinlus Offordty Harp

Sound Durations for Experimental Harp

- Sound Duration of Each String When Struck
- Sound Duration After Each String Struck and Immediately Damped.

Graph #2

String Tuning (A440)

G F E D C
Mortice and Tenon Joints on the Irish Harp

This Comm. proposes and discusses the kind of jointing geometry that may have been used by the early harp makers for connecting together the frame members of Irish harps of the ancient 'low headed' type.

At the time of writing, no precise information (e.g. in the form of photographs of dis-assembled instruments) is available at hand to confirm what is to follow. No doubt, much of this information concerning the surviving harps will exist within the various museums exhibiting these instruments so it would be of interest eventually to obtain details from these institutions for verification of these proposals.

General

It is known that the ancient form of the Irish harp comprised of a frame of three members - a soundbox, a front pillar and an upper arm or harmonic curve. These members were connected together with mortice and tenon joints the whole assembly being held together by string tension alone, no glue or fasteners being required.

The front pillars were made with a tenon at each end and the soundboxes with a mortice at each end. The harmonic curves, therefore, had a tenon at the connection to the soundbox and a mortice at the front pillar position.

The sequence of assembly would then have been to first connect the front pillar to the soundbox and then slide the harmonic curve into place.

While this design is a simple idea in principle, it is not quite so straightforward to put into practice. The three frame members being arranged in a triangular configuration, precludes the use of conventional parallel sided mortice and tenon joints at the connections to the harmonic curve on at least one of the two joints and requires use of modified joints that will allow the harmonic curve to be slid into place over the two joints simultaneously.

The front pillar to soundbox joint, being the first to be assembled would have been a conventional mortice and tenon with parallel sides.

Joint Geometry

Two harps have been chosen to illustrate the proposed solution to this problem. The first is a small harp in the National Museum of Antiquities, Edinburgh - the so called Lamont harp and the second is a reconstruction based on the harp fragments in the National Museum of Ireland - the so called Dalway harp. (see Figs. 1, 2 and 3).

The smallest harps, represented here by the Lamont harp (Fig 2), were fitted with front pillars curved to such an extent that the connection at the harmonic curve was perpendicular to the underside of this component thus allowing use of conventional, parallel sided mortice and tenon joints at this location.

The seating of the harmonic curve to soundbox joint not being parallel to that of the front pillar to harmonic curve joint, however, requires the use of a modified joint at this location. Thus the bottom face of the harmonic curve to soundbox joint has to be made parallel to the lower face of the harmonic curve to front pillar joint as shown in Fig 2.
The larger harps represented in Fig 3 by the Dalway harp were fitted with less curved front pillars and with extended harmonic curves. On these harps, the front pillar connection was not perpendicular to the underside of the harmonic curve requiring a modified mortice and tenon joint at both this location and at the soundbox connection. In this case, the lower surface of the harmonic curve to front pillar joint must be made parallel to the lower face of the harmonic curve to soundbox joint as shown in Fig 3.

The modified joints have the form of a tapered plug (see Fig 1) which has the advantage of being self tightening under load.

**In Conclusion**

The use of modified tapered mortice and tenon joints as described above has been used in the construction of a harp and has proven to be a practical arrangement.

The tapered joint is more difficult to shape and fit than a conventional mortice and tenon joint. To ensure a close, tight joint, it is best to coat each joint surface with graphite to identify high spots in the final stages of fitting - the high points being then removed by filing or scraping. In the case of the tapered joint, there should be a small clearance of about 0.020" left at the joint seating which will be taken up when the joint is subject to full loading conditions. It is important that all joints be made with a precise fit - a time consuming task that cannot be hurried!

In order to take full advantage of the self tightening feature of the tapered joint, it is best to also cut the sides of each joint to a slight taper (about 1/8th of an inch).

The sequence for fitting each joint individually should be first, the front pillar to soundbox joint, then the harmonic curve to soundbox joint followed by the harmonic curve to front pillar joint.

Finally, it should be noted that all the joint surfaces, other than those subject to modification mentioned above, are cut exactly perpendicular to the joint seating surface in the usual fashion for mortice and tenon joints. It would, of course, be possible to make joints with parallel surfaces that were not set perpendicular to the joint seating in order to achieve the same solution to the problem of assembly. Such joints would be considerably more difficult to shape and fit and, in the light of the above proposals, would be an unnecessary complication and inferior to the tapered, self tightening form of joint.

*Figure 1 is on p. 62*
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