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FoMRHI Quarterly

ANNOUNCEMENTS

COMMUNICATIONS

FELLOWSHIP OF MAKERS AND RESEARCHERS OF HISTORICAL INSTRUMENTS
Hon. Sec.: J. Montagu, c/o Faculty of Music, St. Aldate's
Oxford OX1 1DB, U. K.

FELLOWSHIP of MAKERS and RESEARCHERS of HISTORICAL INSTRUMENTS

Bulletin 74 **January, 1994**

A HAPPY NEW YEAR to more of you than usual, and our thanks for renewing on time - it does make it much easier for us to have renewals in before the January Q goes off. Maybe another year even more of you will help us in this way - please do!

As always, it was a pleasure to see many of you at the Early Instrument Exhibition. One of the slight frustrations of an organisation like this is that we all know each other by post and by reading each others' Comms. It's nice to have the opportunity to meet as well.

LOST MEMBER: Has anyone seen Jim Downie, last heard of in Turriff, Aberdeen? Another member's Q came back, too, but he sent us a belated change of address, so I've been able to send him his Q a second time, but this does cost us (ie it costs you) money. Postage is a major expense, and letting us know before you move rather than a month or two afterwards (I got his note in January saying that he was moving in November!) does help. If anyone can give me Jim Downie's new address, I'll send him his Q, too.

FURTHER TO: Older members will remember a barney, way back in the early days of *Early Music*, between Michael Zadro and me about **oiling bores and what oils were safe to use**. It's a subject that's cropped up here, too; Cary Karp had a good article on it back in 1982 (Comm. 406) and there've been others since. I was recently sent a copy of *The Recorder* from Australia because of quite another matter, and there was a good article in it on oils by Terry Simmons which I thought might interest you. He, and the editor of *The Recorder* have kindly allowed us to reprint it and you'll find it here.

Comm.1188: Donald S Gill wrote to me:

I think I can offer some support for your contention in FoMHRI Comm. 1188 that in the painting of the portative organ in the Memling triptych he went wrong in the painting of the keys. I have a poster for the 1992 Bruges Festival which has a large colour reproduction of the small black and white picture in the Grove DOMI under the entry for Portative organ. It is described as a detail from 'The mystic marriage of St. Catherine' by Memling.It shows a marriage ceremony with a musician (who looks remarkably like Emma Kirkby!) playing a portative organ with, I think, 30 pipes. In this painting the keyboard is towards the viewer and has two rows of T shaped buttons. The lower row is continuous but the upper row is definitely split into groups of two and three. It looks as if Memling took more care in painting the keyboard when the viewpoint made it an important part of the instrument but didn't bother when it wasn't.

However, Memling may still have not got it quite right because the buttons look as if their shanks are stickers acting directly on the pallets in the wind chest. In this case the lower row of buttons should have a bigger gap between C and D and D and E than between E and F because C, D and E would be acting on alternate pallets whereas E and F would be on consecutive pallets.

Another thought; were the buttons on square shanks? If they were it would be more difficult to make an airtight seal where they enter the wind chest. On the other hand if they were not square wouldn't the buttons pivot round and catch on each other?

He has permitted me to reply straight away. The Bruges portative is clearly not the same instrument as the Antwerp one. But looking through my own files to see whether I had a better reproduction of the Bruges picture than the one in NGDoMI, I found another Memlinc that I'd quite forgotten, the *Mary in a Rose Bower* which is now in the Alte Pinakotek in Munich. The instruments in that picture are clearly the same ones as in Antwerp. I want to do a longer study of these pictures (and find the time to check whether there are any other Memlinc paintings with instruments), perhaps for *Early Music* because they like to have pictures. The problem is that all that the Alte Pinakotek can send me is a black and white not much clearer than the Christmas card from Edgar Hunt that I had in my files, which was published by the Medici Society. If I can get something better, preferably slides that I can then project, or if I had the time and the money to go to Munich, I might be able to publish something useful because in the Munich painting we see the organ from the keyboard side, the lute obliquely from the bottom end, and the harp from the player's right, as well as a directly full-face view of the fiddle. Anyway, of what I can see at present of the organ keyboard, the upper rank of keys has, from the treble, two, then apparently a gap about one key wide, then a continuous run of five keys without any gaps, and then the player's hand. There are fifteen pairs of pipes, each pair apparently the same length, the height difference between each pair diminishing in what looks to be a smooth curve. What I had thought to be a malformation in the treble end of the base of the case is there again, so it was not a matter of repainting as I'd first thought; it's there on the organ. Further comment will have to await better pictures.

FoMRHI Editing: John Downing says:

If the aim of FoMRHI is primarily to promote the speedy and free exchange of ideas and information relating to the making and restoring of historical instruments then I think that it has suceeded pretty well in this goal over the past 18 years.
I think that the editorial policy is the right one - providing the Comms submitted conform to the basic rules concerning layout, clarity of print etc., are relevant to the interests of FoMRHI readers and are not libellous, then they should be printed. While perfect script and grammar would be the ideal, it would be bad policy to reject Comms because of typographical errors, poor grammar, bad judgment in expressing one's views or whatever as this would result in a decline in the number of articles submitted.
Above all, I feel that it important that the editorial objectives should continue to protect freedom of expression and not get involved with 'poli--tical correctness' in choice of words or other such insidious forms of censorship.

Charles Stroom writes:

Concerning the ''to be scrutinised or not'' question (in reply to your comments on the remark made by Paul Hailperin), of course not. Leaving aside the question who will be the scrutiniser, there should be sufficient self-discipline among the authors not to be too insulting and enough common sense amongst the readers to weed out what seems to be, let me say, of no interest for him/her. There would be a point of course when the Q's would get so thick that postal costs become a factor, but that does not seem to be the case either. In passing, you mentioned that things have been sent back to the authors for ''reconsideration'', which seems somewhat contradictory with the statement in the next line that ''if it expresses a member's view, then he or she is entitled to have it read''.

What I meant by 'for reconsideration' was really 'for rewriting'; things sometimes come too pale to print or in a type size that isn't going to work or with inadequate, or excessive, margins, or

still surprisingly often double-spaced, which we may ignore if it's one page or less but which takes up more than a justified share of space if it's more than one page. I have for the last few years put the relevant information on the back of the List of Members, but not everyone reads it or remembers it.

Comm.1197: Charles also wrote:

There is a small mistake in the formulae of C-1197 from Donald Gill, which can be shown easily by applying the final formula:

$$AB=\frac{\pi R}{90}\cos^{-1}\frac{R-x}{R}$$

on a limiting case where $R=30$ mm and $x=R$. In this case $R-x$ becomes 0, thus $\cos^{-1}=90$ and so $AB=30\pi=95$ mm while in reality $AB=60$ mm (i.e. twice the radius). The correct formula can be derived as follows:

$$\cos\theta=\frac{R-x}{R} \quad\rightarrow\quad \theta=\cos^{-1}\frac{R-x}{R}$$

$$\sin\theta=\frac{\frac{1}{2}AB}{R} \quad \text{(see figure in C-1197)} \quad\rightarrow\quad AB=2R\sin(\cos^{-1}\frac{R-x}{R})$$

The difference for $x=2$ mm is marginal (AB = 21.5 vs 22.0 mm), so it does not matter very much really.

He also said:

Further to your point on sending disks and so on (bull 73, p. 7), when is the time come that we could send you a comm by electronic mail (e-mail)? (See also my C-763.) Or when are we using one of the various computer news networks, which certainly is the fastest way of communication. There is already a "rec.music.early" newsgroup on Usenet, with, as of today, more than 6000 articles posted, not all interesting, but some of them of high scholarly value, as far as I am able to judge. (By the way, why is the word "scholar(ship)" used so often in Comms? Do we need to prove our value?) It's a worldwide distribution, is not censored, relatively easy, and even photographs can be spread around that way. It might be interesting to know how many FoMRHI members are already connected to a network and for how many of them this would be an alternative. In reflection, it would probably mean the end of the FoMRHI Q's, and I would not like to be guilty of that; I enjoy it too much. Nevertheless, my e-mail address is appended, maybe a useful addition for the membership list.

As it happens, I have just got an e-mail address (both his and mine are in the Members' List Supplement herewith). It's a bit of a bind at present because my own computer isn't linked up (I think it will be by tomorrow!) and I have to go up to the Secretary's office each morning and use hers. So far I've not learned what to do to get anything that comes in on to disk, but this should be possible. I would discourage you from sending me Comms by e-mail unless it's absolutely necessary, because if you do it'll mean that I've got to spend the time printing them out instead of you! And of course it won't work at all until I learn how to get stuff on to my disk. Of course once I do learn how to handle the thing properly, and if Eph gets on to e-mail and also on to JANET (the Joint Academic Network, which doesn't cost anything to use), then nothing has to be printed out till it gets to him. But maybe he hasn't got the time to print everything out, either!

PERMUTED INDEX: John Downing asked me if we were planning another index like the 1975-88 one, which he had found very useful. It was Charles Stroom who produced it, and he has gone on doing so. I'd refer to what I said in January 1992: we can't afford to publish it as a freebie. Charles would then, and I hope will now, send, surface mail printed matter, a copy

printed 4 pages on one A4 sheet which you can cut up and staple together for 5 guilders or its equivalent in bank notes. He said then provided that too many people didn't ask! If he's deluged with requests he may start saying no. Personally I find his index a godsend and I use it all the time; I also find his *Galpin Society Journal* one easier to find things in than the official one, though, like his FoMRHI one it does only index authors and titles.

PHOTOGRAPHS: Do please read Graham Lyndon-Jones's Comm herewith, especially the appendix on photographs and, if you're writing about anything that might be illustrated, look for a Kodak 1580 in your neighbourhood. The only reason I've not done so for Memlinc above is that I've not cleared reproduction rights with the art galleries concerned.

MATERIALS: I can't now remember where I came across them but I thought that Camwood's list of boxwood and ebony might be useful. In case you can't read their phone number or fax after it's been reduced it's 0298-77407; fax 0298-71156. They are 'specialists in ebony and decorative timbers' so it could be worth asking about other woods also.

Don Gill has sent me his own list of suppliers of bits and pieces, but he hadn't then had anything from anyone else. Last week both he and I had a list from Mary Kirkpatrick, which I've added on the bottom of his. Can't anyone else add more suppliers?

RESEARCH MONEY AVAILABLE:

J J K RHODES FUND FOR KEYBOARD RESEARCH - The fund will make a sixth award for a research project into either the technical or decorative aspects of historical keyboard instruments or into the musical matters that can be illuminated by such instruments. This wil normally be expected to lead to a publication of some kind. Preference will be given to projects related in some way to the Russell Collection, University of Edinburgh. Applications for the award of up to £900 should be submitted by March 31st 1994. Application forms are available from: Rhodes Fund Committee, St Cecilia's Hall, Cowgate, Edinburgh EH1 1LJ.

QUERY: Peter Foster asks:

Many years ago the late John Feldberg made what he called 'A Schools Harpichord' for £75. I was living in Montreal at the time, and in a letter dated March 1963 he carefully explained why he would not sell me the kit. It was basically because I was not working in a school at that time.

I believe a number of the kits were sold in the UK and I am wondering if anybody still has an instrument because I would very much like to both see and hear it.

He wouldn't sell me one either, for the same reason, but I remember that they were, for their time, good instruments. If I remember rightly they were put together from Neupert parts, including their patent jacks. What I can't remember is whether they were spinet-shaped, like many of de Blaise's instruments, or harpsichord, but I think the latter.

CONFERENCES: In case any of you are interested in ethnomusicology, you may like to know that I've been elected president of the European Seminar in Ethnomusicology and that its next conference will be here, August 29-September 2. ESEM's conferences are always pretty informal and pleasant and interesting occasions. If you want more information, let me know.

COURSES: We have several Bate Weekends in the pipeline. February 26/27 is a **Baroque & Classical Oboe Weekend** with Lorraine Wood & Dick Earle. May 21/22 is a **Gamelan Weekend**. November 5/6 is a **Renaissance Wind Band Weekend** with Eric Moulder. And November 26/27 is an **Alec Loretto Recorder Weekend** with Alan Davis to look after the playing side. Alec says: 'Previous Bate Weekends devoted to Recorder Making have, over a period of years, dealt with topics including drilling long holes and making reamers; making and fitting blocks; voicing, tuning and adjusting the recorder's timbre etc etc. The November 1994 Weekend is of a general nature - any topics connected with the business of making a recorder. Have ready your questions as well as your latest ideas on building. Those from previous courses who have made instruments or parts of instruments are encouraged to bring them along, as are those who have made any tool or gadgets to help in making recorders. And if any established instrument makers of recorders or other instruments happen to be in the vicinity, please feel free to contribute. You would all be welcome. It will be another enjoyable Weekend as long as you turn up and take part!' Cost of all Bate Weekends is the same: £20 (£15 Friends of the Bate Collection and students). To book, send a cheque made out to The Bate Collection, or just turn up; the only one for which advance booking is essential is the Gamelan, because places are limited to about 25.

DOLMETSCH SUMMER SCHOOLS: 7-13 August mainly on recorder, harpsichord, clavichord, and fortepiano, with additional optional courses, concentrating on Telemann and his contemporaries this year. Information from Jill Pite, Marley Copse, Marley Common, Haslemere, Surrey; *0428-643619 & 643235; fax 0428-654920*.

PHILIP BATE BIRTHDAY CONCERT: Philip Bate, our prime donor and why this is called the Bate Collection, will be 85 in March. We thought that this shouldn't pass without some celebration, so we are putting on a concert. Paul Goodwin, Colin Lawson, Anthony Halstead, Alastair Mitchell, and Paul Nicholson will play Mozart's and Beethoven's *Piano and Wind Quintets*, plus perhaps one or two other works. Date is March 12th. Place Holywell Music Room. Tickets £10 (£5 students etc). I am hoping that we shall make a profit which can go to the Friends of the Bate Collection Endowment Fund, which is the only thing that provides us with a purchase fund, and it would be much appreciated if anyone who'd like to come to the concert but can't and who would like to express his or her thanks to Philip for all that he's done, would send the Friends a contribution for that Fund. Tickets for the concert are available; cheques made to the Bate Collection, please.

GALLERY CONCERTS: A new departure at the Bate Collection. Warwick Cole will play harpsichords here on alternate Thursdays: January 20, February 3 & 17, March 3, 5.00 pm for 45-60 minutes. Admission free. He intends to work in chronological order, doing the first on the 1680 Flemish/French anonymous, the second on the 1700 Tisseran, the third on the c.1710 William Smith, and the fourth on the 1750 Goermans.

BRITISH ASS: The British Association for the Advancement of Science (to use its full name) is pushing set , a week of scientific and technological activities etc in museums all over the country. I've said that I'll do a special exhibition on tuning, including the opportunity to invent your own scale on a multi-channel monochord and, if you bring your own cassette recorder, to make a permant record of it. Dates are March 18-24.

OTHER MUSEUMS: Don't any other museums do things like these that they'd like members to know about?

CORNISH CHURCH BANDS: Graham Wells sent me a xerox of an article from *Cornish Studies - new series One*, University of Exeter Press, with an article by Harry Woodhouse on Church

and Chapel Bands in Cornwall. It's only arrived today and I've only had time to skim through it (don't pay too much attention to his instrument history), but it's got some interesting and useful lists and notes on what instruments were played where and when.

NEXT DEADLINE: April 5th please. The first will be in the midst of the Easter no posts.

THAT'S IT, though I'll keep this open while I knock off everything else. I don't know what the weather's like with you, but we seem to be surrounded by floods. It was all very well for Chesterton to say that he didn't mind where the water got as long as it doesn't get into the wine, but it's even worse for instruments! So far we're OK. I hope you are.

Jeremy Montagu
Hon Sec FoMRHI

BULLETIN SUPPLEMENT

Ephraim Segerman

I require advice from the membership about publication of two papers submitted by Felix Raudonikas mentioned in Comm 1190. "Relative syntax of two-dimensional mode" is 35 pages long and "Musical texts and systems" is 15 pages long. From undergratuate courses in pure mathematics, I have a little familiarity with the language Felix's papers are basically in, but I've tried and can't understand them. I would expect that very few of our members other than Felix himself can understand them. The question is whether it is appropriate to use the subscription money of our members, which goes into printing and postage costs, to publish papers of such size that members generally don't understand.

Jeremy and myself have much sympathy with Felix's predicament. None of the standard journals seems to be willing to publish his work. But what purpose is served by our further publication of them? We have been publishing them so far because we know that previous publication in the West helps subsequent publication in Russia. This apparently hasn't happened. It has always been the policy of FoMRHI to encourage 'kite flying' exercises where members throw out new ideas to see if other members find them interesting or useful. We have never thought up a policy about deciding when to give up on getting a kite to fly.

To me, Felix's claims in the first paragraph in Comm 1190 about the significance and application of his work are grossly exaggerated, or at least premature. Being able to describe a phenomenon such as Pythagorean intonation by a higher-level (i.e. more abstract and general) mathematical theory may be an advance in understanding on the higher level. But usefulness of the theory depends on its ability to solve (and perhaps pose) problems on the lower level that practitioners in that field are interested in and cannot solve (or solve as easily) with the lower-level theory they are working with. Someone who understands the higher-level theory might appreciate its generality as beauty, but no-one will take the trouble to get to understand it unless its usefulness is demonstrated. Relativistic physics is a more general, higher level theory than Newtonian physics, but the only reason why anyone has paid any attention to it is because it explains the results of some experiments when Newtonian physics can't. The acceptance of relativistic physics did not end Newtonian physics, and Felix's theories will not lead to the 'end of traditional musicology', as Felix exuberantly claims. If Felix cannot convince others who can understand his language to appreciate the potential value of his approach and so help him in its development, or if no-one else can understand his conceptual language, the demonstration of usefulness (as defined above) can only be done by Felix himself.

My inclination is to encourage Felix to collect his theories and their development in a book, which could well be easier to publish than individual articles, and to confine his Comms for us to consequences of his theory that some of us can understand, appreciate and discuss. But I am open to other ideas. I would appreciate any comments and advice that you, the members, can offer.

GENUINE BOXWOOD

BOXWOOD: Buxus sempervirens (French Pyrenees) SG .85 - 1.14

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	Above 1000 kg	@	£0.90 per kg
Log Size:	2" to 8" dia. x 24"-78" long (Average 4" dia. x 60")		
Quality:	Selected logs only, free from all major defects.		

Sawn Dimensions (Musical Instrument Quality)

We will have a range of sizes available from mid December and we can cut to customers own specifications, prices on request.

Example Prices:	1" sq. x 12"	@	£0.69 per pc
	1.1/2" sq. x 18"	@	£2.34 per pc
	2" sq. x 12"	@	£2.77 per pc
Quality:	No discolouring, straight grain and free from heart.		
Terms:	Suitably packed, delivery at cost.		
Prices:	Exclude VAT		
Quotes:	Individual quotes are available for volume orders.		
Delivery:	Mid. December 1993 onwards.		

All offers are subject to final confirmation

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Prices:	Black	@	£185 per ft.3
	Mixed	@	£140 per ft.3
	Striped	@	£110 per ft.3

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1"	sq.	x	6",	9",	12",	18",	24"	
1.1/4"	sq.	x	6",	9",	12",	24"		
1.1/2"	sq.	x	6",	10",	12",	15",	18",	24"
1.3/4"	sq.	x	8",	12",	18",	24"		
2"	sq.	x	4",	6",	8",	12",	18",	24"
2.1/4"	sq.	x	6",	12",	18",	24"		
2.1/2"	sq.	x	6",	8",	12",	24"		
3"	sq.	x	6",	12",	18",	24"		

		Up to 1.3/4" sq.	Above 1.3/4" sq.
Prices:	Black	@ £175	@ £180 per ft.3
	Mixed	@ £135	@ £140 per ft.3
	Striped	@ £105	@ £110 per ft.3

Colour: **Black** - Consistent black colour.
Mixed - Black & striped mixed, approx. 50 % of each.
Striped - Primarily black with grey-brown stripes.

Quality: Straight grain and free from all defects.

Terms: Suitably packed, delivery at cost.

Prices: Exclude VAT

Quotes: Individual quotes are available for volume orders.

Delivery: Mid. December 1993 onwards.

All offers are subject to final confirmation

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Fax: 0298 71156

Review of: **Gillian Sheldrick, ed, *The Accounts of Thomas Green 1742-1790*,** Hertforshire Record Publications, 14 Westbury Close, Hitchin, Herts SG5 2NE, 1992, 169 pp

Thomas Green was a music teacher and also clearly the main local tuner etc for harpsichords and all such instruments. This book, the bulk of which notes the money he received for tuning instruments, though it also includes other income and expenditure, is a fascinating record because it shows what was being used in and around Hertford over the period when the harpsichord and spinet were giving way to the piano.

He began in 1743 (1742 seems to be old-style, when the year number changed on Lady Day in March) with twelve customers, and the list steadily builds up so that by 1746 he had 34, one of them for an upright harpsichord. A number of these are, of course, repeated visits, though a surprising number of people seem to have been happy to be tuned once a year or even less often. Maybe they touched the thing up themselves whenever it needed it, and then shouted for a professional when it got too bad for them to cope with. One of his new customers had a 'Spinnet, double' and a later entry for the same instrument refers to it as 'Spinnet, double Strings'. I have once seen a double-manual spinet; perhaps they were more common than I'd thought.

By 1747 he had several customers with two harpsichords; before that he had had some with a harpsichord as well as a spinet. In 1752 one of his customers had a virginal, and one would assume that he knew the difference between that and a spinet, for this is the first and only time the word appears. He also did some repair that year on someone's organ; he was organist at All Saints in Hertford and he had done work on other church organs previously but this is the first entry for one in private hands; it was not the last.

From 1755 (unless I've missed an earlier one that I hadn't marked when reading it) he sometimes gives a maker's name, quite a few of them not in Boalch, or a numbered or dated instrument also not in Boalch and thus presumably not known to survive. For instance, Petrus Gunan, Hugh Mahoon, Jos'h Mahoon 1751, Shudi no.298, Joseph Harris harpsichord, and so on; it would be tedious to list them all but I can do so if required, or anyone can come and check my marked copy.

He didn't only cope with keyboard instruments. In 1756 he mended and strung a Citron, nd he tuned one in 1758, and from 1757 he quite often tuned a guitar, both presumably an English guittar. He also tuned harps occasionally.

In 1762 there is an entry for 'Spinnet tuning - Johannes Relfe Fecit, leathers', presumably an instrument 'quilled' with leather instead of quill, as Shudi, for example, did on one of the ranks of his harpsichords and as the Bate spinet by Baker Harris is today.

From 1770 we start to get forte-pianos (occasionally pianoforte), and not all his customers were exclusively modern, for some had both piano and harpsichord. Michael Cole pointed out to me the way Green changes piano terminology, starting with Forte Piano, using that and Piano Forte interchangeably from 1771, then always Piano Forte until 1784, from which date we start to get Piano *tout court*. An interesting indication of growing familiarity with the new instrument. Nevertheless, by 1786, the last year of his tuning records, harpsichords are still in the majority; there are twelve harpsichord entries, one spinet, two guitars, and five pianos.

He was also a dealer, and he had separate accounts for all the things he bought and sold, which included violins, cellos, and so forth as well as keyboards. He also provided a local hire service, including for organs ('my little Organ with a Flute Stop' which cost one guinea for three months).

There are useful lists in the back of all the people for whom he tuned each type of instrument and of the named makers. Some of the introductory paragraphs in this section are inaccurate (for instance a wholly imaginary decription of a harpsichord lute stop, which

also appears in the Introduction; bad enough to have it once and a pity to have it twice. There are other errors in the Introduction, for instance that a harpsichord commonly cost ten guineas, less than a third of the true price for a single manual; Michael Cokle pointed out to me that ten guines was the commission which Broadwood paid Shudi for each instrument with his patent swell, and presumably this is how the error arose.

Such errors are of little account for us, however misleading they may be to the general public, and for anyone interested in the social history of keyboard instruments in the second half of the 18th century, this is a very interesting book.

FoMRHI Comm. 1207 **Jeremy Montagu**

Review of: **Joseph Doane, *A Musical Directory for the Year 1794*,** reprinted by Royal College of Music, Prince Consort Road, London SW7 2BS

This is, as it were, the Langwill for 1794, though it is by no means restricted to wind instruments, nor to makers, so perhaps the Musicians' Union *Directory* would be a nearer comparison. Doane listed all the musicians he knew, whether instrumentalists or singers, noting where they habitually played or sang, which choir, which theatre, which festivals, and so on. And he gives their addresses (no phone numbers!).

He, like Bill Waterhouse, asks for additional names for future editions, and I could give him a few, especially among makers, for his list is not as complete as we might like, though quite a number are there. Interestingly, Goulding is down as a music seller, rather than a maker, and I have long suspected that - I don't believe that he made anything; I think he was a large scale dealer, getting things made for him all round the trade and putting his own name on. We all know a few modern examples of this practice.

It is a surprisingly useful list to have to hand, and also nice to have; most of us have met references to Doane, and I don't suppose that we have all bothered to chase them up; I know I haven't. Now, thanks to the RCM we can. I have to apologise to the College; if they gave me a price, I've lost that bit of paper.

A useful supplement, too: Doane winds up with a short History of the Academy of Ancient Music, which is also interesting to have. We can only regret that he never did publish a Doane2.

Review of: Peter Holman, ***Four and Twenty Fiddlers; The Violin at the English Court 1540-1690***, Clarendon Press, Oxford, 1993, 491 pp, illus, mus.ex. £48.00

This is an enormously detailed and copiously referenced study, so dense with fact and detail that about the only person who could review it adequately is the author. I suspect that people will be picking up points from it for months, even years to come, and indeed I would encourage all FoMRHI members to chip in with any points that amplify or otherwise comment on Holman's work.

I very much doubt whether anyone is going to argue with his basic facts, for he has done so much research and annotated his text so carefully that it is difficult to believe that it could be argued with on any basis of fact. It is a superb piece of work and it outdates all previous work on the history of the violin and on its use in this country. I am, blast him, going to have to rewrite several lectures, including one for next week!

To begin with, he ties down the invention of the violin much more closely than has been done before, both in time and in place. (I don't see why I should spoil his sales by giving you the answer - buy the book and look it up, or at least persuade your library to do so). What he gives is much more precise than has been suggested before by people such as Boyden and Winternitz, but it isn't going to raise great arguments or create great surprise - it's a matter of narrowing down and greater precision.

What is going to change things much more, I suspect, is his evidence of use in England, and it is evidence that looks to me incontrovertible. It would seem that it is more likely that the French court band of the *quatre-vingt violons du roi* was a copy of the English court band than the other way round. It is clear that there was a court violin consort in Henry VIII's time and that this could be called an orchestra (more than one player to a part) by James I and perhaps a little before. Whatever Charles II created on his Restoration, even if it had a new name, a direct translation of the French, the establishment was based on what had existed at his father's court.

Peter Holman does not neglect the church and chapel music, nor the stage, including the non-court dramatic music for which the royal band also played, whether they were supposed to or not. His main emphasis, inevitably, is on dance music and dinner music, which were often the main employment of a court orchestra.

Nor does he neglect the wind players, or the wind-playing duties of double-handed musicians, and historians of court wind-bands and of the early history of the new baroque wind instruments and their use will neglect this book at their peril.

It is densely written, and I have found that it needs reading and rereading. One can get a long way by skimming, but if you want to get all the way, you've got to read it very carefully and thoroughly.

It is illustrated with relevant matter from title pages, engravings, etc, on text pages, and a small selection of not very well reproduced plates, some of which (eg some examples from manuscripts) might have equally well appeared on page. There are many music examples, mostly brief, well chosen to amplify the text, and well laid out with original clefs and time signatures as well as modern equivalents.

We have waited a long time for this book, for we have known for many years that Peter was working on it. It has been worth the wait. The references are as copious and as detailed as any doctoral thesis, but it doesn't read like a thesis, nor like anything that started life as a thesis - it reads like a book, a well-written and well-researched book, and it's going to stand as *the* study of the violin and its history for many years to come.

Review of: **William Waterhouse, *The New Langwill Index – a Dictionary of Musical Wind-Instrument Makers and Inventors*, Tony Bingham, 11 Pond Street, London NW3 2PN, 518 pp, 1993. £64 (+ £2 p&p Europe & overseas surface; + £16 by air-mail overseas); leather-bound limited edition available £210.**

Well, I could save space and just say: 'It's now available'. After all, Langwill's *Index* doesn't need any introduction nor any sales pitch. If you're involved with wind instruments, you use Langwill; it's the only source of information for locations, dating, and so on and so forth. We've waited for this for a long time; Langwill 6 has been out of print for a number of years, and anyway it was really Langwill 4 with a couple of up-dating appendices in the back.

Now we have something completely new. It's not Langwill 7, but New Langwill 1. Completely recast, redesigned for format and coverage, with vast amounts of new material. Don't think 'Oh well, it's a lot of money, the old one will have to do'. It won't. And don't think that you can leave it to the local library to buy, and use it there. For one thing, libraries are more skint than you are, and for another, you'll spend more than its cost going to and fro to the libray to look things up! I've only skimmed it (looking up all the names that occurred to me off-hand), but already I've noted a fair clutch of Bate Collection labels that I'm going to have to rewrite, and a fair amount of my own catalogue that now needs revision.

That brings me to one anomaly that I've noticed. Obviously public collections have priority for locations (Lyndesay had far too many examples in private collections, and indeed far more locations than anybody needed; Bill has left much of that to Phil Young's *2500*, whose new version is due later this month), but where I have the only, or nearly only, example of a make, sometimes it's noted as 'Jeremy Montagu collection', and sometimes as 'a trombone [or whatever] reported', and similarly of course for other people. I wonder why the difference? Where something is not normally available, I'd have thought it sensible to say where it could be found.

Another thing that worried me was the absence of museum catalogues *as such* from the bibliography. A fair number appear under the author's name (not all; the Bate *Checklist* doesn't, and we are one of the very few museums that produces a complete checklist of the collection and updates it each year, nor does Edinburgh appear). But that's only useful if you happen to know who wrote the catalogue, and anyway there are some museums which don't put an author's name on their catalogues. This is something that I'd push Bill Waterhouse pretty hard to add to the next edition. Maybe it won't be complete but the present bibliography isn't complete either (why is my *Romantic & Modern* listed and not my *Baroque & Classical*? – the one has as many wind instrument makers named and illustrated as the other.). Sorry to be a bit egocentric and Batecentric here, but naturally one looks up first all one's own material.

Three things are immediately noticeable as vast improvements over the old Langwills. One is that maker's marks appear with the relevant maker (and there are a lot more of them, though we've lost a few of the earlier ones which couldn't be linked to a name – that's a pity and surely it might have been possible to have given them a page or two by themselves just for reference). The second is that families of makers appear now as a family tree, with each member numbered as well as named, which makes them much easier to sort out, especially where the same forename crops up in different generations (eg Milhouse, and Grenser even worse). It is also going to be far easier to follow up references than the old Langwill was, for the vast majority of entries have a bibliographical reference.

There are, of course, many new names. There is also much new information about known names. There are also several well-known mysteries solved, and solutions published elsewhere brought together for the first time (eg ISW, I.IR., and Scherer). There is one limitation on coverage: makers established since

about 1950 are omitted. One colleague complained to me that Yamaha aren't included; in fact they are, but under the name that they used before 1950! Another limitation is that makers of keys, reeds, and other accessories are not included, as a number used to be. This can give rise to anomalies for, for example, John Hale is included because he made instruments, too, and it is noted that he made keys, stamping them IH; Thomas Ling is not because he only made reeds, and doubtless there are others.

There are a few things that are going to take getting used to. For instance, German *umlaut* is alphabetized as e, so that -öp- would come before -of-; apparently this is correct German usage. We are going to have to remember other national customs, too; where a maker is Van something, if he's Dutch, he's listed under surname (eg van Heerde comes under H for Heerde), but if he's Belgian, he's listed under V for Van (eg Van Enghelen). This is correct national practice, but it may be annoying when one of the things you're trying to find out is where a maker comes from. So always look under V and under the surname for Vans, under D and under surname for de, and so on.

But these are only niggles. It is a *tour de force*. It's a book I expect to use almost every day, so much so that I've had to buy a second copy so that I have one at the Bate and one at home.

Tony Bingham has asked me to say that he isn't intending to wholesale it; it was sufficiently expensive to produce that there isn't a lot of margin for price reductions for that, so you'll probably need to order it from him. He takes Visa or Access (Mastercard) with the usual information, or cheques on UK banks or Eurocheques, or UK Giro 55 731 4003.

And Bill Waterhouse (address in our List of Members) says, like Lyndesay Langwill always did, that he welcomes additions, corrections, and any other new information. Langwill was an institution; the New Langwill will become one in its turn.

FoMRHI Comm. 1210 **Jeremy Montagu**

Review of: **Larigot**; annual subscription FF 150 to ACIMV, care of B Kampmann, 93 rue de la Chapelle, APT 166F, F-75018 Paris, France

Recent issues, which I have been remiss about noting, have included an article on the evolution in France of bass brass instruments with fingerholes (the illustrations to this included the Royal Basso Hibernicon which, as the name implies, was invented in Ireland, not in France, and of which only one example exists, and that is in the Bate Collection, which wasn't specified, nor was the photo acknowledged, something of which I always take a dim view). A Millerau catalogue was reproduced, as was one of Gras, both dating from 1910; the reprints of wind catalogues is one of the most useful things they do.

Another of their very valuable features is the special issues which cover private collections. There have been two of these recently, one of the Jose da Silva Collection, and the other of the Patrick Delile Collection. The former is woodwind, flutes and oboes, the latter is brass, cornets and trumpets. Both are well illustrated with good, clear photographs; even though they are photolitho like FoMRHIQ, the photographs are as good as or better than one often sees in books today.

If you're interested in wind instruments, a subscription to ACIMV (Association des Collectionneurs d'Instruments de Musique à Vent) is well worth considering.

FoMRHI Comm. 1211 **Jeremy Montagu**

Review of: **Edinburgh University Collection of Historic Musical Instruments, *Catalogue, Vol 2;E;ii: William Waterhouse, Bassoons, and Vol.2;H;iii: Arnold Myers & Raymond Parks, Trumpets and Trombones*** £3 and £4 respectively, plus p&p £1 in UK, £2 abroad. EUCHMI, Reid Concert Hall, Bristo Square, Edinburgh EH8 9AG. Also available on disk for DOS, ASCII or Wordperfect 5.1, same prices but plus VAT, or ASCII only via e-mail through JANET.

For general comment I'll refer you to Comm. 1133 of a year ago. The fascicles are as before, in format and appearance.

Again it is noticeable that there is greater provison of detailed measurements in the brass catalogue than in the woodwind. Again it is noticeable that there is a high proportion of loan material, much of it once again due to the generosity of the Curator. Again brass mouthpieces have a different number from the instrument with which they are associated, and this is more noticeable than it was last time because bassoon crooks do not, and yet these are just as easily detached from their instruments and disassociated as mouthpieces are from trumpets. I still think it a mistake; part of the instrument is part of the instrument whether it was original or not (quite often bassoon crooks aren't original either.

There are useful indices of makers' names and serial numbers.

I am worried about the 'Nominal pitch' which is given for each instrument. For bassoons it is C; it does not relate to the lowest note but merely to whether the instrument is played at concert pitch or whether it is transposing; tenoroons are F because their notes come out a fourth higher. This presupposes that tenoroon music would be written as though the instrument were a cor anglais, either in treble clef to sound a fifth lower than written, or in bass (like a bassoon which be more logical) to sound a fourth higher. Was it?

What made me think about it is that trombones are catalogued as a nominal pitch of B♭ for tenor, E♭ for alto, and G for bass (there are other pitches too, but these are what the standard sizes are catalogued as). But the trombone isn't a transposing instrument. The trumpet is, so putting that as B♭, E♭, F or whatever is fair enough; read C and what comes out is B♭, E♭, F, according to which instrument we've got. But read C on the trombone and what comes out is C, irrespective of size. I have debated this with Arnold Myers in the past in relation to flutes. To me the 18th century flute is a D flute, though it's not <u>in</u> D because it doesn't transpose; the lowest note is D, the natural scale is D (ie 2 holes open is F♯ not F♮) even when it has a C foot, and this is one of the changes which Boehm made; the Boehm flute <u>is</u> a C flute, not because that is its lowest note (it was quite often extended to B♮) but because that same fingering gives F♮ and not F♯.

So, either a bassoon has a nominal pitch of B♭ or a tenor trombone has a nominal pitch of C. Then, of course, one has to distinguish the 9-foot instruments from the 8-foot, those tenors that have a B♭ harmonic series from those that have a C harmonic series.

This whole nomenclature business is tricky and it needs more thought. My own preferred practice would be to do away with Nominal pitch and talk about, for example, concert flute, lowest note D. In the case of the two groups here, a bassoon is a bassoon and does not need specifying unless it's some unusual size. Then one can talk about B♭ tenor trombone without worry because we aren't trying to distinguish between transposing and non-transposing instruments any more.

Meanwhile, these are good demi-catalogues as I use the term in realtion to the Bate demi-catalogues; a reasonable amount of information without the full details which one has come to expect from Leipzig and a few other places but which, while those are wonderful to have, most of us neither need nor can economically provide.

What Can We Reasonably Expect Museums to Provide or Allow?

I have to admit that the urge to write this Comm was inspired by receiving one from Michael Ransley which appears elsewhere here, which is naughty of me, but it does also express things that I have been feeling for some time.

I am, of course, writing it from the viewpoint of a museum curator, and I do have to say, at the outset, that I have quite often been annoyed by what many of you expect of me.

I provide, and maybe bigger and richer museums would provide, but in the case of the Bate Collection, it's 'I provide', a plastic caliper gauge; Korg pitch meters; cloth dress maker's measuring tapes or, for longer instruments, surveyor's plastic tape; small hole gauges; T-gauges; dentist's mirrors; torch with perspex light guide, or even without a guide; screw drivers for key axles; pusher to remove axles for keys in blocks. I don't suppose the list stops there, but these are things that I keep at the Bate to do my own work there and which I have fished out of drawers in the Bate workshop for visiting instrument makers in the last few months. Am I now expected to buy paper measuring tapes for the benefit of makers who come to the museum? We do provide disposable gloves, but that's because any gloves you brought would be dirty from being carried in your cases.

It is a considerable and continuing surprise to me how many instrument makers come to look at and measure instruments without providing themselves with basic equipment such as the above. Some of it does derive, of course, from the fact that the museum community doesn't like metal tools, but surely everybody knows this? Whatever we think about discs and T-gauges (and I'll come back to this in a moment) we none of us allow the normal metal caliper gauge, which has very sharp corners and edges. But I can't begin to count the number of people whom I have had to stop from using one, and to whom I then have had to lend my own plastic one. I could, I suppose, be tough and say 'Out' but I've only done that once. Incidentally, Harry Vas Dias came up the other day with a caliper gauge with digital read-out instead of a dial, which can be zeroed in any position; why not sheath such a gauge with plastic and zero it to suit? It might be the odd hundredth of a mill out, but so what? Breath on the wood you're measuring, and it's moved more than that.

Many people have brought plastic discs for measuring bores, and some of those discs have had edges as sharp as any scraper. 'Oh but we must have a sharp edge - how else can we get a definite position?' How else can the bore of our instruments get chewed up, they mean. To my mind, the steel T-gauge with rounded edges (the Mitutoyo is better than the Stanley) is a hell of a lot safer, and I suppose that that has most often been the reason that I've fished mine out. Safer still would be a strain gauge like Rod Cameron's, and I have thought of buying one of these, and Rod has very kindly offered to make one available. But why should I, or the Bate, spend several hundreds of pounds on something for visitors to use? OK it would protect our instruments, but what would protect them even more is to say no measuring - this is why some museums do say just that.

I don't (I know I should) stand over someone the whole time he or she is here. If it's someone I don't know, I do watch for a while, but I've too much work to do to be there all the time. Then I drop in from time to time. Sometimes I find the maker sticking plastic tape on the instrument - 'Oh it doesn't mark' - or putting blutak or similar substances on - 'Oh it all comes off'. It doesn't all come off and it does mark. If you need to cover a hole, plumber's PFTE tape is non-adhesive and really does not mark (OK, that's another thing that I provide). But anything adhesive, when you take it off, look through a microscope or powerful lens and you'll see traces on the surface, where it has left a deposit, and look at the tape and you'll see particles that it has pulled off the instrument. As for blutak and its allies, they always leave oils.

As for putting paper on the instrument and

taking a rubbing of the fingerholes or maker's mark or anything else, you might as well take a rasp to it. Look at the fingerholes of any instrument and you'll see straight away whether it's been used and how much. The wear on the surface is the result of being touched by the skin of the fingers. Not rubbed, players don't rub their fingers up and down, they put them down and lift them up. Not by a stick of carbon, but just by soft skin. Would anyone in their senses take a wooden stick and rub it up and down along the instrument? And can you tell me what's the difference between a wooden stick and a carbon stick down the middle of a pencil?

It does really help if makers think a bit before they come to us. Think of what it is reasonable to do to an instrument. Think of what tools you're going to need and whether they are going to be really suitable. To pick up one of Michael's analogies, imagine you're measuring a baby and think what a devoted mum might allow you to use. Just remember that some of us curators are even more paranoid about our instruments than mums are about their babies. After all, babies heal, and anyway they don't last more than a century at best, and instruments don't heal and are already a couple of centuries old or more!

FoMRHI Comm. 1213

Measuring Instruments in Museums & Conservation. Michael Ransley.

I have often wondered what would be a good safe alternative to using a steel rule for measuring.instruments in museums.

Mostly in my workshop I use a Vernier caliper for short lengths, and these are available in a plastic or nylon and are acceptable in most museums, although the depth gauge is metal.(The depth gauge can be removed).

For longer lengths I use either a steel rule or a flexible steel tape measure. Unfortunately neither of these are suitable for safely measuring old instruments because of the potential for scratching the instrument. Also the tape measures with a return spring can retract very quickly, with considerable power and the L shaped hook on the end could cause damage.

I have wondered about the possibility of covering the steel rule with some sort of plastic coating and would like to hear from anyone who has done this.

Another alternative that I have just discovered is a paper tape measure. These are used to measure babies, whose mothers are often even more anxious than museum curators.
These paper measures seem quite accurate and would be very safe to use on instruments. They are made by a firm called Eskland LTD, Tel 051- 722 6692.

These paper measure can only be used a few times but must be very inexpensive. Perhaps every museum should buy a box of them?

Another way of measuring would be to take a roll of paper, lay it on the instrument and then carefully with a fine but soft pencil,make marks where you need to. Then back at the workshop this information can be converted into measurements. Or you could work directly from the roll of paper. Such a roll of paper could be laid down the front of a wind instrument and rubbings could be made of the fingerholes.

FoMRHI Comm. 1214

Donald S. Gill

SUPPLIERS OF MATERIALS

There has been an underwhelming reponse to my suggestion for lists of suppliers in last quarters Bulletin. If anyone is interested here is my list. If anyone is ashamed I am still offering to prepare consolidated lists.

Hardwood

County Hardwoods, Creech Mill, St. Michael, Taunton, Somerset. Tel. (0823) 443760.

Harpsichord parts

Heckscher & Co., 75 Bayham Street, London NW1 0AB. Tel. (071) 387 1735.

Organ Leather

Bevington & Sons (Leicester) Ltd., Illife Avenue, Oadby, Leicester LE2 5LH. Tel. (0533) 716151.

Plastic Ivory

GPS Agencies, Unit 3 & 3a, Hanbrook Business Centre, Cheesmans Lane, Hanbrook, W. Sussex PO18 8UE.

Steel and non-Ferrous metals, Silver solder etc.

Flapstock Ltd., Shucklow Building, Little Horwood, Milton Keynes MK17 0PT. Tel. (0296) 713631.

Woodscrews

Ace Screw Supply Co., Royle Street, Congleton, Cheshire CW12 1HR. Tel. (0260) 278236.

Metal screws - Model engineering supplies

GLR Distributors Ltd., Great Northern Works, Hartham Lane, Hertford, Herts. SG14 1QN.

Tools

Axminster Power Tool Centre, Chard Street, Axminster, Devon EX13 5DZ. Tel. (0297) 33656.

Craft Tools

Craft Supplies Ltd., The Mill, Millers Dale, Nr. Buxton, Derbyshire SK17 8SN. Tel. (0298) 871636
Tilgear, Bridge House, 69 Station Road, Cuffley, Herts. EN6 4BR

Jewellers Tools

H. S. & Sons Ltd., 12 - 16 Clerkenwell Road, London EC1 5PL

Mary Kirkpatrick sent the following:

Small Parts Inc., 13980 NW 58th Court, POBox 4650, Miami Lakes, FL 33014-0650; *(305) 557-8222; fax 1-800-423-9009.* They supply 'Engineering Findings - Components, Materials, & Precision tools', have a fascinating catalogue over ½" thick - materials such as delrin, nylon and teflon as well as metals, low melting point alloy for bending crooks, screws, wire, rods, tubing, all kinds of small parts and small tools which inventors and scientific laboratories would need. It's somewhere in between a standard industrial supply place such as Manhattan Supply Co and a jeweller's supplier such as Rio Grande. All three companies are very efficient.

MSC *(800) 645-7270; fax (800) 255-5067* - Best call, there are branches all over the country

Rio Grande, 4516 Anaheim Ave NE, Albuquerque, NM 87113

JM adds: A fairly local firm that I've found helpful in the past and quite cheap for tools of any sort, including Mitutoyo gauges etc, are Millhill Supplies, 66 The Street, Crowmarsh Gifford, Wallingford, Oxon OX10 8ES; *0491-38653 & 25518; fax 0491-25510.* If you want to visit them (they do mail order) it's best to phone first because they do go off to model engineering shows now and then and leave the shop empty.

FoMRHI Comm 1215 Peter Bavington

A Reply to comments from various members on Comm 1174

To reply at any length to a Response to a Counterblast might try the patience of even the most avid controversialists among FoMRHI members, so I will try to be brief.

The use of the term 'Calvinist' was an error of judgment and I withdraw the word (perhaps I should have said 'Stalinist').

The charge of abusing the words 'authentic performance' with intent to mislead I utterly deny. To call something 'authentic' means that it really is what it seems to be: thus an authentic Rembrandt is a picture which really is from his hand. The poor word has become sadly worn through misuse of late ('authentic copy', for example, is a contradiction in terms) and I was attempting a little restoration work by offering a definition of an authentic performance as one which really is what it claims to be, i.e. a pleasing and moving experience. If this was not clear, I apologise.

Perhaps 'authentic' is now beyond being put back into playing order, and should be consigned to a museum.

FoMRHI Comm. 1216 Bob Barclay

Some observations on the 'natural' trumpet

I read Comms. 1160, 1174 and 1191 with interest. Being a maker of *real* baroque trumpets I probably encounter the most "interpretive" of all the practitioners of so-called "historically informed performance." But, surely, isn't all this verbiage simply masking one essential kernel? It's called *truth*, isn't it? Can we not simply say: "Be honest with yourself, but especially be honest with others?" Wouldn't that cover it? So, if a player needs (for example) to use a fingerhole trumpet to get the desired effect, let him go ahead. As Peter Bavington observes, there is no shame and no moral lapse attached to mere expediency.

Where I have encountered the most obvious distortion of ethics is in record blurbs and concert programmes which routinely fail to define accurately the instruments used. How often has the term 'natural trumpet' been used correctly? How often are manifestly modern instruments ascribed falsely to *bona fide* early models? By all means let the player use whatever works for him, but let that same player avoid writing (or allowing to be written) words like: "After Friederich Ehe, 1700" or "Copy, Nuremberg, 18th century" on liner notes or promotional material. The above two examples are taken from information provided with fairly recent recordings, both of which employ vented instruments produced from ready-made parts and equipped with tapered leadpipes and modern mouthpieces. (We will not discuss the musical results here.) From the information provided the purchaser of those recordings would indeed believe that there is an encounter with "authenticity" implicit in the performance. However, those who know these instruments cannot deny that some players are bending truth much further than they could ever bend harmonics 11 and 13. Do they assume that Eph Segerman's "sharp-eared mafia" are more adept at detecting bent harmonics than bent historical facts? The general public do not have access to the information that we possess, and often do not even realise that all the finger fluttering has nothing to do with the original music. The fostering of such widespread misconceptions is wrong by any measure. To be sure, there are a few trumpeters who will play sound copies in the original manner, who will demonstrate their instruments, who will discuss the necessary compromises and who will, in short, call a spade a spade. But they are few and far between. Most proceed on the assumption that they have the freedom to continue the delusion, as most of the previous generation of players have, and even, with the debased apparatus they are now using, to take retrograde steps.

Much of the agonizing back-and-forthing in the pages of FoMRHI and elsewhere would be entirely unnecessary if we allowed the fresh breeze of honesty to blow through the early music factory. It's getting pretty hard to breathe in there! Truth, that's all! And don't quote Pontius Pilate at me!

p.s. I wrote a very similar communication to the *Newsletter* of the Historic Brass Society a couple of years ago begging for comments, rebuttals, criticisms, or even acknowledgements of the points I was making. The silence was deafening. It must be me.

 Ephraim Segerman

On Musicologists and Early Music

I was talking to a friend who happens to be the director of a prominent early-music ensemble, and he was discussing a small group of musicologists who are hired as consultants by groups like his. They have teaching posts in music departments of universities and are considered leading scholars in music history. They share the duties of reviewing early-music recordings and performances with writers who know very little about music history. He said that the comments they make range from 'great' to 'marvelous'. Record companies hire them to provide written material to be included with recordings. He was grateful for having their support, but he wondered about their commitment to music history because they showed little interest in shifting his interpretations in more historically-accurate directions. On the radio I heard another prominent ensemble director being interviewed, and he expressed great relief that the musicologist reviewers didn't demolish him on historical grounds after some of his more extreme efforts in early-music showmanship.

If one is committed to promoting today's early music, one sees no problem here. The performers, record companies, media and academics are all working together to provide listeners with exciting beautiful music they wouldn't otherwise have known, and it is only proper that they have financial rewards for their efforts. But if one is committed otherwise (eg to informed independent critical reviews or to music history), this smells of corruption and conspiracy. It is not that simple.

For more than half a century, there has been a group of musicologists researching and promoting early music for the enjoyment of the general music-loving public. They optimistically have assumed that the more authentic the performance and the edition is, the more enjoyable it is bound to be. Their research created the editions to be played and determined the instrumentations intended. Getting the right instruments, and musicians who can play them competently, appeared to be the main stumbling block. Only in recent years has this problem been solved to their satisfaction. Now their dream is realised, and the music that they have loved and laboured over is gaining the popularity they always knew it deserves.

It is particularly curious that in this movement, the musicologists have assumed that, given historically correct music and instruments, modern musicians with a competent technique would play the music in a historically probable way. The basic assumption of modern performance style is that the musical content of a performance essentially <u>is</u> the musical content of the composition, and that a competent performance is a skillful and faithful translation. The musicologists have assumed this in their view of historically performances, rather than researching the issue and taking note of what the historical evidence indicates. They have always explored and worked with the music on their pianos, and the realisation of the piano reduction in an early-music performance is visualised as similar to such a realisation of any other music.

The underlying assumption made here is that basic 'musicianship' (ie musical judgement) has not changed through the centuries. If there were no evidence that conflicts with this assumption, it is a valid one according to the rules of scholarship (the consequence of Occam's Razor that has been called the 'Law of Similarity'). <u>But there is plenty of such evidence.</u> And the musicologists have defended this coveted assumption by doing their best to ignore that evidence, and when it has been so obvious that they can't ignore it, they have dismissed it. It is perfectly proper for artists to have deep unquestioning belief in their own judgements, but very odd behaviour for intelligent people supposedly committed to and trained in the objectivity of scholarship.

I suspect that this erosion of scholarly objectivity can be traced to habits acquired in the mainstream of what musicologists do. Their research is considered most useful when it concerns high-quality music, so they give high priority to assessing musical quality. These assessments have largely been guided by historically-recorded assessments or criteria, but many have not. The historical information is assimilated in the way musicians assimilate style: getting the feel of it by immersion in what are considered 'good' examples, and checking one's own judgements against those of respected colleagues or teachers. The pieces of historical information which fit the consensus get absorbed, and those that don't are considered anomolous and tend to be passed by. Judgement becomes intuitive, and the distinction between what is historically based and not is lost. As long as one's colleagues respond similarly, this approach seems valid to them.

The scholarly approach is different. The historical information is treated much more analytically. Anomolous information is a challenge to the hypothesis of current understanding, and if it cannot adequately be explained within that hypothesis, the hypothesis itself is modified so it can be. There are music analysts amongst the musicologist fraternity, but they are a minority that tends to get ignored by the rest. The majority can be very successful in the field by relying on their research, intuitive and communication skills, without properly using the logical skills of scholarship.

So the obsession of musicologists with assessing musical quality is guided by the cooperative judgements of musicologists familiar with the type of repertoire involved, with underlying historical criteria included in a non-objective way. In their teaching, they consider that training in such judgement of quality is one of the most important skills they can pass on to their students. The consensus on these subjective judgements makes them acquire an authority that feels stronger than the authority of objective analysis based on evidence. When they conflict, the group beliefs of aesthetic fashion triumph over the individual responsibility of true scholarship. They can be historical scholars only when it feels right according to their musical intuition. But since they are respected members of the academic community, they feel that all of their work is 'scholarship', and have been known to consider criticism, such as offered here, as 'anti-scholarly'.

A consequence of this is that musicologists have not seriously considered studying the history of how music sounded when performed because they can't imagine any other than modern aesthetic judgements of quality of musical performances. The evidence on embellishment and tempo standards is so obvious that it cannot be ignored. The musicologists have dutifully reproduced embellishment tables from original sources, but they have not analysed how they were used, as they have for, say, musica ficta. When, as is most common, the embellishment has not been notated in the music, they just advise the musicians to use the tables in any way they want, with no advice on which, where and how often. Without such guidance, the musicians just follow their own modern judgement, and the musicologists have nothing to say on the matter, since that sounds fine to them

On tempo, excellent unambiguous evidence from the 14th and 17th centuries, plus confirming weaker evidence from the centuries inbetween, have been known for a long time. These pieces of evidence indicate that tempo standards were much slower than modern ears like, so the musicologists have ignored (most), misinterpreted (eg Dolmetsch), maligned (eg Donington) or simply denied (eg Sachs) them. Tempo, embellishment and phrasing strongly influence each other. No-one has thought of researching the history of phrasing (a bit of evidence I've stumbled on, quoted in Comm 862 Q51 p20, indicates considerable difference between 1866 and now).

Though the musicologists are effectively incompetent as historians of what musicians actually did when performing, it still is worth his while for my ensemble-director friend to hire them as performance consultants. The musicologists can be very articulate and sensitive advocates of the modern early-music style that they (and their predecessors) helped to create, and so can make suggestions that will add to audience satisfaction. Since they happen to be music historians, their approval of performances reassures the musicians in the ensemble who care about the historical acceptability of what they are doing. It also gives the director insurance against a bad review.

The record companies realise that most people purchase only one recording of a work and want it to be the most 'definitive'. The musicians have trained the public into believing that their main interest in music is to realise the intentions of the composers. So the record companies try to sell early music recordings as 'authentic' interpretations of the composer's intentions, and so are as 'definitive' as can be. 'Authenticity' needs authentication of experts, and they get musicologists who are leading music historians to write the record sleeves. The media employ such experts to write performance reviews. It is approval of the performances by the authority of historical scholarship that everyone is buying, and it is sold without conscious dishonesty by the musicologists because they believe in their own judgements (agreed by colleagues) much more than in the historical evidence.

Modern early music is often very beautiful, and thus deserves its success. But the claim of historical accuracy is far from meeting scholarly historical standards. Another objection is that much of it can be much more beautiful if more historical performance practices were applied. A final objection is that scholarly research into the history of how music was performed is suppressed. The musicologists carry great responsibility for these failures as well as this success.

Scholarship, Statistics, and the Minimum Amount of Evidence Needed

When one encounters statistical methods for testing scientific hypotheses, one can meet the statement that the size of the sample (ie the number of pieces of evidence) can be too small to reliably draw conclusions from. The rules of scholarship should be the same for all fields, be it scientific, historical, literary, theological, or whatever. So how can it be that one piece of evidence in science can appear to be worthless, while people like me insist that every piece of relevant evidence in historical scholarship has to be accounted for by the hypothesis?

In all scholarship, there has to be agreement between all concerned about the nature of the evidence and the complementary nature of possible hypotheses that can generalise on the evidence. Then the scholarly method can compare hypotheses to find the best fit to the evidence according to criteria that are as objective as possible. One cannot avoid judgement, but this procedure resolves conflicts by shifting the places where judgement can be applied to areas where there can be much more agreement.

When a statistical method is used, the concern is whether the amount of evidence for (as opposed to against) the claim of the hypothesis justifies it. The existence of the contrary evidence is accepted in the hypothesis, and its nature (ie, why it is contrary) is assumed to be understood.

The competing hypotheses are the original one and the 'null' hypothesis, in which it is assumed that the evidence is randomly for or against the original hypothesis. One calculates the probability that the null hypothesis could still be true while producing the numbers for and against that is observed. Then one accepts the original hypothesis as probable if the above probability for the null hypothesis to be true is lower than a mutually-agreed figure called the 'acceptance level'.

For this method to be valid, the evidence needs to meet a group of criteria. Each piece of evidence is either for or against the hypothesis, and its probability of being for or against it is the same. The sample is chosen in such a way as to be representative of the total population (of possible evidence) that the hypothesis addresses itself to. There has to be enough evidence to do arithmetic with, and which way each piece of evidence goes doesn't affect the way any other goes.

This agreement on the equivalence between pieces of evidence allows them to be treated collectively rather than individually. In this way the numbers count and the value of each piece of evidence is only in its contribution to the numbers. This is the way that each piece of evidence is accounted for by the hypothesis.

There are some hypotheses in historical scholarship that lend themselves to statistical hypotheses. The ones that I've been in controversies about have been of the type that <u>any</u> contrary evidence is contrary to the hypothesis. In such cases, statistical methods cannot apply, and any apparently contrary evidence has to be explained away in the hypothesis. Here, the amount of evidence in favour of the hypothesis is irrelevant, but each explanation of contrary evidence weakens it.

The amount of evidence needed to convince a person of the 'truth' of any hypothesis, chosen by the scholarly method or not, is generally very strongly dependent on whether it meets that person's expectations, and especially whether it can easily be incorporated into his or her already-existing understanding of the subject. Very little evidence is needed if it is expected and doesn't violate previous understanding, and sometimes no amount of evidence is enough if it is unexpected and violates previous understanding (this is a serious problem in teaching physics in schools).

Convincing people of 'truth' has nothing to do with the scholarly method, which is only concerned with as objective a relationship as possible between hypotheses and evidence. But it has plenty to do with the sociology of the scholarly community, where the reputations of hypotheses and scholars involve some very strong non-objective factors. The 'knowledge' that is written in textbooks includes a consensus of what scholars believe rather than a catalogue of results of the scholarly method. But because scholars are trained in the scholarly method and respecting its results, its results eventually become part of 'knowledge' when the scholars who don't like the results have exhausted efforts to change it by collecting more evidence or creating and testing more palatable hypotheses.

FoMRHI Comm. 1219 Ardal Powell

WELL UNDER A THOUSAND WORDS FOR THE IVORY BAN

Abstract: An article earlier reprinted in this Quarterly opposing the CITES ivory ban does not address substantive matters. Progress in the discussion seems impossible without new information on elephant poaching and populations throughout the African continent since the ban.

The *Times* piece on ivory in Comm. 1173 reminds us how hard it is to have a reasonable debate on the subject. Many of its points have been answered again and again in the past few years, even in these pages, and it is not encouraging to see them grimly served up one more time. Again it fails to provide opposing statistics, barring a single inconsequential reference to relative elephant populations.

The *Times* piece claims that folk like myself who support the CITES ban have been misled by a small group of bad people. It attempts to devalue the statistics given by those who supported the CITES ban, which I reported here at the time (Comms. 902, 974). Please note that the *Times*'s attack is not on the statistics themselves, but on the individuals who provided them.

As the imputation has been made in the *Times* piece, I should mention that the personal stakes for those whose livelihood used to be the ivory trade are of course just as high as, if not higher than, they are for those who organized the vote which passed the ban at CITES. And so if a reasonable person must be suspicious of those on one side of the question, he or she must doubt both. If all the information we have is untrustworthy and everyone may be lying to us, how is anyone supposed to come to a decision about what to do?

Perhaps this is the very question readers of the *Times* piece are meant to ask themselves. There are good reasons why the author of this article does not provide an alternative model or set of statistics to those he claims are false: he is aware that those figures were so overwhelming that no amount of interpretation or spin doctoring would make them serviceable for any other purpose than turning people off ivory. And to provide an alternative set of any kind would only draw attention to the original figures once again. So the best strategy against the ban is to skirt the statistics while casting doubt on them, making the issue appear confused and out of focus so that public opinion behind the CITES ban will fatigue and crumble. I believe that is the aim of the *Times* piece: to numb and weary the reader. Similar articles have appeared elsewhere (for example the much longer one by Raymond Bonner, "Crying Wolf over Elephants", *New York Times Magazine*,

Sunday February 7, 1993).

Everyone agrees that an ivory ban is an imperfect way to deal with the problem the ivory trade has created. It does indeed seem unfair that it is the very countries which are doing well with their elephants which are feeling the pinch, and it is no wonder they complain about it. The *Times* article pointed out some of these inequities, though it did so with hyperbole and without perspective. But, I repeat, it did not suggest a real way to solve them, introduce any new material, or even provide a basis for further discussion or for a reevaluation of the ban. Instead it used provocative language and violent imagery. I have made very similar criticisms of anti-ban arguments before. If anyone is interested in reading a genuinely dispassionate, and therefore all the more disturbing, piece of reporting on the subject, I recommend Michael Satchell, 'Wildlife's Last Chance?', *US News and World Report* 115.19 (November 15, 1993), 68-76. [I think *US News* is now available on the Internet—you could try asking for a copy of Satchell's article by sending e-mail to 71154.1006@compuserve.com.]

I look forward to new statistics showing what effect, if any, the CITES ban is having on the poaching of elephants in Africa, and on their numbers in the afflicted countries. I will confidently rely on such figures unless and until they are plausibly contradicted by writers who try to use the language of independent thought, avoiding polemic and invective. I remain concerned about secondary effects of the ban, such as the loss of income to South Africa and its satellites, but I do not consider this central to the issue, which is the ultimate survival of the species in most of the continent—that is, outside South Africa, Botswana and Zimbabwe. I live in hope that perhaps one day there will be regular culling in all African countries so that the Africans themselves will be able to establish a controlled, legitimate ivory trade. Until then, I believe the ban must stay.

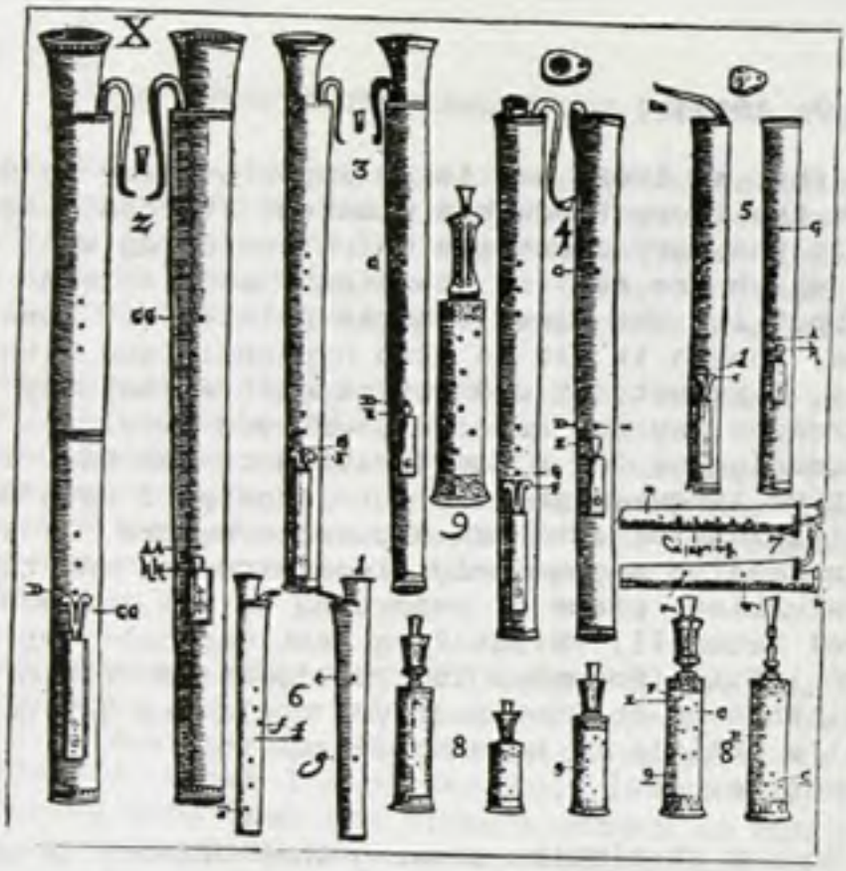


Figure 1.

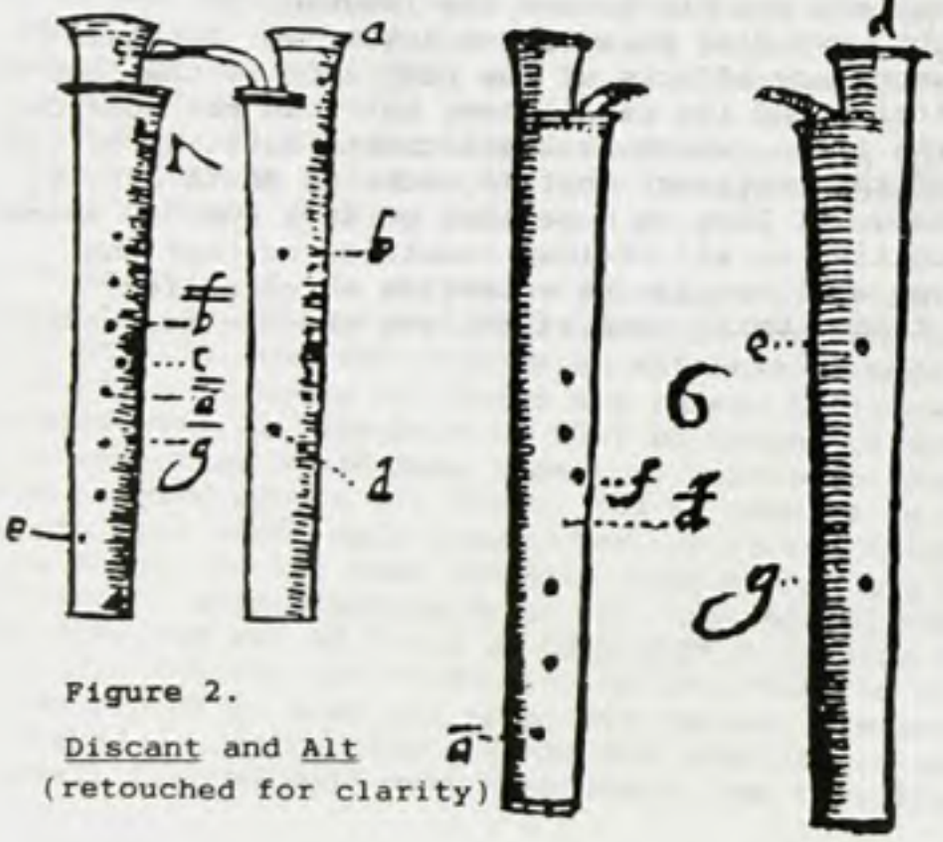


Figure 2.

Discant and Alt
(retouched for clarity)

Figure 3.
Alt with missing holes added

FaMRI
Comm. 1220

Graham Lyndon-Jones

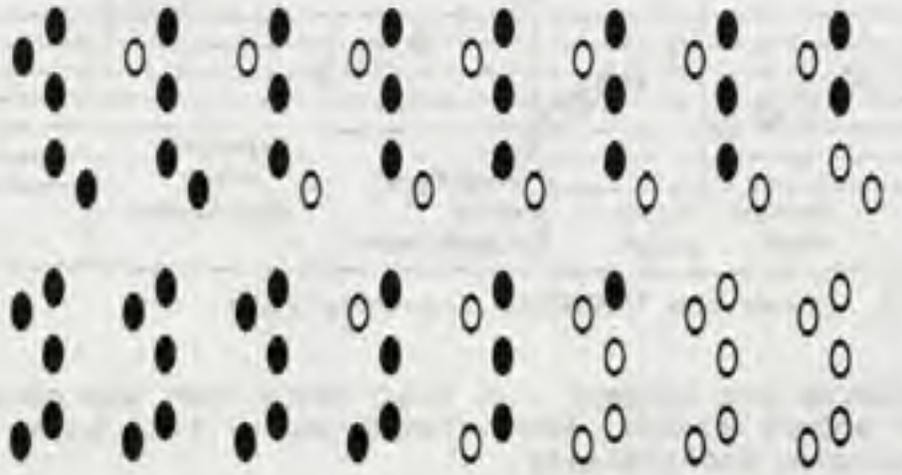
Praetorius' Keyless Curtals

The illustration in Syntagma Musicum II (De Organographia) shows that all seven curtals are, at first glance, left-handed i.e. mirror versions of what we regard as normal who play woodwinds with left hand above right (see figure 1). As with most other 16th and 17th century designs playing either way is catered for by means of the double touch key for the little finger of the lower hand. When playing a left-handed curtal right-handedly, the left hand cradles the downbore, the ascending bore being uppermost. This does not affect the lower hand much. (An advantage might be that there will be no tendency for moisture to get into the top two tone holes.)

However, the bodies of the two smallest sizes the Alt and Discant have the same disposition, but **must** be held with the left hand above the right, since fingerhole 7 is offset, and may be safely assumed to enter the upbore (figure 2). Also the left-hand little finger is employed to control hole 9 (this is done by the right thumb on keyed curtals). This is less easily achieved than with hole 7 as it has to pass through more wall to be offset enough for comfort, and also is brought further away from the reed. All this requires this hole to be enlarged to be in tune, but not so much as to make it difficult to cover with the little finger. However the problem is alleviated as the note this hole gives is a semitone lower than the note given by hole 9 on normal curtals.

Praetorius gives the notes that come from some of the tone holes and bell; six for the Alt and eight for the Diskant. I have drawn up a chart showing these fingerings, which Praetorius seems to have believed, quite rightly, to be the most interesting. Again, referring to figure 2 it will be noticed that hole 1 is missing on the Alt, and a dotted line from $\bar{d}$ goes to the probable position of hole 4 which is also missing. Figure 3 shows the drawing with these holes added, so that it resembles the Discant (but differing in respect of the up-bore semitone). Note also that some notes given are too high, e.g. $\bar{b}$ should be $\bar{b}$ (N.B. b in Praetorius, as in Germany today, is always B♭, b♮ being referred to as h).

Praetorius' Fingerings (his notes in brackets)



Diskant	a (a)	b♭ (b)	c′ (c)	d′ (d)	e′ (e)	g′ (g)	a′ (ā)	b♭′ ($\bar{b}$)
Alt	d (d)	e (e)	f (f)	g (g)	a (ā)		d′ ($\bar{d}$)	

The only surviving keyless curtal is the one at Augsburg (3017) but this is rather different, having only 9 tone holes (see Comm.[224]). The three extant descants at Brussels, New York and Avila are keyed in the manner of larger curtals, as is the g treble and f alto in Brussels and the alto in Berlin. It is probable that the keyed descants are, although at different pitches, nominally in b♭ , with lowest note f. [Incidentally, I am adopting what has become the convention for cornetts, viz. instruments with seven holes closed giving g are trebles, those a tone lower being altos. Otherwise underlined terms, vice italics, are Praetorius' nomenclature.]

Praetorius' drawings all have a scale of Brunswick feet and inches, and in general most instruments seem to be the correct size. However the two keyless curtals are rather too large for their given pitch. There is clearly a problem here. Was Praetorius theorizing, and why did he leave the Discant out of the tabella of Sorts, and only give one upbore note for Sort 5? (see figure 4) I have never heard of any attempts at making a Praetorius high pitch d' descant, but Eric Moulder makes them in modern c', a minor third lower. I have made some too, but at a time when I mistrusted Praetorius enough to build them the 'wrong' way round, requiring hole 7 to struggle past the down bore and enter the upbore. Eric and I both agree that the treble in g can just be achieved, but is better at high pitch. Eric's descants give b♭ with the fingering 12345678, corresponding to the wholetone drop in Praetorius' instruments.

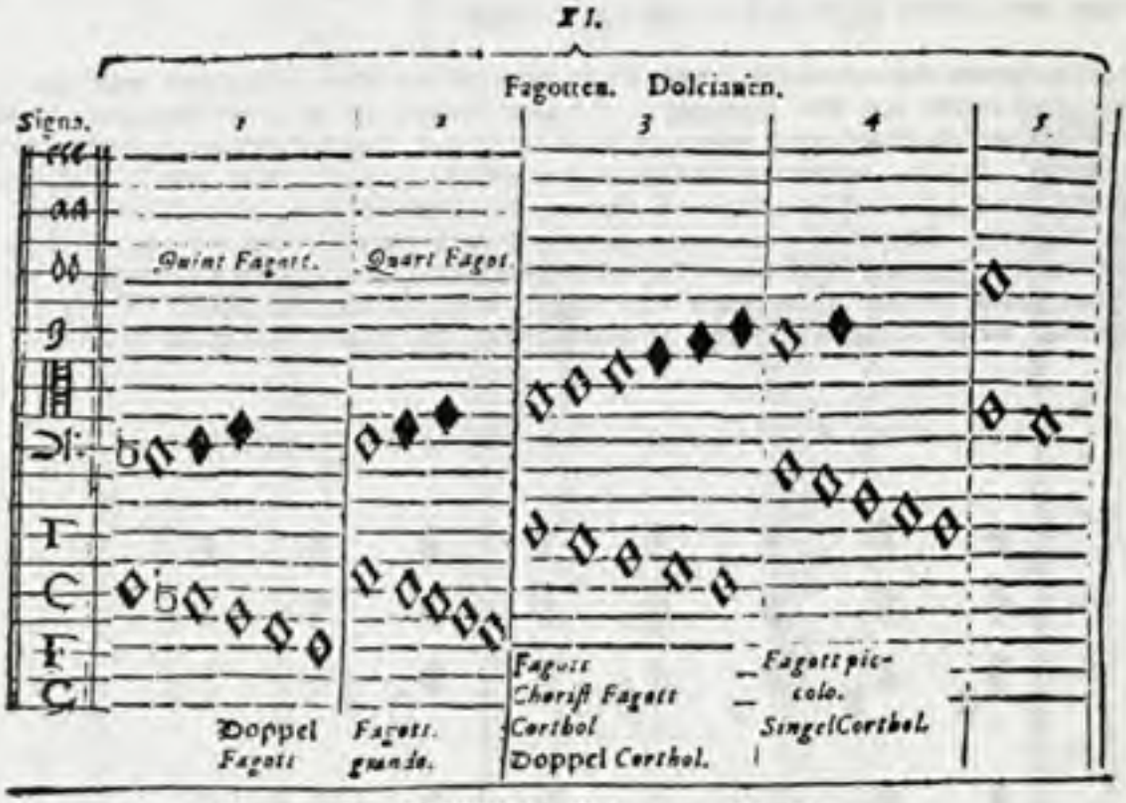


Figure 4. (from the "TABELLA Universalis")

The black notes are falsett i.e. high notes that are obtainable beyond the normal range. Low notes given by tone holes in the upbore are shown individually.

What then were these little curtals used for and how widespread were they ? Syntagma Musicum III deals only with orchestrating with the larger sizes. Other references to small curtals specify mostly altos; "octave fagott", etc. The tonality of the descant being the same as the treble shawm (Schalmei) probably means it too was used at shawm pitch, a fifth higher, reading as if it were in g, thus providing the player with a quieter alternative. For instance, in 1645 the Chapel Royal in Madrid was looking for "dos contraltos de chirimías" aptos para tocar el bajoncito" (two alto shawm players able to play the small curtal). This requirement disappointingly did not apply to the treble shawm players.(1) At about the same time, in Coimbra, Portugal, Pedro de Esperança wrote four Christmas responsories with a part for fagotillo, with the range c' to f''.(2) I suspect that in hundreds of cathedral and monastery libraries there must be many more similar pieces requiring high curtals.

Inventories are helpful too; for instance in 1577 Archduke Karl of Steiermark's collection in Graz included "Ain copia dolzani, darunder ain basz, zwen tenor und ain discänt1" (a box of dolzani, including a bass, two tenors and a little descant). (3) Descants occur in other inventories including one in the Württemberg Hofkapelle in 1590: "1 Vagot, so Discant ist" (1 Vagot which is a descant). (4) Even so we have to remember that in general, discant is translated as "treble", and does not always apply to what Praetorius, and we nowadays, call a descant, thus, St Wenzel's church, Naumburg included "2 Discant-Dulcian", and it is certain that the surviving alto in Berlin is one of these.

To summarize, I hope in this Comm. and Comm.1224 to have restored belief in both Praetorius' descriptions, and the Augsburg treble, and suggest that this actual instrument (or another of the same type) was the source of the treatment of the Alt in 'Syntagma Musicum', the Sciagraph and in the Tabella.

References

1 J. Subirá, 'Historia de la Música Española Hispano-america' (1953)
2 R. Stevenson, 'Christmas Music from Baroque Mexico' (California 1974)
3 J. Schlosser, 'Die Sammlung alter Musikinstrumente' (Vienna 1920)
4 G Bossert, 'Die Hofkapelle unter Eberhard II (1628-1657), in: WVfL, Neue Folge XXI (1912)

Graham Lyndon-Jones

A Wizard Lizard

(with a footnote on half-tone blocks for 11p)

Munich has two important collections of musical instruments; at the Deutches Museum, and at the Stadtmuseum. This latter houses everthing formerly in store at the Landesmuseum. The most remarkable instrument I saw on a recent visit was a 5-keyed cornett. It is on loan and it is not known how long it will be there. A replica has been commissioned.

The accompanying drawings and photographs will do most of the description. The animal's head is well modelled, and not at all like the simple snake heads that other cornetts have[1](e.g. Paris 0087, and E 581)[2]. Dentition is still perfect, but the tongue is missing: there is the vestige of a support for this on the lower jaw. The leather covering is beautifully done, and it is difficult to locate the join. The octagonal form continues into the carved head, which has large, but shallowly carved, 'scales' with leaf-like veining. The leather is so fine that these features show through to good effect.

Fig 1

Only the front keys survive, and indicate a right hand below left hold. The large extent of the instrument beyond the right hand must have necessitated a support of some kind. A protuberance under the head may be to do with this. The keys are black and corroded, perhaps steel. There are no obvious signs of keycovers having been present. An X-ray is available for study, and shows that the top end is a replacement. (The X-ray does not show the spur between the two sides of the f key, and I can think of no explanation for this.) Woodworm has attacked this as much as anywhere, so the repair was early. However, the form of construction and bore are rather unusual. In my view, the shape looks wrong. The sinuosity might have continued to nearer the mouthpiece (Figure 6). The X-ray shows a number of hard rings in the bore which at the top is cylindrical to start with. It then flares a little, but there is a step up where it joins the original body of the instrument (Figure 4).

The main points of interest are first, the pitch, and second, how did the missing keys work? Measurements and comparison with other cornetts indicate that this is an alto, i.e. closing the top key gives f, at or a little above 440. If the lower keys give diatonic downward extension, this would give a lowest note of B♭. The overall length of the instrument is however a bit short for this. The missing back keywork can be largely conjectured from the front keys. Pivots are in lugs set into the wood. Elongated perforations in the leather make it is easy to see where the missing pivot points are:

Fig 2
X-ray from above

Fig 3 Front keys

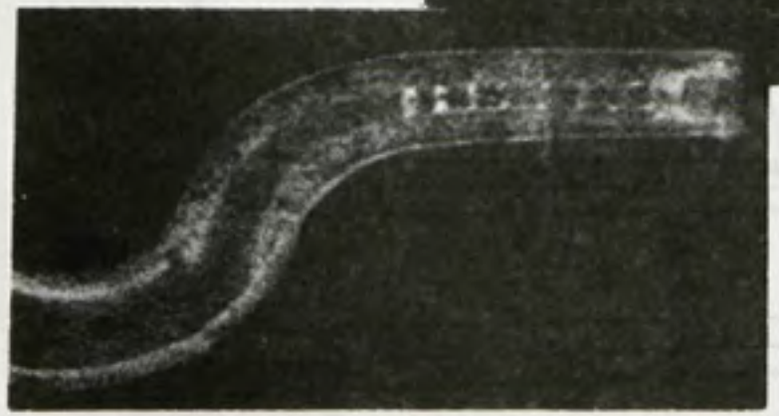


Fig 4 Detail of X-ray showing later top end with discontinuity of bore

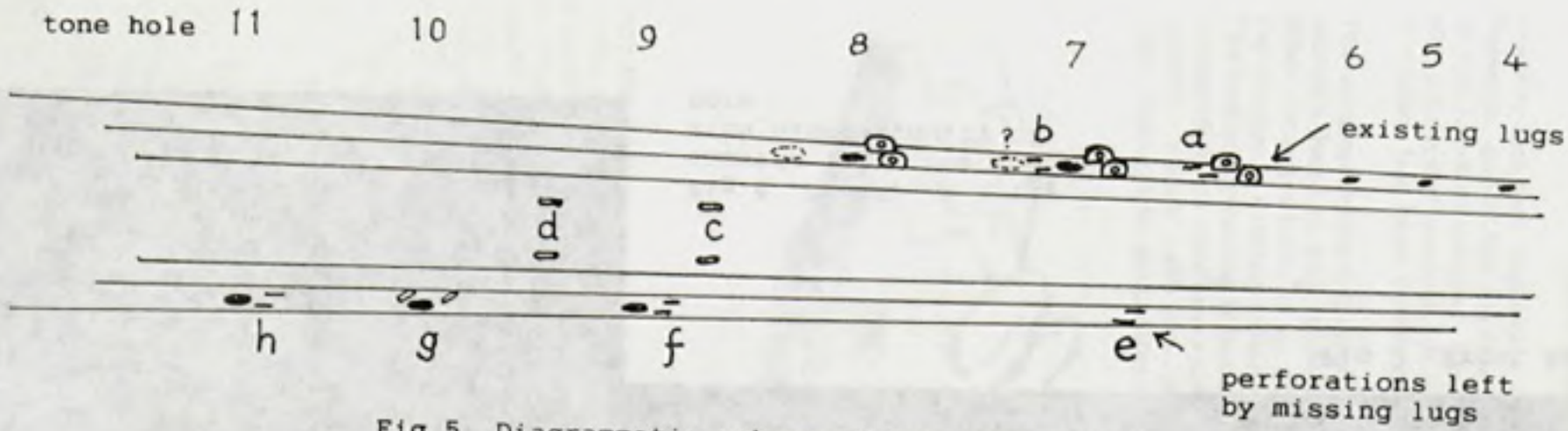


Fig 5 Diagrammatic scheme of key-work pivots

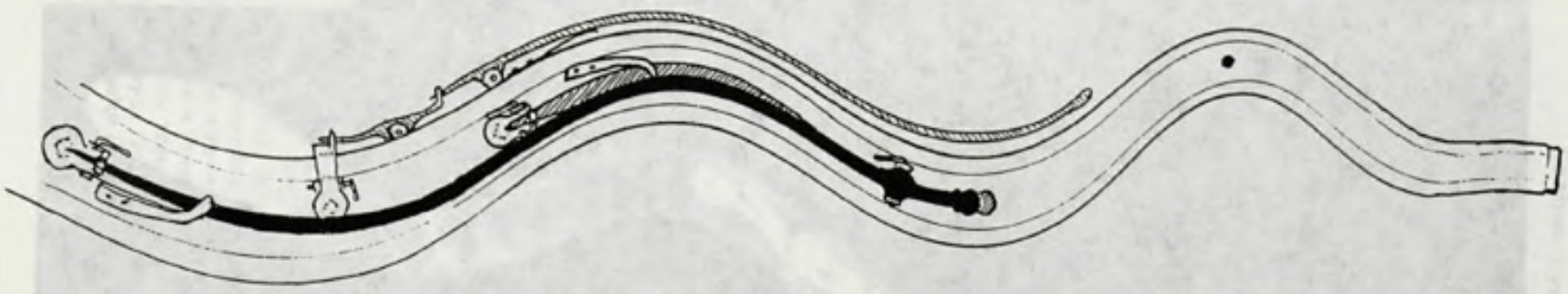


Fig 6 Conjectural (i) arrangement of back keys and side key
(ii) shape of upper end

a	Just south of key-touch pivot of 7
b	Just south of hole 7, offset to the right
c	On the left hand side
d	ditto, but 90mm further south
e	On the back, north of hole 7
f	Just above hole 9
g	Just beside hole 10
h	Just above hole 11

Clearly e f and h represent the two keys for the lower thumb. This leaves c d and g for hole 10 and a and b for something else! These latter might well be earlier positions for the front key system. In fact the X-ray shows what looks like a filled hole about 45 mm below hole 8, offset to the left, and there is probably another just below hole 7 (pivot point b). Of course, pivots a and b must have been in use after the leather was put on. There are however no lug marks for the lower filled hole, so the maker must have decided to change things after finding hole 7 unsatisfactory. Hole 10 is close to lug slots g which are placed **beside** the hole. Two more sets of lugs, c and d, were placed on the side of the instrument further up, and so cannot have been anything to do with the front or back keys. This hole then was controlled using **three** pivots, so that depressing the touch **lifted** the pad (figure 7). Closed keys are typified by the baroque flute in the 1660s, but operated here by the little finger of the upper hand. Another feature supporting this possibility is the piece of spring still remaining so as to lift the underside of a key. Also the little finger could not press easily on such a long lever so as to close the tone hole reliably, but opening it would be more practicable. The placement of holes favours a semitone below hole 9. Thus the closed key would be an e♭ key (or b♭ when transposing up a 5th).

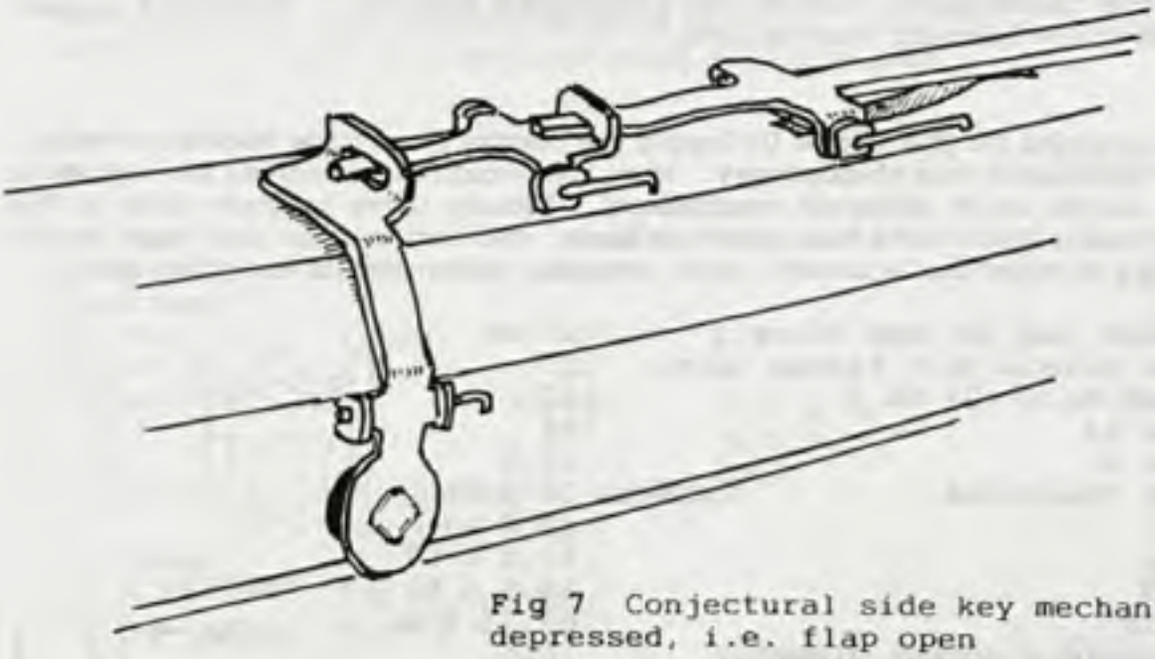


Fig 7 Conjectural side key mechanism depressed, i.e. flap open

This design has much in common with the bassett shawms, particularly the extended Altpommer in Berlin, but anticipates the baroque practice of a closed key and the even later one of a clarinet-like long lever for the left little finger. The bass cornett Paris E 572 has four keys for downward extension, and the mechanism has even more curvature.[3]

Fig 8 f key flap

The surviving front key system is well made. The pads are made of several layers of leather sewn right through onto the four holes in the flap, which fit inside the hole, so that the thread doesn't interfere with the seating. (This type of flap is found for the back key on curtals, which covers a smaller hole, so the last layer of leather would have had to be glued on). The tongue of each touch piece penetrates the hole in the flap, stopping it opening too far. The instrument has two raised motifs, a shield and a horseshoe (figure 9). The latter appears on one other cornett, Verona 13290.[1]

I am grateful for the help of Dr Joppig the curator, and Holle Rohlfs who helped with measuring and photography. More time would have enabled me to do more and maybe reach different conclusions. Clearly there is much more to this instrument than I have been able to indicate, and I am only too glad that I am not having to make the facsimile! Some specimen measurements are given below:

Length (as the bee flies!)		1120 mm
from hole 1 to 6 (along axis)		225
thumb hole (0) to 9		523
9 to 11		181
3 to 4		62.5
Body thickness	lateral	38 X 34
at 4		49 X 43
at 8		61.5 X 57
at 9		63.5 X 61
at 10		64.75 X 61
Mouthpiece socket diameter		18.5
Depth (slightly conical)		15.4
Bore diameter at top		c.6

Fig 9

References; 1 Basler Jahrbuch für Historische Musikpraxis Vol V 1981 p 243
2 Der Zink, F.R.Overton. Schott 1981
3 European and American Musical Instruments, A. Baines. Schott 1966

Footnote: **Half-tone Printing for FoMRHI Comms.**

There is now a (digital) photocopier, the Kodak 1580, which converts glossy photos into dots, just as when a screen is used to make a printing block. Enlargement or reduction is possible at the same time. This function is called 'photo-screen'. 'Photo Text' mode is used where black text and half-tone originals are to be treated together. A menu screen offers (i) 'Snapshot Glossy', about 110 lines /in, and (ii) 'Magazine', 133 lines. The coarser option is best where further size reduction is to be done, as is the case with the Q. Retouching is then easy on normal paper. Photos, colour or b & w, should have a well-spread tonal range. Intensity is variable as for ordinary photocopies, so I get two or more and choose the best. The three pictures in the Antwerp Comm. in the October issue were done this way, as were the X-ray and keywork pictures above. Finding out about the 1580 saved me a lot of time, and there are occasions where a photo is better than a drawing. Some of the 'Kall-Kwik' chain of copy shops have these machines. The one in St.Albans charges the same as for an A4 photocopy, 11 pence. There may be other machines with this facility, but if members find difficulty I don't mind getting pictures converted, as we live very near to one of these gadgets. Photographs would certainly liven up the pages of FoMRHI Q and at the same time speed up the preparation of members' comms.

Comm. 1222 Graham Lyndon-Jones

Checklist of some of the Woodwinds at the Stadtmuseum, Munich

This list was made in March 1993, looking at the cases, referring only to the display labels. No catalogue is available, and there may not be one for some time. Some items have been in this museum for some time, while others, bearing 'Mu' numbers were formerly at the Bayerisches Nationalmuseum.

			No. of keys	
OBOES				
W Kress			3	Mu 145
W Kress			3	Mu 146
Engelhard			2	Mu 140
Scherer	Ivory		2	
Tauber			2	
? (late 18th C.)	Marks:	top joint mid joint bell	2	9.685
Grundmann	Dated 1792 Two top joints		2	
Grundmann			2	Mu 133
F G A Kirst	Top joint only			
F G A Kirst	With 3 top joints		3 incl. C# between C and Eb keys	
OBOES D'AMORE				
W Kress	Later keys added		3+	92-54
Dotzell			3	Mu 139

TENOR OBOES

L. Lindner	Bulb bell	3	Mu 148
L. Lindner	Flared bell	3	Mu 143*
L. Lindner	Top joint only		NN 2553
	? possible c.d.r. for Mu 148		

'MUSETTENBASS'

I. IR		5	Mu 122

(similar to no. 541 in A. Baines' 'European and American Musical Instruments')

BASSOONS

German c1780	Brass crown on bell, wooden pillars	5	
? late 18th century		4 short G# key	4039
? mid 18th century		4	40383
C A Grenser		4	loan
German 1st half 18th century		4 short G# key	40286
? early 18th century	later bell joint	3	63-26
J W Kenigsperger	1st half 18th century bulbous bell top	3+ later low-position G# key	

Illustrated in 'Look of Music' Philip Young (no. 103)

TENOR BASSOONS (quint fagott)

Kraus		3 down to G	Mu 121
Kraus		4 down to F	Mu 120

CONTRABASSOON

H Mayer c.1830	Top boot later	6 down to C	40-469

BASSET HORNS

F Otto	in F		Mu 116
W Hess	in F		Mu 124
German	Ball-shaped bell ?F		2295
A & M Mayrhofer	Curled foot in Bb (?= Basset clarinet)		52-50
J G Eisenmenger	Square form in D		Mu 128

(There's a drawing of this in 'Das Bassetthorn' J. Saam (1971); photo of instrument in an article by R. Maunder GSJ XXXVII)

G. Glezl	in F		Mu 111

(Illustrated in 'European and American Musical Instruments' Anthony Baines, no. 645)

* Given as Mu 142 in (old) Langwill Index

 Ephraim Segerman

On the Difference between Early and Modern Baroque Reeds

At the London Exhibition I asked a maker and an historically-minded player what they thought were the differences between original baroque reeds and the reeds modern baroque players use. They did not seem to want to get into any controversies, so I will not identify them. Yet they did not indicate that what they told me was particularly private, so I feel free to mention and elaborate on it. The maker suggested that the baroque bassoon was a reed with a tube attached, while the modern bassoon, and what the modern players of baroque bassoons want to play on, is a tube with a reed attached. I understand this to mean that in the baroque, the reed controlled the pitch more than the tube, while nowadays the tube controls the pitch more than the reed.

The historically-minded player said essentially the same thing: The modern reed is less responsive to the lips and more responsive to the tube than the old reed. He also said that pictures of early bassoonists show much more strain in the face of the player than we see today. So if the fingering is right and the instrument well tuned, it is easier to play in tune with the modern reed than with an old reed. But if one wanted to use the lips to sound the instrument at a pitch different from the pitch that the fingered tube resonates best at, the old reed will do this more readily than the modern one. The sound produced when using a reed this way would be softer than it would be if the pitch was the same as the tube's most resonant pitch.

In the modern style of playing, the modern reed is clearly preferable because 'standards' require very high agility while keeping spot-on intonation, which is easier with fingers than lips. The question must be asked of why the old read was what it was. We cannot say that the old players were in any way inferior to modern ones. They would quickly have discovered how to cut modern-style reeds if they would have preferred them. People won't work harder than they have to, so there must have been an advantage to them of playing on the reeds that they did play on. What could that advantage have been?

One possibility is that the players often had to play at somewhat different circumstances (such as pitch standards), and they used their lips to perform the same job as the interchangeable joints on the flute (but when the interval between joints was about a tone, the reed player more probably transposed). Another possibility is that some characteristic of notes lipped to the same pitch from different fingerings was different and interesting enough that being able to choose between them was a valued aspect of interpretations. The final possibility that I can think of is that baroque singing styles involved some smooth sliding between notes, and that all instruments that possibly could do the same would do so.

My guess is that all three possibilities have a part to play. There could easily be more. I would appreciate some discussion of this issue by the many people who know a lot more about reed instruments and reeds than I do, and are interested in what baroque music really sounded like.

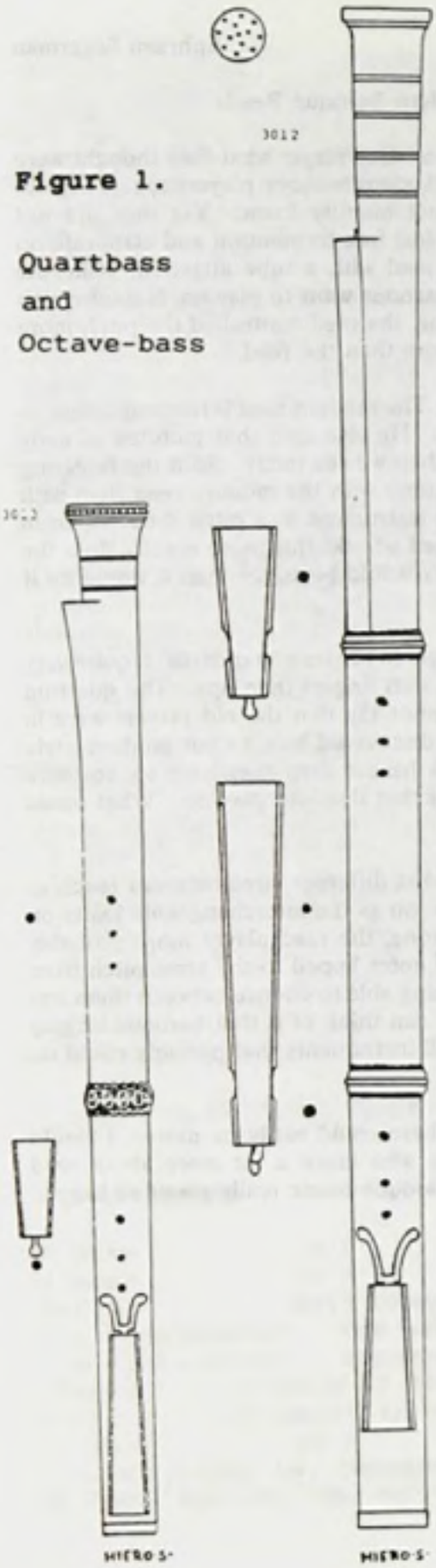


Figure 1.

Quartbass and Octave-bass

Figure 2. Detail of bell and shoulder surface

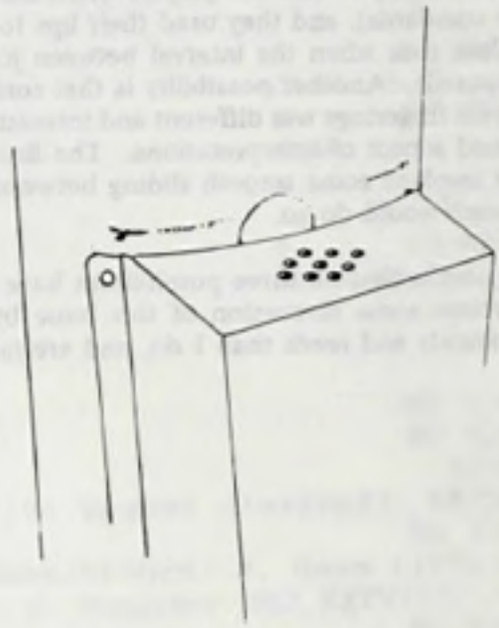


Figure 3. Upper end of lower back key cover

FoMRHI
Comm. 1224

Augsburg Revisited Graham Lyndon-Jones

In 1977 I visited the Maximilian-Museum in order to see the collection of musical instruments and in particular to study the curtals. These are illustrated in Grove and comprise Treble, Tenor, 2 Basses, Quartbass and Octavebass. Of course, fifteen years is a long time in Early Music research, but it was salutory to see this year (a) what I had missed and (b) what wrong conclusions I reached after my first visit. This is particularly so with reference to the smallest and largest of the instruments. The problems posed by these is dealt with below.

It is reasonably assumed that the collection is a surviving remnant of the much larger instrumentarium owned by the Fugger family. For instance Raymond Fugger had 227 wind instruments at the time of his death in 1566, when an inventory included the following entries: 12. Further, 10 Fagotti and 2 cornetts with them, in a case covered with black leather. 13. Eight Schallmeien, and 1 Fagotti, each in its own case. 21. Two Fagotti belonging to the 10 above, each in a cloth bag.

However, the entire collection went to the Count Palatine in Heidelberg in 1622, and we do not know what became of it. Perhaps a few instruments possessed a homing instinct, or the present Augsburg collection is a remnant of some items that never went to Heidelberg.

The Fuggers were well-known in musical circles. It is surprising then that Praetorius never heard about the octave-bass if it predated 'Syntagma Musicum'. He says that Hanss Schreiber was building one. This may be because of the fact that the Fuggers apart from several residences in Augsburg, had establishments in other cities where they had warehouses for their trading in various commodities. Thus we cannot be certain where individual instruments were at any one time. Even so, knowledge of the existence of an Octobass would have filtered through to Michael Praetorius. There remains the possibility that some HIERO.S. instruments may be later than 1619.

A combination of factors could be considered. The instrument shows signs of much alteration, probably by the maker himself, who no doubt was dealing with a prototype. It may have been delivered and then returned, or had modificiations carried out 'in the home'. This might have kept mention of the instrument both out of the Fugger inventories and general musical gossip.

The Octave-bass Curtal (3012)

On first seeing the instrument in 1977 Barbara Stanley and I measured as much as was permitted, and the next day visited Rainer Weber who had restored all the instruments by then and made copies stretched to A=440 Hz. He made us very welcome and showed us how much restoration had been done. (He said that the gedackt feature was original - a perforated brass disc with a toothed edge fixed into the bell - and acoustically necessary and not solely for the low C.)

The instrument is in three sections, so the maker may have had the option of shortening these at the tenons when first trying it out. The upper section is itself jointed, the down- and up-bores being bored out of different pieces of timber. A fragment of ornamental carving remains near the crook socket, which must have encircled the bell (figure 2). For some reason the up-bore was unsatisfactory, and was sliced off, retaining the down-bore. The replacement bell is slightly out of style with the quartbass. One might imagine the original to have had carving applied not only at the shoulder but round the rim. Other curtals by HIERO.S. having this are Augsburg 3013 and Vienna C199, but C198 has no carving. The only other odd thing we noticed at that time was that the back keycover extended way beyond the location of tone hole 9 (see figure 1).

We were sure about this as the flap can be seen through the lateral sound holes. The key covers are modern. As it is usually possible to see where missing keycovers used to be, we assumed that these were the correct length, but neither then nor this year was I permitted to have the keycover removed. Also, all three keycovers are wider and higher than is necessary to cover the keywork.

This time though, a closer inspection revealed that there is a mark left by an earlier keycover, just north of the modern one. This dark line just intersects a plugged hole, half of which is outside the end of the key cover (figure 3). This I failed to see on my first visit. Clearly a tone hole, c.13 mm diameter had been there, and found to have been problematical, neatly plugged and the keywork removed, obviously leaving unsightly impressions and holes. The new hole was put further down the instrument, and the keycover was shortened a little to (almost) conceal the plugged hole and all the other blemishes.

Furthermore, it is noticeable that the up-bore toneholes are all further from the butt than is the case with the quartbass (or any other curtal, including the contras at Dresden and Sondershausen) to the extent that hole 7 is about 145mm from the butt, so that the key and its cover are very much shorter even than that on the quartbass. Likewise holes 8, 9 and 10 are all displaced upwards, requiring keys. Both the earlier and existing locations for hole 9 are even further north. All known curtals with a back key (except Vienna 201) have a very short key action, this being sometimes above, sometimes below the thumbhole, because the notes from these holes are only a semitone apart, F and E on a bass. On the octobass, however, this distance is nearly three times greater, instead of being just double, and the original plugged hole over four times the equivalent distance on a bass. Thus it can only have emitted Eb. In this latter instance the distance between 9 (now plugged) and 10 would now be a bit small, so it is possible that 10 was further up too, and the C from the bell was unacceptably sharp. Four cures may all have been employed:

(i) the bell lengthened
(ii) its flare reduced
(iii) the bore from the knee to the join less conical, and
(iv) a perforated cover fitted.

Low D was perhaps found to be too flat, and hole 10 brought down (on the replacement upbore section) as hole 9 had been. How then was the note E obtained? It is possible that the right thumb keys could allow the closing of 9 while leaving 8 open as if it (8) were a hole. Then the fork-fingering should give a reasonable E. Of course if I am wrong and hole 9 emits E, then Eb is unobtainable, because all the back holes have keys.

There is also a remote possibility that all three holes were used, either all closed in succession by the lower thumb to obtain E, Eb and D or, as with the Munich cornett (see separate Comm.), the Eb key might have been a closed key: it would be very nice to see under the key cover! Perhaps next year?

The main reason for my recent visit had nothing to do with the above. It was the result of an article about octave-bass curtals in Oboe Klarinett Fagott by Rainer Weber, in which he states that a longitudinal join exists also in the middle section, between the upper and lower knees.

I couldn't believe I had missed this important feature first time round, so I asked an experienced German acquaintance who was going to Augsburg to have a look. He was as puzzled as I was, reporting that he could see no join. So I just had to go and see for myself. On my recent visit, a friend, the curator, the craftsman on the museum staff and myself all had to agree that the middle part is in one piece. Since then Rainer Weber has contacted me (via another bilingual intermediary) to say that he made a mistake. The restoration work was done way

back in 1968. X-ray pictures showed that HIERO.S had problems with the alignment of the bores when fitting the sections together. Having a 'split' middle section made this easy to control. He therefore adopted this method of construction for subsequent octave-basses. The three tone holes pass through the glued junction, but the two halves are taken from the same piece of timber, to hide the join as much as possible.

The Treble Curtal (3017)

Having studied the small curtals in Brussels, and Praetorius' depictions of the keyless variety, but with no prior information as to what to expect, I was very surprised on my first acquaintance with it in 1977. The first impression was that a small curtal had been cut off just below hole 6, leaving no tone hole for the righthand little finger (figure 4). A tone hole is placed laterally in the up-bore, about level with hole 4. Two thumbholes on the back were normal, but I couldn't see how the side hole between them could be closed, so the instrument could go no lower than the note obtained by closing hole 7 with the right thumb. It was clear that the instrument had not been shortened, as there was no sudden increase in bore at the butt; the curtal is very thin-walled here, (figure 5) and there is a neat brass (original?) butt cap.

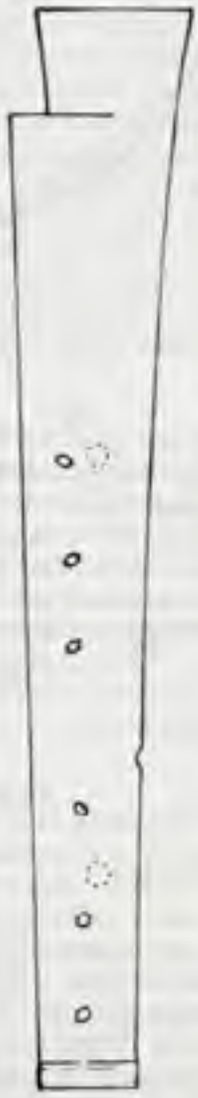


Figure 4.

Figure 5.

Nothing has happened to it in the intervening years, but things have happened to me, including some dabbling with racketts, kortholts and sorduns. My friend Harald Schäfer had the idea that holding the instrument with the right hand above left might be possible. We tried this, and the impossible side hole now lay conveniently under the first joint of the index finger. We were permitted to play the instrument briefly, and a reasonable scale was obtained. Assuming 123 456 gives a, the notes below being g closing the left (lower) thumb hole, by closing the side hole, and something between e and e♭ on closing the right thumb hole. We had no means of pitch measurement, but the comparisons with Brussels and Berlin indicate a probable pitch of 460 Hz. The next step is to make a ruthlessly authentic copy, with no false assumptions, for further experiment.

Such an instrument, while differing radically from all other known curtals, is certainly satisfactory, and would be easy for a musician who was accustomed to playing lefthandedly on a flute or cornett.

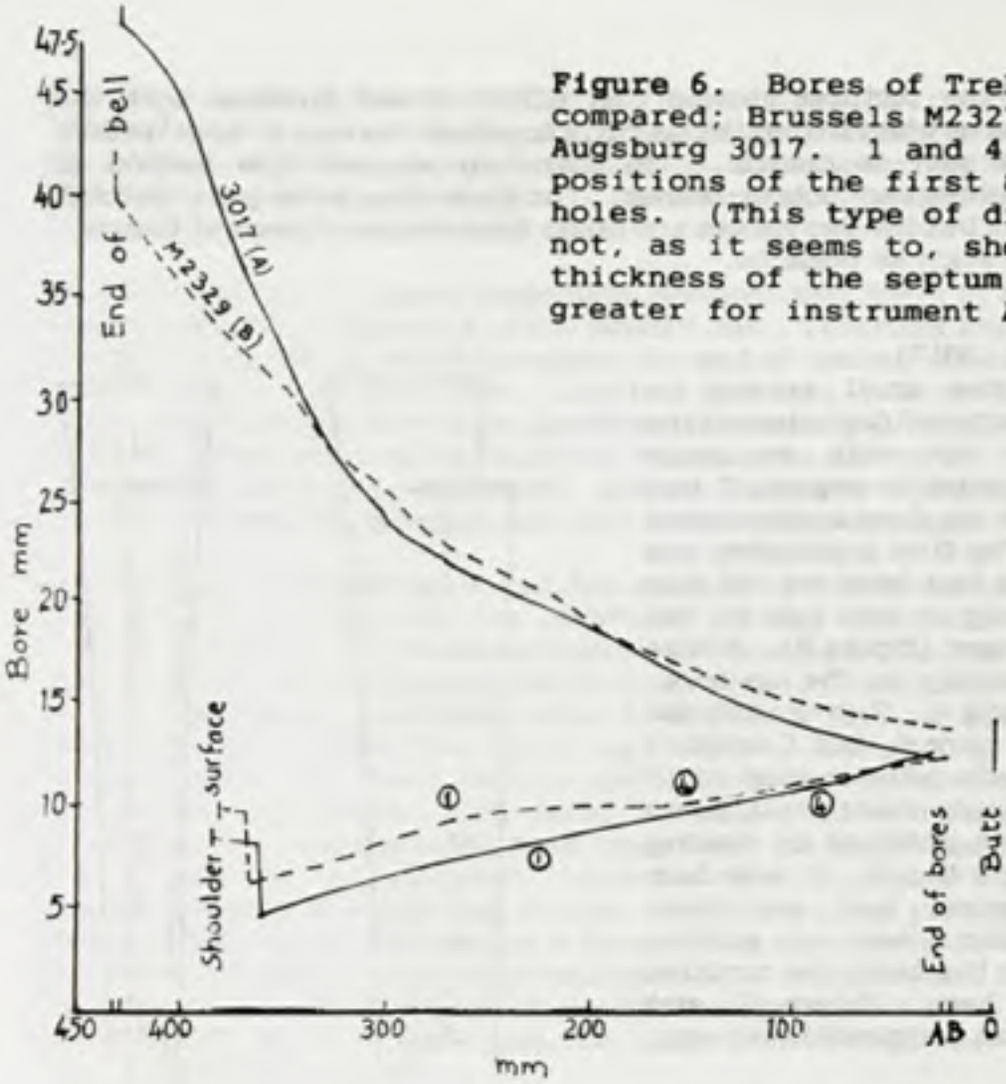
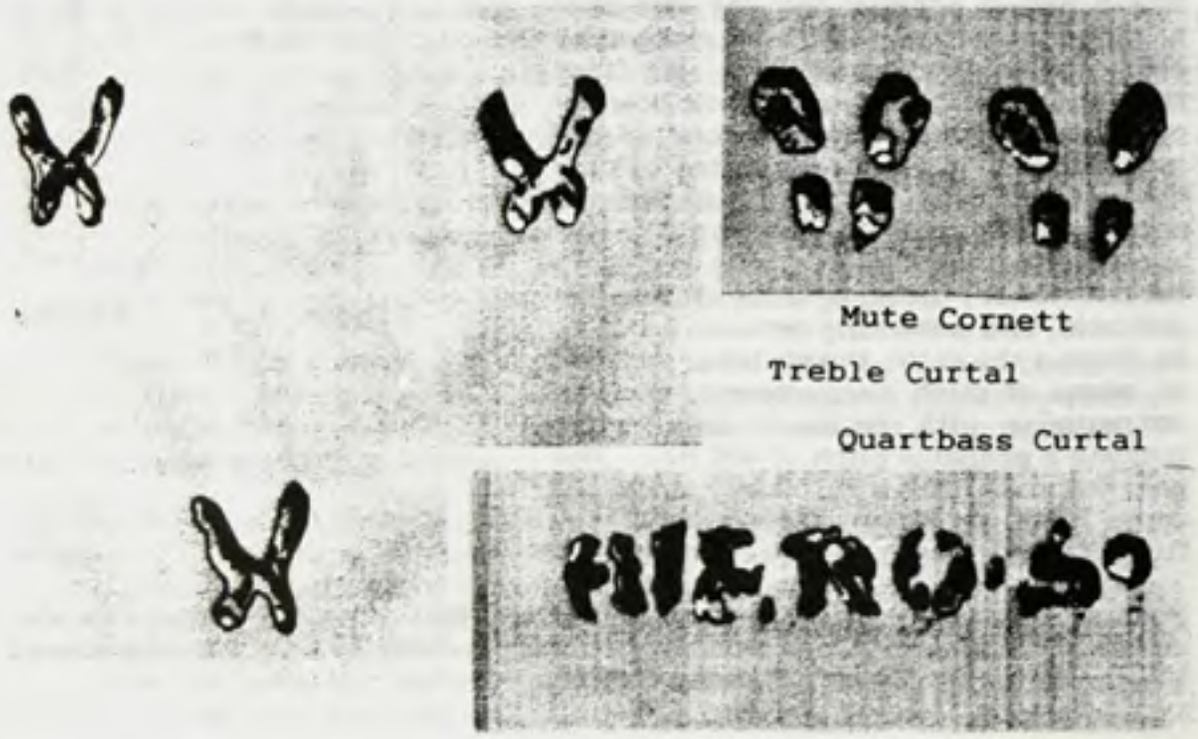


Figure 6. Bores of Treble Curtals compared; Brussels M2327 and Augsburg 3017. 1 and 4 are the positions of the first & fourth tone holes. (This type of diagram does not, as it seems to, show the thickness of the septum, which is greater for instrument A than B.)

Figure 7. Brand markings



The other noteworthy feature is the bore, which starts very narrow and ends very wide. (see figure 6). Such an acoustic would provide a bright and strong sound, able to hold a cantus against a battery of deeper reeds. All this provokes further thoughts.

Is it possible that such an instrument was sufficiently distinct from other curtals to warrant its being given a distinctive name? Furthermore, could it be a survival of some form of proto-curtal? For some time now, I've held the view that the curtal represents the answer to the problem of reaching tonehole 7. An instrument with a U-bend would be easier to construct if the lower little finger were made redundant, and the lower thumb were used to play the ut of the instrument's natural scale. Since it would be odd to saw off the instrument half way up on the back, an extended bell section could then be carried up to the top, with tone/tuning holes as for the treble shawm (Schalmei) or placed so as to enable the higher thumb to be used and possibly also the little finger, as in Praetorius, or the first finger joint, as in Augsburg. Instruments employing this simple device might have been referred to by names such as the mysterious douçaine, which whenever they are mentioned are never referred to as being tenor, treble etc. Also, such a configuration might have been used for bagpipe chanters.

It is likely that some such primordial curtal will have had the fingerholes placed frontally, with the ascending bore toneholes behind - indeed this idea lives on in later illustrations, possibly in error, such as in Mersenne's Fagot drawings. Such an arrangement occurs in Praetorius' Sorduns and Kortholt whose bodies are cylindrical. The oval section and lateral placing of tone holes would have followed with a number of practical advantages. Because the toneholes now have to pass through more wood, obliquely bored toneholes are possible. This would enable larger sizes of the instrument to be made. By then, any unwillingness to fit keywork would be scarcely a memory, so that placing the U-bend a long way down from hole 6 would enhance the lower extension of the instrument's range, e.g. down to 'CC' on a bass in F.

Now just suppose that Praetorius or his informant had seen the Augsburg treble, He or she might have made a drawing, or just described it as being a fagott with only 6 holes in front and two behind, with one side hole. When the engraving was eventually made, it would be reasonable to displace holes 3 and 6 sideways. The side hole could be conveniently forgotten, and the 6 emanating notes put on in an attempt at conformity with the descant (which latter may have been a perfectly accurate record of another instrument, perhaps belonging to the same establishment). In the absence of any keyed alto or treble, this would satisfy his requirement for the next voice above the Fagott piccolo size. This is corroborated by the tabella giving the expected upper limit of c'' going down to g given as a separate note to the right, implying (as we have seen in Comm.) an up-bore note. Further, it is very noticeable in Praetorius' drawing that the crook on the Alt is much shorter than that for the Discant. Also he fails to give the instrument a name. Apparently then, as with myself in 1977, no feasible way of closing hole 8 was envisaged. Could this be yet another instance of an early writer being considered wrong just because he then and we now tend to simplify and compartmentalize too much, or in other words see only what we expect to see? In so doing we can easily miss important alternative possibilities.

Finally, the maker's marks on the Augsburg treble and tenor are unlike the marks sometimes referred to as 'rabbit's foot'. My drawings are accurately made from good macro-photographs. It would be convenient if the rabbit's foot could be proved to be associated in some way with HIERO.S., but to the best of my knowledge there's nothing yet known about the pattern of Xs on these two instruments. It is worth saying at this point that the museum staff were

extremely helpful, getting the instruments out and on to a long cloth-covered table, for ease of examination in good light, and allowed me to take photos to augment those I already have from my earlier visit. These curtals, with all the other instruments, are well displayed and there is a tape of many of them being played, so important in bringing a static display to life, since it is impossible for anyone to imagine a sound by merely looking at a group of unfamiliar instruments.

References

R. Weber "Kontrabaß-Dulciane, die Vorläufer des Kontrafagottes", in: Oboe - Klarinette - Fagott, 1991, Heft 2

R. Schaal "Die Musikinstrumenten-Sammlung von Raimund Fugger d.J.", in: AfMw, XXI 1964, p. 212

For more about the !! marks, see GSJ March 1993; D. Lasocki "The Bassanos' Makers' Mark Revisited"

FoMRHI Comm 1225

Barry Jefferies

C.N.C REAMER EXPERIMENT

JULY 1992

Introduction:

Following criticism of relevance regarding my previous writings on C.N.C I here produce an example of relevant usage regarding the production of a Reamer for flute bore profiling.

Experiment:

The idea of this experiment is to produce a taped bore profiling reamer in lesser time to the same accuracy as would be achieved manually using a centre lathe but by using a CNC lathe.

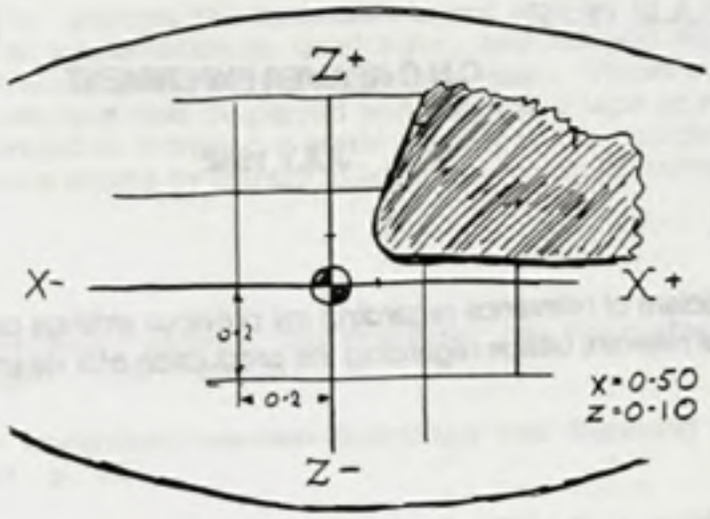
Equipment:

The lathe available for the experiment was an Anilam Crusader II controlled Bedford Lathe from c1977, this being essentially a centre lathe with motors and counters fitted rather like the Myford retrofit comm 1141 but to industrial proportions and with the addition of Gothic Arch circulating ball screws in order to remove the necessity to programme back-lash compensations and improve accuracy.

The control was linked to an IBM 486 compatible computer which enabled the programme to be viewed on a monitor which was not possible with the existing control.

Tooling available was conventional ground steel tooling in universal holders set using a shadow graph c1977.

This device enables the tools to be set at a precise angle and distance from the tool holder which maximises the cutting efficiency, and means a datum can be set such that one can change bilet and be the same distance from the centre.



Procedure:

The data is taken and entered into the computer, by one of the following means

i) Direct entry into the machines control console, known as MDI (manual data input)

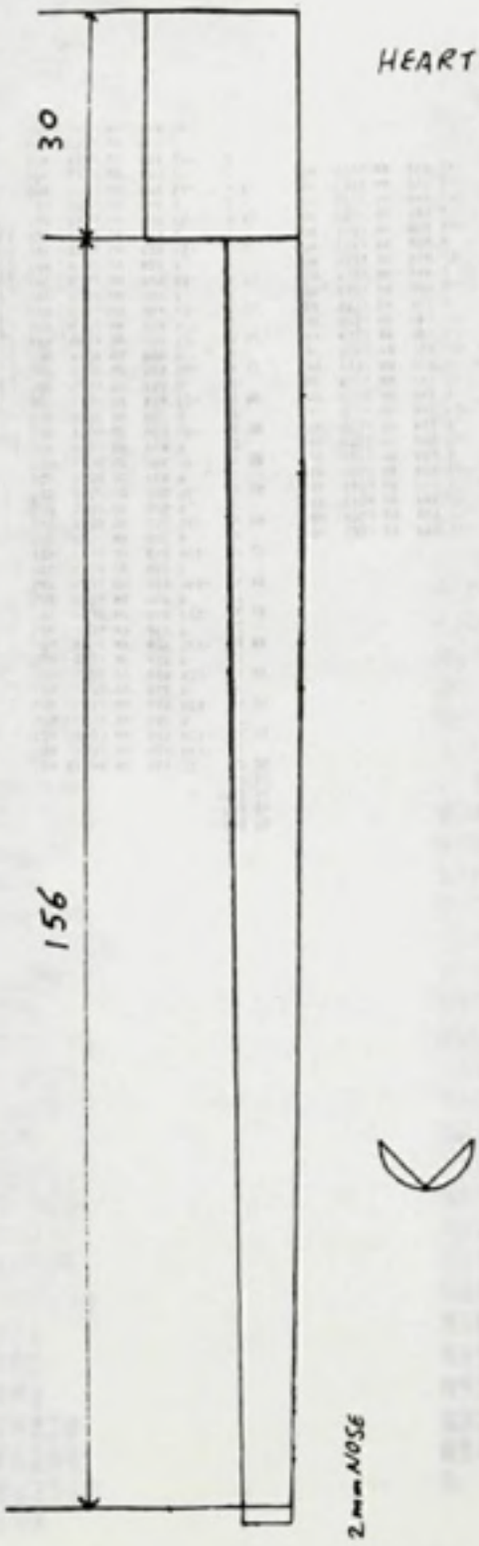
ii) It is typed into a machine that produces a paper tape programme and a printed read out.
This being the standard means of production in the 1970s when paper tape had replaced punch cards as the means of data storage.

iii) It is typed into a desk top PC which gives instant TV viewing, editing and disk storage plus on-line data transfer to the machine consol.

Option iii was used for this procedure as the most flexible option.
The skill of producing this code is not something to be underestimated, it being considerable!
I am indebted to the Engineers at OCFE for enabling this experiment to take place by virtue of their skill.

Data:

The data input was for a reamer to form the bore of a joint of a De Lusse 1 keyed flute in D, measurements being taken by Max Thornsie at Phillips in the 1980's.



HEART JOINT

Ø	DISTANCE ALONG
15·25	0
15·25	32
·2	34·5
·1	38
15·0	44
14·9	51·5
·8	55·5
·7	54·5
·6	69·5
·5	72·5
·4	75
·3	80·5
·2	85·5
·1	89
14·0	93
13·9	96
·9	103
·7	107
·6	110·5
·5	114·5
·4	118·5
·3	122·5
·2	125·5
·1	129
13·0	131
12·9	135
·8	137
·7	139·5
·6	140·5
·5	141
·4	—
·3	152
·15	156

Programme:

This programme was produced in two formats, the first is a machine specific code used on this particular machine. It can be considered obsolescent.

```
1 TOOL  2001
2 X                 0.000  MM RAPID ABS
  Z                 0.000  MM RAPID ABS
3 TOOL  2001
4 X               100.000  MM RAPID ABS
  Z               100.000  MM RAPID ABS
5 CALL  1
6 SUBR
7 CALL  2
8 SUBR
9 CALL  1
10 SUBR                0.0
11 TOOL  0
12 AUX   1101
13 X                1.500  MM RAPID ABS
   Z                0.000  MM RAPID ABS
14 CALL  3
15 TOOL  0
16 AUX   1101
17 X                1.250  MM RAPID ABS
   Z                0.000  MM RAPID ABS
18 CALL  1
19 TOOL  0
20 AUX   1101
21 X                1.000  MM RAPID ABS
   Z                0.000  MM RAPID ABS
22 CALL  3
23 TOOL  0
24 AUX   1101
25 X                0.750  MM RAPID ABS
   Z                0.000  MM RAPID ABS
26 CALL  3
27 TOOL  0
28 AUX   1101
29 X                0.500  MM RAPID ABS
   Z                0.000  MM RAPID ABS
30 CALL  3
31 TOOL  0
32 AUX   1101
33 X                0.250  MM RAPID ABS
   Z                0.000  MM RAPID ABS
34 CALL  3
35 TOOL  0

36 AUX   1101
37 X                0.000  MM RAPID ABS
   Z                0.000  MM RAPID ABS
38 CALL  3
39 TOOL  0
40 AUX   1101
41 X                0.000  MM RAPID ABS
   Z                0.000  MM RAPID ABS
42 END
43 END
44 SUBR  1
45 TOOL  1
46 AUX   5
47 AUX   0
48 X                0.000  MM RAPID ABS
   Z                0.000  MM RAPID ABS
49 END

50 SUBR  0
51 TOOL  0
52 AUX   5
53 AUX   0
54 Z               11.000  MM RAPID ABS
55 X                5.000  MM RAPID ABS
56 END
57 SUBR  3
58 FEED          350.       MM
59 Z               11.000  MM RAPID ABS
60 X                7.625  MM RAPID ABS
61 Z                0.000  MM FEED  ABS
62 X                7.625  MM FEED  ABS
   Z               -4.000  MM FEED  ABS
63 X                7.600  MM FEED  ABS
   Z               -6.000  MM FEED  ABS
64 X                7.550  MM FEED  ABS
   Z               -21.000  MM FEED  ABS
65 X                7.500  MM FEED  ABS
   Z               -22.500  MM FEED  ABS
66 X                7.450  MM FEED  ABS
   Z               -25.000  MM FEED  ABS
67 X                7.400  MM FEED  ABS
   Z               -28.000  MM FEED  ABS
68 X                7.350  MM FEED  ABS
   Z               -32.000  MM FEED  ABS
69 X                7.300  MM FEED  ABS
   Z               -34.000  MM FEED  ABS
70 X                7.250  MM FEED  ABS
   Z               -37.500  MM FEED  ABS
71 X                7.200  MM FEED  ABS
   Z               -42.000  MM FEED  ABS
72 X                7.150  MM FEED  ABS
   Z               -45.000  MM FEED  ABS
73 X                7.100  MM FEED  ABS
   Z               -49.000  MM FEED  ABS
74 X                7.050  MM FEED  ABS
   Z               -53.000  MM FEED  ABS
75 X                7.000  MM FEED  ABS
   Z               -57.000  MM FEED  ABS
76 X                6.950  MM FEED  ABS
   Z               -64.000  MM FEED  ABS
77 X                6.900  MM FEED  ABS
   Z               -67.000  MM FEED  ABS
78 X                6.850  MM FEED  ABS
   Z               -71.000  MM FEED  ABS
79 X                6.800  MM FEED  ABS
   Z               -74.500  MM FEED  ABS
80 X                6.750  MM FEED  ABS
   Z               -79.500  MM FEED  ABS
81 X                6.700  MM FEED  ABS
   Z               -85.000  MM FEED  ABS
82 X                6.650  MM FEED  ABS
   Z               -87.500  MM FEED  ABS
83 X                6.600  MM FEED  ABS
   Z               -91.000  MM FEED  ABS
   Z               -42.000  MM FEED  ABS
   Z                7.150  MM FEED  ABS
84 X               -45.000  MM FEED  ABS
   Z                7.100  MM FEED  ABS
85 X               -49.000  MM FEED  ABS
   Z                7.050  MM FEED  ABS
86 X               -53.000  MM FEED  ABS
   Z                7.000  MM FEED  ABS
87 X               -57.000  MM FEED  ABS
   Z                6.950  MM FEED  ABS
88 X               -64.000  MM FEED  ABS
   Z                6.900  MM FEED  ABS
89 X               -67.000  MM FEED  ABS
   Z                6.850  MM FEED  ABS
90 X               -71.000  MM FEED  ABS
   Z                6.800  MM FEED  ABS
91 X               -75.500  MM FEED  ABS
   Z                6.750  MM FEED  ABS
92 X               -85.000  MM FEED  ABS
   Z                6.700  MM FEED  ABS
93 X               -87.500  MM FEED  ABS
   Z                6.650  MM FEED  ABS
94 X               -91.000  MM FEED  ABS
   Z                6.600  MM FEED  ABS
95 X               -95.000  MM FEED  ABS
   Z                6.550  MM FEED  ABS
96 X               -104.000  MM FEED  ABS
   Z                6.500  MM FEED  ABS
97 X               -108.000  MM FEED  ABS
   Z                6.450  MM FEED  ABS
98 X               -112.000  MM FEED  ABS
   Z                6.400  MM FEED  ABS
99 X               -116.000  MM FEED  ABS
   Z                6.350  MM FEED  ABS
100 X              -122.000  MM FEED  ABS
   Z                6.300  MM FEED  ABS
101 X              -126.000  MM FEED  ABS
   Z                6.250  MM FEED  ABS
102 X              -129.000  MM FEED  ABS
   Z                6.200  MM FEED  ABS
103 X              -134.000  MM FEED  ABS
   Z               -144.000  MM FEED  ABS
104 Z                12.000  MM RAPID ABS
105 X
106 CALL  1
107 END
108 END
```

The second coding is to 150 format which was BS 3635,1973-85, this being understandable to all CNC engineers.

```
ANILAM ELECTRONICS    CRUSADER RS-232-C    038510

%

N0G0G70G90
N10G29T2000G71X0Z0
N20G29T2001X100Z100
N30G29C1
N40G4
N50G29C2
N60G4
N70G29C1
N80G4
N90T0
N100M1101
N110X1.5Z0
N120G29C3
N130T0
N140M1101
N150X1.25Z0
N160G29C3
N170T0
N180M1101
N190X1Z0
N200G29C3
N210T0
N220M1101
N230X.75Z0
N240G29C3
N250T0
N260M1101
N270X.5Z0
N280G29C3
N290T0
N300M1101
N310X.25Z0
N320G29C3
N330T0
N340M1101
N350X0Z0
N360G29C3
N370T0
N380M1101
N390X0Z0
N400G29E
N410G29E
N420G2951
N430T1
N440M5
N450M8
N460X0Z0
N470G29E
N480G2952
N490T0
N500M5
N510M8
N520Z11
N530X5
N540G29E
N550G2953
N560F350
N570Z11
N580X7.625
N590G1Z0
N600X7.625Z-4
N610X7.6Z-8
N620X7.55Z-21
N630X7.5Z-22.5
N640X7.45Z-25
N650X7.4Z-28
N660X7.35Z-32
N670X7.3Z-34
N680X7.25Z-37.5
N690X7.2Z-42
N700X7.15Z-45
N710X7.1Z-49
N720X7.04Z-53
N730X7Z-57
N740X6.95Z-64
N750X6.9Z-67
N760X6.85Z-71
N770X6.8Z-74.5
N780X6.75Z-79.5
N790X6.7Z-85
N800X6.65Z-87.5
N810X6.6Z-91
N820X6.55Z-95.5
N830X6.5Z-104
N840X6.45Z-108
N850X6.4Z-116
N860X6.34Z-122
N870X6.15Z-126
N880X6.09Z-128
N890X6Z-134
N900Z-144
N910G0X12
N920G29C1
N930G29E
N940G29E
%
```

This coded programme gives the following information if one translates it into English.

% = End

NO This is the data entry block number which enables one to find the item again in the computer memory; without it the item stores itself at random and is therefore impossible to find!

GO Rapid traverse G codes are general codes

G70 Imperial measurements

G90 Absolute measurements the computer will now always read from where it started not from where it happens to have got to, therefore if I ask it to move 100mm and then 50mm it will move back 50mm not on to 150mm.

N10 G29 Transfer of last nominal value as pole
T2000 Tool definition T=Tool 2000 is just its name so that it can be found again.
G70 measurement metric
XOZO Cartesian co-ordinate datums (See FOMRHI comms for definition).
This block is all about defining a tools starting place!

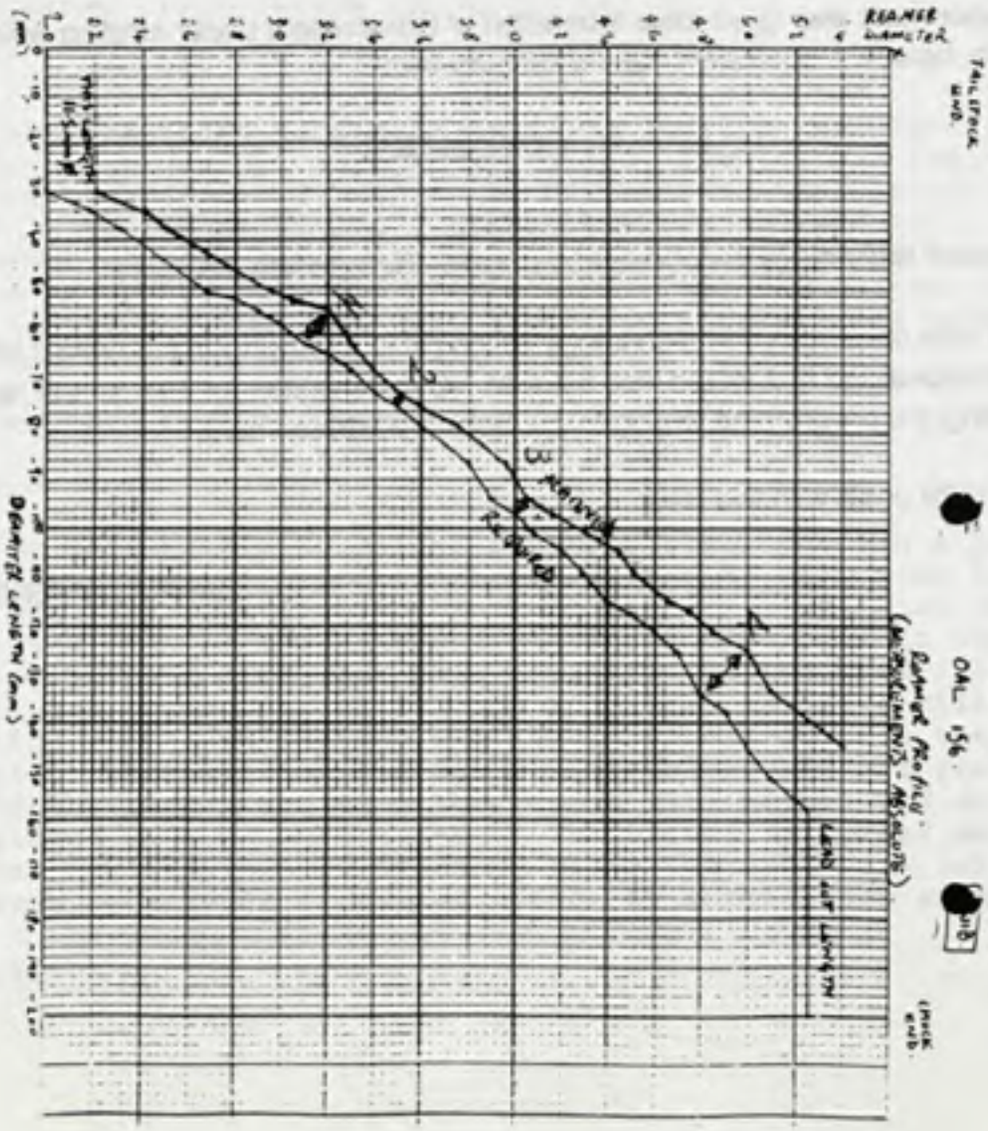
The process continues until N550 when G29 S3 spindle on clockwise commences cutting.
N560 F350 = Feed rate 350mm per min!
N600 - N900 = cutting the taper
N910 to % = move the tool away and stop the lathe.

The reamer is then milled to the appropriate shape but this process is beyond the scope of the experimental write-up as it is merely an industrial process (like facing and centring the steel billet) with no use of historical data, my point being to illustrate the transfer and use of such data into a CNC machine!

Result:

The experiment produced a reamer that was cut in 2½ minutes and looked very impressive!

Unfortunately when comparative measurement between desired and required profiles was made the following result was obtained.



This clearly shows an unacceptable discrepancy. When the reasons for the were examined it was discovered that there is no programming error!
Nore tool setting error!

The difficulty was that the lathe had not been rebuilt since 1977, and was therefore worn and uncalibrated (its general usage being for HND student projects where large diameter screws are cut where a 0.25mm discrepancy is not serious - modern lathes work to 0.001 mm).

It serves as a typical example of the subsequences of government spending cut-backs where skilled engineers are prevented from reaching or teaching to their full potential due to inadequate equipment.

Conclusion:

There is no reason why flute bore reamer data should not be stored on computer and this data used to produce reamers directly with great speed and efficiency.

This experiment also gives clear illustration of Government under-funding which, I am sure, its Japanese equivalent has no difficulty with.

POST SCRIPT

This level of technology is not one that I would chose to use any more!

I would now use CAD/CAM technology which gives a drawing of the artifact labelled and dimetionalised that would also have an NC code written for it to cut the reamer thus eliminating the programme writing in the fashion illustrated here.

Comm 1179 deals with this issue.

BARRY JEFFERIES

SOME HISTORICAL NOTES ON ACID STAINING

David E Owen

The suggestion that the characteristic colour of many 18th century boxwood wind instruments was obtained by the use of nitric acid staining has caused raised eyebrows and other expressions of doubt and incredulity as well as accusations of non-authenticity when one uses these techniques when constructing modern reproductions of such instruments.

Nitric acid has been known since at least the 8th century, when in the writings of the alchemist Jabir ibn Hayyan (Geber, latinised) precise instructions for its preparation are given. So that it is certain that its effect on wood must have been observed for many centuries.

Two more recent sources of information as to its use by wood turners are from the classic works on the subject (1) Plumier "L'Art de Tourner en Perfection" of 1749 (2nd Edn.) (1st Edn. 1701) and (2) Bergeron "Manuel du Tourneur" (2nd Edn.) 1816.

Both authors give lists of recipes for varnishes, stains and finishing treatments for woods and other materials.

The Plumier stain recipe (paraphrased) runs:-

"..... another for yellow.

You take some hard wood such as walnut, olivetree, box, maple or others which you put into nitric acid; then expose the wood to the fire at some little distance, or to the sun; and leave it exposed until it no longer fumes. After that you polish* it. In order to render it more handsome, you may throw filings of iron, steel, copper or bronze into the nitric acid, that causes the effect to be more varied and you will have a different colour and marble-like veining."

The Bergeron recipe (paraphrased) runs:-

"Another sort of yellow.

Take an earthenware vessel of generous size, pour in a sufficient quanitity of nitric acid. Throw in, bit by bit, some iron filings. From the surface will rise blackish vapours like thick smoke. Avoid breathing them as they are suffocating and noxious to the lungs. It is advisable to carry out this operation in the open air. Put in only a small quantity of filings at a time as there will be a strong reaction which could cause the liquid to escape over the side of the vessel. When all the filings are dissolved and the reaction has ceased the liquor and even the vessel will be hot and so they should be allowed to cool before use. The liquor is spread on the wood in several applications in order to bring the wood to a very dark brown and even to produce a marbled effect by application with a brush.

You may also produce designs on the wood by the use of wax applied with a brush - the wood brought to a yellow or brown as required; then when completely dry carefully remove the wax and the design will appear in the natural colour of the wood against a yellow or brown ground. It is in this manner that flutes are coloured yellowish brown and bassoons a very dark brown."

It is interesting to note that while the instructions of Bergeron are lengthier they do not suggest the use of the pure acid as does Plumier, i.e. without the addition of copper or iron. Practical experiment shows that the pure acid (concentrated) produces considerable yellow staining on box, pear, maple and other woods; the depth of colour depending (as would be expected) on strength of acid, temperature and length of immersion. Also the progress of the staining can be arrested by plunging into a large volume of water at the appropriate stage to dilute and wash away the acid.

It is also interesting that Bergeron refers specifically to the use by woodwind manufacturers of these acid staining techniques.

In ending this short note on acid staining it should be emphasised that nitric acid - particularly when concentrated - is EXTREMELEY DANGEROUS. It can penetrate clothing in seconds causing severe burns to the skin etc. Also the fumes - as mentioned by Bergeron - are irritating and noxious.

*In the original the verb is PRESLER (PRÊLER) = to polish with shave grass (Dutch rush; bot. Equisetum hyemale) - a technique formerly much used in fine wood turnery before abrasive papers were generally used for wood finishing. (vide Holtzapffel, "Turning and Mechanical Manipulation" vol IV).

Post scriptum September 1993:
This article was originally written in 1978 as I had been experimenting with acid staining of "reproduction" 18th century flutes and oboes. I had brought up the subject with certain Galpin and FoMRHI people of an older generation than my own and had been met with a certain scepticism. This had prompted further historical research. In the years intervening much has changed and it seems now that most of this is accepted.

FoMRHI Comm. 1227 Mary Kirkpatrick

Expanding Boxwood and Playing In

Boxwood is a remarkable material, continuing to show movement long after seasoning has removed excess moisture, sometimes in surprising ways. Recently I have been considering some of my observations of the way boxwood moves and the phenomenon of playing in -- what actually happens to the wood, to cause the difference in tone color and response that we can readily perceive in a modern copy after it has received a lot of playing -- and how they might be related. The observations that follow are from my own experience as an oboe maker, but I expect they could relate equally well to all woodwinds, especially those made of boxwood. The discussion considers the effects of playing in, and also points to ways of understanding how the early makers worked, or how the dimensions of an original might have changed. So, what follows is a mixture of observations, conclusions, and tentative theories, all of which I hope will stimulate further discussion and experimentation.

Incidentally I am not concerned here with the kind of constant swelling and shrinking that goes on with changes in humidity (whether from the atmosphere or from playing) -- which makes itself evident in keys that stick or tenons that need their lapping adjusted -- but rather with the kinds of changes that remain after, and may be quite independent of, all that back-and-forth with humidity. I have grouped the observations into three categories.

1. Bore diminishes where socket cutting exposes end grain: Back in the 70's when I was starting to make oboes, I used to measure almost anything that came along, including some flutes and recorders. When I was measuring the head joint, adjusting the internal calipers so they would gently contact the bore along the cylindrical portion, I would generally find more resistance, that is, a slight decrease in diameter, at the point just next to the widening out of the socket. Often I recorded this in my measurements, and the decrease averages about 0.1 mm. It is consistently small, and there is clearly no evidence of reaming or polishing down from the top of the head joint which might have produced this effect. This nipping-in can also sometimes be observed in the bell throat of baroque oboes, which are typically cylindrical for a significant portion, at the point just below the socket.

It is probably common knowledge by now that even thoroughly seasoned boxwood can warp like crazy if it is cut from the log and turned into a finished piece straightaway -- because it is not the loss of moisture, so much as the loss of the surrounding and supporting wood, that allows a piece to warp. My guess is that the end grain surfaces at the bottoms of sockets, because the sockets are made at a later stage and all at once, are not given time to season and settle. Thus they show more movement than the rest of the section, accounting for the nipping-in observed just next to the socket -- with the mass of wood occupying the space of the socket freshly removed, the wood behind the end grain cut is free to move in a new way, in this case expanding inward toward the bore. This assumes that other surfaces of the same section have been worked gradually and given plenty of time to settle. In my experience, one reckons on about two years from cutting apart a log to finishing the turning of an oboe to ensure against any noticeable warping in the future. The first stage is to cut a log into sections on the bandsaw and shape them roughly with a hatchet; after some months or a year I turn the pieces round leaving them at least 10 mm. oversize; after some more months, I recenter them on the lathe and take off a few mm., noting how much they had warped -- if a lot, I give them extra time; if hardly at all, I might proceed with boring. When boring, I ream them only part way, then

recenter and reduce the diameter to only 3 or 4 mm. oversize. After another suitable period the reaming is finished, and only then is it time for the sockets -- in the interests of keeping them as on-center as possible. Typically the space of time from turning the sockets to finishing the outside turning is a matter of days rather than months. It would involve significant extra work to rough out the sockets in the same manner as the rest of a section -- I haven't considered it worth the extra trouble myself, and I doubt the old makers did either, though the better ones clearly understood how to work to avoid warping.

The movement at the bottoms of sockets may be increased by moisture from playing getting into the end grain -- but I am led to think that playing may affect it only slightly, by the consistency with which it occurs, and by the consistency of the following very similar kind of movement, where playing is not a factor.

2. End grain cuts causing outer diameter increase adjacent to mounts: A second pattern of observations concerns the behaviour of ivory mounts on the upper (socket) ends of oboe middle and bell joints, in those cases where the ivory and wood are turned together in one continuous curve. Where the two surfaces would have been flush, I was puzzled to find the wood always a bit proud, sometimes measurably so. I am not familiar enough with ivory to know to what extent it shrinks; I have heard that it does, and needs seasoning the same as wood, but I couldn't believe it would shrink <u>more</u> than wood. Well, a few years ago I started using Corian as an ivory substitute. This is the epoxy material made by DuPont for high-quality countertops, and available in 3/4" thick pieces (sometimes as offcuts) from places that install such things. Their color "Almond" is a close match to the color of new ivory; all it lacks is the grain. I use it because it is a lot closer in weight and texture to ivory than any of the so-called artificial ivories I've seen, and it turns and polishes beautifully. Incidentally, there may be something different going by the same name in England, because a friend there told me he'd tried some half-inch sheet and found it brittle and difficult to work. I've made five oboes so far with Corian mounts, enough to observe the same protrusion of wood, where it had started out flush. In an oboe made several years ago (a failed experiment which was hardly ever played), the little step is obvious to the touch and measures about 0.06 mm. (on both middle joint and bell); in an oboe finished nine months ago, the step is already there, just perceptible to the fingernail. I think we can rule out Corian shrinking, so here is some clear evidence of wood next to the end grain expanding outward. (I wish I had recorded the exact outer dimensions at a few other points on this oboe; it could well be that the whole thing has expanded by 0.06 mm. or more.) It may be worth rough turning a mount's tenon in advance, if one is concerned about the wood-to-mount join remaining as flush as possible; another factor to consider is the angle of the tenon -- a steeper angle will result in less end grain surface at the join, hence less potential for expansion. I had in fact often wondered at the steep angle of the tenons under mounts of some originals.

3. Overall outward expansion increased by playing: A third observation: although as yet poorly documented and remaining somewhat conjectural, I find it potentially the most interesting. I make reproductions of a Grundmann classical oboe, and as it is a jewel of an original and I see no reason to change any of the external dimensions, I normally work to about 0.1 mm. of the original measurements while doing the final turning, at least for the straight sections (where the fingerholes go). A while ago when I had one of my Grundmann copies back in the workshop for a checkup after it had been played for a year or more, for some reason I began checking the outer diameters of the straight sections, and was surprised to find them consistently about 0.1 mm. over those of the original. A top joint from another Grundmann copy which I know was played a lot at one time now measures 0.3 mm. over. At the same time the bores had hardly changed at all. (Generally when I ream a copy -- at least one made in the last few years when I have

been careful to work in gradual stages -- the reamer scrapes out some oil and maybe a shaving out of the tenon area, if it has contracted there.) Another example is a top joint which I copied after Bruce Haynes' Naust and sent to him in June '92 with the comment, "...the outer diameter shows signs of having expanded since it was turned, by about 0.2 mm.." Humidity may be playing some part, but not to this extent. What would clearly be good to do is to record a few key outer measurements as soon as each piece of oboe is turned and polished, and then find an opportunity to check them again after the oboe has been played for some time -- or after it's just sat around for a while, if that's the case, and then one could do a further comparison to see to what extent playing makes a difference -- also a comparison between test pieces that had been previously roughed out or not. Perhaps another time I could have some more concrete results to report, and I'd certainly be curious to hear other makers' observations along these lines.

As regards this overall expansion (independent of proximity to freshly cut end grain), some could be due to the springing-back effect after wood is removed, but I suspect it has more to do with playing in -- from the fact that, in the second Grundmann copy I mentioned, the increase in diameter (if so) is greatest at the top of the straight portion, (where more moisture and stress would occur), and also by some close study of an original French oboe from c. 1700, the above-mentioned Naust belonging to Bruce Haynes. I took measurements of this in '87, and Bruce was interested in eventually having a copy that would play closely enough to the original that he could switch from one to the other. About a year and a half ago I (finally) finished a first copy and sent it to Bruce, along with a letter assuring him that it was "as close to the original as I could get it" in the bore and all details of turning -- and I had tuned it based on what I remembered of how the original played. I somehow guessed that it would not be easy to reproduce the tone quality of the Naust, as it had evidently been played a lot, and had a very warm and mellow sound, with a strong, ringing quality as well. As it turned out Bruce was disappointed with the copy -- "The principal problem..." as he wrote, "is to get the copy resonating, playing freely, ringing like a bell, as the original does. In terms of ease of playing, notes are more specific on the copy and do not blend easily, or blend into other notes and allow themselves to be adjusted in pitch (again, in contrast to the flexibility of the Naust)." This pretty well describes the difference between any copy and its original, given it has been played a lot -- as well as that between a new copy and one that has been well played -- a new oboe tends to be bright, clear, a bit high in the high notes, more pitch-definite and generally "nervous" in response. Often I notice some mellowing just in the two weeks or so that I am playing and tuning it before I feel it's ready to send. This typical difference was just rather extreme in the case of the Naust.

On Bruce's suggestion I went to Montreal to check it out more thoroughly. After fixing some differences in tuning in the copy by tuning the holes and checking the reaming, there remained the difference in tone and flexibility, or quality of response. We had an interesting time listening to each other play, swapping joints and so on, and incidentally agreed on 396 as the pitch the original seemed to play at most comfortably. I gained a new appreciation of the Naust, particularly of the sheer beauty of its tone -- robust and ringing, with a bit of chiff in the attack. By comparison the copy seemed introvert, a bit overly smooth and refined. In the end as I was packing up my things, Bruce (in a fit of generosity) offered to loan me the Naust for a while, in case there was more I could still learn from it. It has been a real priviledge having it available, for comparison in tuning, or to check details of color or finish as I get new ideas -- the sort of details that one wouldn't think of in a situation where there is limited time.

Weight difference: The difference in tone lay principally in the top joints. When I weighed the two accurately, the Naust was significantly lighter than my copy, which had been soaked in linseed oil. I thought it would be worth trying a top joint without any

prolonged soaking in oil, first for one of my 415 oboes, which I finished only in "Pryme", an alcohol based wood sealer -- in the interest of having some sort of very thin protective sealer which would keep the joint lightweight, and the surface almost like that of dry wood -- and then for the Naust, which I finished with a rubbing of linseed oil on the outside (it looks and feels a lot nicer) and "Pryme" on the inside. Both of these play with a robust, direct tone as opposed to the smooth tone of the oil-soaked joints. The Naust copy is somewhat closer in tone to the original, but has not as good a response as the previous one. Ironically the copy which seems to come closest so far in quality of response to the Naust is one -- only just finished, and lightly soaked in oil -- where I have altered the dimensions for 392 -- but there may be other factors.* Anyway, it was interesting to find that the unsoaked top joint -- which did end up almost exactly the same weight as that of the original -- came at least a bit closer to it in tone.

The weight difference started me thinking -- it seems unlikely that the Naust would be as free of oil as my Pryme-finished top joint, and Bruce mentioned oiling it occasionally with olive oil. Also the wood is of excellent quality, and the top joint quite close-grained, not the sort of wood one would expect to be lightweight. (I chose similar wood for my top joints.) The Naust top joint has, however, been subjected to a lot of stress -- there are many fine surface cracks on the outside all over the decoratively turned portion -- corresponding to the three inches or so just below the reed, where it gets the most moisture on the inside -- and the bore in this same area looks like weathered barn siding. (No wonder Bruce wants a good working copy!) Considering the amount of playing this oboe has obviously received, I would guess that the lightness of the top joint has to do with the wood having been literally stretched -- from being alternately soaked and dried, probably often remaining wet for longer than was healthy for it -- so that it settled at a new, expanded, equilibrium. If this guess is correct, we may (for once) have something concrete to point to, some real physical evidence besides that of playing, for the difference between a top joint that has been well played and one that has not.

Quality of playing-in a factor? I would stress that this guess, about playing causing extra expansion, is still only a theory, and there may be many other factors contributing to a good played-in quality. To toss out a "for example", I remember Michel Piguet expressing a reluctance to lend out his recorders for fear they might come back out of tune. At the time I thought this a bit far-fetched, but over the years, my experience trying my oboes which have been with customers for some time -- customers of differing playing abilities -- suggests that there is more to this idea than one might think. I have had a couple of oboes which I at first considered to have at least above average potential, in the hands of an amateur (of, shall we say, less than average amateur ability) become unstable and quite uninteresting in tone. Generally, with customers of <u>good</u> amateur or professional levels of ability, the effect of playing is only positive. It seems as if, through being played with good intonation, an oboe develops the ability to lock on to a note, thus increasing its stability; the tone becomes mellow and richer, and the dynamic range increases as well (in both directions). What could be the mechanism, the actual physical changes to the wood, involved here? Could the expansion be taking place unequally, or could dissolved material be precipitating or crystallizing unequally, or the cell structure subtly changing, or oil hardening differently, according to the patterns of nodes which would cause the wood to vibrate more or less in certain areas? Is moisture even a necessary factor? I feel we are a long way from being able to analyse scientifically such a delicate riddle. It is such a subjective thing -- our ways of perceiving the phenomenon may differ, subject to our own habits of playing and affinity for a certain type of oboe or a particular instrument. But who knows, someone reading this may know of some research into the phenomenon of playing-in, and if you do, I'd love to hear about it.

Subjectivity aside, there is something universally inspiring (to makers) about the beautiful sound made by many old oboes such as the Naust, which seem to be both well played and well made. Now this may seem really far-fetched -- if the quality of playing in has an effect, could we be hearing, in a fine old well-played oboe, the skill of the player (of the time) as well as that of the maker? Bruce made a comment (as part of his feedback on my copy) that making a copy that plays as much like the original as possible and making one that has as many of the same dimensions as possible are not necessarily the same. So perhaps the dimensions of an original are not even necessarily optimal for producing the sound that a player of the time has enabled the oboe to make?

In conclusion: The implications are that one should probably study as many originals from a given maker as possible, and be familiar with the playing characteristics of as many different oboes from a given musical style (together with the music) as possible, in order to refine one's intuition as a maker. Obviously when measuring and testing an oboe, it is worth paying attention to evidence of how much playing it has received -- both with the ears and the eyes, to be able to take that into account, in reproducing the dimensions, and later the tuning and response. By working in gradual stages, one can at least ensure that dimensions will remain over time close to what one intends. What the original maker intended (as we understand it) will probably always be a subjective matter, and rightly argued about, as makers approach it in their own ways, based on their separate experiences.

* Paul White take note: Bruce has not seen this, or any other "improved" copy of mine. In your Comm. #1160, you have carelessly misinterpreted the reference to my copy in Bruce's letter/article (which he sent to some other makers as well as myself).

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continued from p. 63

these surfaces without apparent disadvantage to the tone production, so sealing the wood should have no adverse effect. However, do not allow oil to enter the windway!

1 Fatty acids are so named because of the need to observe strict conventions in the nomenclature of chemical compounds. In fact, they are *very weak* acids, and have no chemically damaging effect on wood.

2 *Recorder Technique*, OUP, 1959, p34.

3 *Bailey's Industrial Oil and Fat Products*, Ed. Daniel Swern, Interscience Publishers, 1945

• *Terry Simmons took his degree as a textile physicist at the University of N.S.W. and has worked for many years in the Textile and Clothing industries; he now works at the Warrnambool campus of Deakin University. He has been a recorder player since 1962 and later studied singing with Catherine Senftleben. He has played and sung with several early music and theatrical ensembles in Victoria's Western District and is a frequent solo recorder recitalist with harpsichordist and jazz pianist Gavin Franklin. He also regularly broadcasts a music programme for community radio station 3WAY-FM.*

The Good Oil

...what *really* happens when you oil your recorder?

Terry Simmons

Having invested a very significant amount of money in a new wooden instrument, any recorder player, amateur or professional, should be keen to protect that investment by providing proper care.

Oiling, an important aspect of care, ought to be a simple matter. But the recorder player is faced with such conflicting information from instrument makers and from independent writers on the subject that it is difficult to be confident that the correct methods are being used.

Careful reading reveals that there are two clearly identifiable schools of thought on the oiling of recorders. They are characterised as follows:

- Use plenty of oil, even going as far as total immersion (with the block removed). Use it as often as once a week.
- Use oil very sparingly. Oil infrequently—about twice per year is plenty.

There is little consistent advice about the choice of oil, a confusing variety (linseed, banana, peanut, coconut, almond, olive, etc.) being recommended by different writers.

The recorder player really needs to know what is the best oil to use, how much to use how often to use it and how to apply it. To answer these questions it is useful to know a little about oils, and the things that happen when we oil a recorder.

Let's have a look at the nature of oils. What is it that makes them "oily"? What are the particular properties of oils that make them suitable for treating woodwind instruments? And what is the purpose of applying them in the first place?

A Short Chemistry Lesson

Fats and oils are water-insoluble substances originating in plants or animals, and which consist predominantly of *triglycerides* or "fatty acids". These are very complex molecules, based upon three long chains, each consisting of usually about 18 carbon atoms trailing out from a central linking point called the *triglyceride link*.

Diagrams 1 and 2 show the way chemists represent the individual building blocks that make up these long chains. The letters C and H represent atoms of carbon and hydrogen respectively.

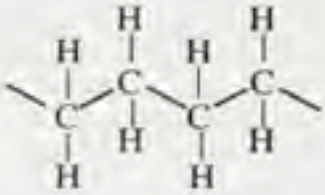


Diagram 1: Carbon chain in a saturated molecule.

Whilst each hydrogen atom has only one "hand" to link itself to other atoms, each carbon atom has four such "hands", available. This enables carbon atoms to connect into long chains, like pearls on a string, and still have a couple of "hands" left over to link up sideways with other atoms. The longer the chains, the more likely they are to become entangled with other chains, and the thicker and more viscous the oil. (As will be explained later, the interaction between wood and oil is confined to the surface of the wood, so viscosity is not important to the present discussion.)

If every carbon atom in the chain is attached sideways to two hydrogen atoms, as in Figure 1, the chain is said to be *saturated*. That is, it couldn't accommodate another hydrogen atom if it wanted to. In many cases, however, there is a *double link* between two carbon atoms, as shown in Diagram 2. When double links occur in the chains, they are called *unsaturated*. These double links (also called unsaturated centres) are *extremely influential* upon the oil's chemical properties.

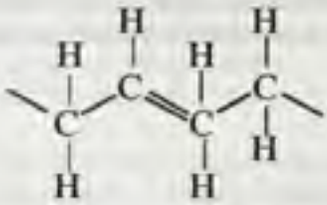


Diagram 2: Carbon chain in an unsaturated molecule.

Because oils are naturally-occurring substances, they are not pure chemical compounds but are mixtures of many different compounds. Vegetable oils are typically made up of a mixture of saturated and unsaturated oils, the proportions of the two types influencing the oil's properties.

The carbon atoms in saturated chains are fully occupied, so to speak. Therefore, oils that are composed mainly of saturated chains are stable and inert. They tend to be unaffected by exposure to air or to other chemicals. The situation is quite different for the unsaturated chains, however, because the double links form "activity sites" where chemical reactions can and do take place quite readily. For this reason, unsaturated oils are much more chemically active, and much less stable when exposed to air. For example, unsaturated chains will react with the oxygen in the air, a process known as "oxidisation". This is responsible for the rancid taste and smell that develop in fats and oils (usually in edible fats and oils, which will not concern us here), and it is also responsible for the phenomenon of *drying* of particular oils used in the manufacture of linoleum and paints.

Drying Oils

When some oils are applied to a surface, the applied film changes gradually from a liquid to a firm, tough and durable solid. The phenomenon bears a superficial resemblance to the change occurring in a water-based

solution when the water evaporates, and hence has been termed "drying". Actually, the term is a misnomer. The essential process in the transformation of the film is *polymerisation*, which is discussed below.

Oils that behave in this fashion are termed *drying oils* and the drying power of the oil increases with the degree of unsaturation. This drying property is so important that at one time it was used as the basis for classification of oils, which were categorised as drying, *semi-drying* or *non-drying*.

Polymerisation

The film-forming properties of the drying oils are closely related to their degree of unsaturation, since it is through the unsaturated centres or double bonds that polymerisation takes place.

In polymerisation, most of the action takes place in the region of the double links. The oxygen from the air moves into the region of the double link, prising one of the links apart and attaching itself to the carbon atom. This now means that the long carbon chains are able to form links across from one chain to another, forming a three-dimensional, solid substance. Once this cross-linking starts to occur, the oil fairly quickly becomes solid, with any saturated-chain oils (which do not take part in the polymerisation process) becoming trapped in the cross-linked "web" of polymerising oil. The result is a tough gel or resin.

Anyone who may have wondered about the "resinating plant oil" recommended by Rowland-Jones[1] now has an explanation for the term.

The Iodine Number

The more unsaturated an oil is, the better its ability to polymerise. This being the case, it is not surprising that chemists have developed experimental techniques to measure the degree of unsaturation of oils. The *Iodine Number* is a measure of the degree of unsaturation, and is the number of grammes of iodine absorbed by 100 grammes of the oil. Highly unsaturated glycerides such as linseed oil and tung oil have an iodine number from 180 to over 200. Glycerides with a lower iodine number in the range 100 to 120, such as cottonseed oil, are called semi-drying oils. These thicken in air but do not form a skin. Non-drying oils such as olive oil (iodine number 85) have iodine numbers well below 100.

Table 1 lists Iodine numbers[3] for some fairly readily available vegetable oils. In this list, only Linseed Oil and the rarely encountered Tung Oil are drying oils. The others are either semi-drying or non-drying.

Oil	Iodine Number
*Coconut Oil	7.5—10.5
Palm Oil	44—58
*Olive Oil	80—88
*Peanut Oil	84—100
*Almond Oil	93—106
Rapeseed Oil	97—108
Cottonseed Oil	101—109
Sunflowerseed Oil	113—140
Tung Oil	160—175
*Linseed Oil	165—204

All those marked with an asterisk (*) have been recommended by one writer or another for oiling recorders.

It will be noted that this table does not include *Banana Oil*, which is occasionally recommended for recorder oiling. I have neither been able to purchase Banana Oil nor to locate information about its properties, so have been forced to omit it from this discussion. However, the name "Banana Oil" unfortunately is applied to two quite different substances — and the difference is very important!

• Banana Oil may be used as the name of an oil extracted either from bananas or from some other part of the banana plant, in which case it may possibly be suitable for oiling recorders. (However, in the absence of an Iodine number, one would not know the correct way of using it.)

• There is also a chemical compound which is commonly referred to as *Banana Oil* or *Pear Oil*, mainly because of its odour. It is used in manufacturing industry for a wide variety of purposes—mainly as a solvent with a pleasant odour. It is a pure chemical called an *ester*, with a very small molecule (only seven carbon atoms and no triglyceride link). It is **not an oil**, possessing none of the characteristics described earlier. It should not be brought into contact with your recorders.

How does oiling change the instrument?

The appearance of woods is determined by its grain, its texture and its figure (which generally arises through irregular patterns of pigment). The texture of wood is determined by its cellular construction. This can be thought of as consisting of tiny cells of cellulose "glued together" by a substance called lignin. This is a bit like a brick wall, which consists of lumps of clay "glued together" by mortar, with the important difference that the wall is only two-dimensional whereas the wood is three-dimensional.

As a generalisation, the cellulose loves water but hates oil, whereas lignin likes oil but hates water. When oil is applied, it is ignored by the cellulose, but attaches itself to the lignin, by a process of wetting, rather than chemical bonding. This means the attachment is quite weak. It is important to realise that the attachment between oil and lignin occurs only at the outer layer of cells. There is no real question of the oil being "absorbed" to any real extent. Any impression that the oil has penetrated or that it has been absorbed by the wood is merely an illusion resulting from the oil drying.

If a non-drying oil is used, the only oil that will survive on the instrument after a few swab-outs will be oil that is sitting in depressions or pores in the surface of the wood. (In the very smooth woods used in recorders, that won't amount to much!). The oil will occupy the pores and thus inhibit the entry of any liquid water that forms in the bore.

If a drying oil is used, the situation is far different. The first application of oil will leave a tough film of polymer attached to the lignin. The next layer will attach itself to the first layer, and this process will continue with successive oilings. If there are any fine fibres of wood remaining in the bore after the instrument's manufacture, they will become coated with the oil, and will then become brittle as the oil solidifies. When the bore is swabbed out, these fibres will be broken off and removed, helping to smooth the bore surface. Over many years of oiling, there will be a very gradual build-up of

a tough, smooth coating that will be impervious to liquid water but which will permit relatively free passage of water *vapour* between the atmosphere and the cellulose cells— a desirable situation, as it allows the recorder to adjust to climate and weather changes as well as the moisture changes encountered when the instrument is being played. Successive cycles of oiling and swabbing over several years will produce a high level of polish in the bore, and this will have a subtle effect on the recorder's timbre, as the hard, clean, smooth reflecting surface will encourage the formation across the instrument's diameter of standing sound waves which, in combination with those standing lengthways in the instrument, contribute to the sound character of the instrument. Is this a positive or a negative contribution? That is of course a matter of opinion, but it is significant that at least three of to-day's most respected recorder makers take the trouble to smooth and finish the bore of all their instruments with a durable, hard varnish so that it looks like a gun barrel—so *they* must consider it a positive contribution!

It seems reasonable to conclude that if the maker has already produced this kind of finish in the bore, it may be unnecessary to provide additional coatings by using a drying oil. In such cases, it is probably sensible to apply a non-drying oil occasionally, just to keep the bore clean.

By the same token, if the maker has supplied the instrument with the bore unvarnished, a sensible strategy is probably to apply films of a drying oil such as linseed, repeated six-monthly over several years with polishing, until a shiny protective coating has been produced. At this point, the bore has considerable protection, and from this point onwards a non-drying oil could be used, again merely for the purpose of cleaning the bore.

Now that we have acquired further knowledge about the properties of oils, and in particular, their classification into drying, semi-drying or non-drying, we can examine oiling instructions in a new light.

The "Plenty and Often" School

It now becomes obvious that if a writer recommends the use of semi-drying or non-drying oils such as almond, olive, peanut or coconut oil, a "plenty and often" application procedure should also be recommended. These oils will not polymerise into an impervious film. Rather, they remain on the surface of the wood as a thin film of liquid. With "swabbing out" of the recorder after playing, most of the oil will be removed, and it must therefore be replaced regularly. If such oils are used, therefore, they need to be used frequently — it is not intended that the oil become a permanent part of the recorder!

The "Little and Seldom" School

It also becomes obvious that if a writer recommends the use of a drying oil such as linseed oil, a "little and seldom" application procedure will also be recommended. The oil will adhere to the wood and polymerise into a tough, impervious film, becoming a permanent part of the instrument.

There is a good reason for allowing several months between applications if a drying oil is used. After the oil is spread over the surface of the wood, any excess is wiped off, leaving a very thin film. Exposure to the air will cause polymerisation to commence almost immediately and at normal temperatures (about 20°C) it will be substantially complete in a couple of days. However, the final part of the polymerisation reaction *will continue for several months after oiling*. During this period, swabbing of the instrument may remove a little oil that may not have polymerised, but the only other effect will be to polish the polymer surface.

Which ?

The choice of "school" is up to you. Both approaches are valid. The important thing, however, is *not to mix the two approaches*. If you decide to use copious quantities of oil and to re-apply the oil frequently, you *must* select a non-drying or semi-drying oil. If not, you may be faced with a recorder filled up with a heavy layer of messy "gunk". On the other hand, if your choice is to oil sparingly and infrequently, you should select a drying oil. If you do not, the oil you apply will soon be removed and for long periods your recorder will lack the protection it needs.

End-Grain

There are parts of the recorder that are especially susceptible to the effects of moisture, and which therefore will benefit from the protective effects of oil. In particular, we should give attention to those parts of the instrument where the *end-grain* of the wood comes into contact with water. End-grain is exposed when the wood is cut at right angles to the direction of the grain, and water can most easily penetrate the wood at such points. The principal places where this can occur are in the regions of the tenons and sockets, particularly the upper one where the headpiece connects with the barrel. Always ensure that these end-grain parts are oiled.

In bass and larger recorders there is often a wind-cap, and here too, water can come into contact with the end-grain. Such points require oiling. It's difficult to generalise here, because of the wide range of wind-cap designs, but careful inspection will readily reveal the places where moisture and end-grain come into contact.

End-grain is exposed at the ramp—the sloping surface from the bore to the exterior of the headpiece, just below the window. In the course of manufacture, several prestigious makers varnish and seal the wood of the ramp, without adverse consequences upon the tone, so it may be concluded that the sealing effect of oiling will do no damage. However, remember that the wood is very thin at the edge, and that damage could result from over-vigorous mechanical pressure either during application of the oil or rubbing it off.

How to oil a recorder

My own strong preference is for the use of a drying oil. The best drying oil is linseed oil, which is readily available at low cost. The following procedures are valid for the application of both drying and non-drying oils. However, if you are using a non-drying oil, you may ignore those parts of the instructions that involve waiting for the oil to dry, and any comments that obviously apply to drying oils only. Here are some of the things you'll need:

- a piece of cotton fabric. An old handkerchief is very suitable. It is thin, about the right size and not inclined to shed fibres.
- recorder swabs. These are usually shaped like a bottle

brush, with a twisted wire handle with a "head" of wool fibres. They are often supplied with new recorders, and are not much help in wiping out a recorder because they don't seem to absorb water very well, merely pushing it about from one place to another. However, if you wrap an oil-damp cloth around the head of one of these swabs, you'll be able to apply oil to places that are otherwise difficult to reach.

- another piece of fabric, for polishing. An old T-shirt is quite appropriate. Again pure cotton is best.
- soap and water, to wash the oil from the fabric and the swabs, so you can use them again at a later date. If you are using a drying oil, you should wash the fabrics and the swabs as soon as you have finished oiling. If you don't, the oil will dry in them, they will harden and you'll have to discard them.

First step is to apply oil to the handkerchief. This should be done very gradually, and the fabric should be folded and squeezed after each addition of a little more oil, to ensure that the oil is evenly distributed throughout the fabric. Eventually you will reach a point where the whole of the fabric is oily, and the fabric has taken on a pale, even translucency. It should *not* be possible to squeeze liquid oil from the fabric.

Application is simple: to wipe the outside of the instrument and the end-grain areas, use the oil-damp cloth as it is. To apply oil to the inside, wrap the fabric around the head of an appropriately sized swab and pass it carefully through the bore.

After oiling, there is no particular advantage to be gained by allowing the instrument to stand. Wipe the instrument, inside and out, with the clean polishing cloth. After this has been used, A *very thin* coating of oil remains. Because it is so thin, polymerisation of the oil will begin almost immediately. The instrument should be put aside and not played for two days.

The Foot Piece

The procedure here is to pass the oil-damp cloth through the bore, and then attend to the end-grain in the joint socket. The only problems in oiling the outside of the foot-piece arise if there are keys there. Irrespective of whether you are using a drying or a non-drying oil, you must keep it away from the keys and key pads. Both the key mechanism and its pad will be adversely affected by oil.

The effectiveness of keypads and tenon wrappings depends on the achievement of an airtight seal, but the effect of a drying oil is to harden the leather, cork or thread, so that it no longer remains flexible enough to mould itself to the shape of the tone hole or socket.

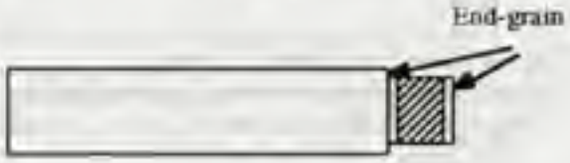
Keep drying oils away from ivory fittings because there is a slight tendency to yellowing due to the film of polymerised oil. Usually, one likes to keep ivory fittings as white as possible. Otherwise, the effect of oil upon ivory is neither beneficial nor adverse.

The Barrel

If it's a small recorder, oil the bore by twisting the oil-damp cloth through it several times. If it's a large recorder, wrap the cloth around the head of an appropriately sized swab and push it into the bore from either end. You can check progress by squinting down the barrel to ensure that the oil coverage is even and complete. Don't be tempted to speed things up by adding oil to the fabric until it is saturated and wet, then slopping it into the bore. It is preferable to remain patient and achieve evenness of application through persistent application of a moderately damp rag.

If there are keys on the barrel, give them a wide berth! Should you oil the finger-holes? It is unnecessary to oil those on the top of the instrument because they don't come into contact with liquid water. However, the thumb-hole is exposed to liquid water. Moreover, it exposes end-grain, so it will benefit from oiling. The oil cloth can be twisted into a cylinder and poked into the thumb-hole to oil it.

At the tenons, attend to the end-grain. The tenons will be wrapped with thread or with cork. In either case, keep oil away from the wrapping!



The Head-Piece

We will deal with the head-piece section by section:

The block: It is not particularly important that the block be able to absorb water. Many recorders are constructed entirely of plastic material that is totally impervious to water, and they are no more susceptible than are wooden recorders to the effects of liquid water in the windway or head-piece bore. It should be remembered that any water-absorbent properties of a wooden block are relevant only until the block has become wet, after which it cannot absorb any more water. What is more important is that water should not accumulate in the windway on the upper surface of the block. Rather, it is desirable that any water that forms in the windway will clear away by running down into the bore of the recorder. Well-designed windways tend to clear themselves during playing, but any oil in the windway inhibits this natural clearing ability. If oil finds its way accidentally into the windway, it can be removed with acetone, which has no adverse effect on wood. (You may need to remove the block to do this.) If you are using a drying oil, remove the oil quickly, before it polymerises to any significant extent. The sensible practice when oiling the head-piece is to oil the bore up to about one centimetre below the edge. If you can establish a technique that enables you to oil the lower part of the bore close to the block (ie. opposite the window) without any possibility of damaging the edge, that will be an advantage because this part of the bore is exposed to much water. This task is made easier if the block is removed, but not everybody feels confident in doing this — I certainly don't!

The socket and the ramp have been discussed already under the heading "End-grain". Wrap the oil-damp rag around a fine object such as a matchstick, and apply it with precision to the ramp where the ramp and the ramp "walls" meet. Oil up to the edge.

Finally, should you oil the "beak" of the recorder and its underside, including the back of the block? Again, one should note that several prestigious makers varnish

continued on p. 59

Restoration Report, Seventeenth-Century Italian Harpsichord at *MusicSources*, 1993

This harpsichord was recently donated to MusicSources, a foundation in Berkeley, California, for the performance and study of early music. Report by Robert Greenberg.

Part 1: The Instrument

Harpsichord
Italian, End of the 17th Century
(Giovanni Battista Giusti, Lucca?)

One Manual C/E–c^3 8'8' c^2=285 mm.

Inscription

No antique inscriptions. Various twentieth-century notations appear under *"Original and Altered States."*

Classification

This harpsichord is typical of many smaller Italian harpsichords of the later seventeenth century.[1]

Case

Difficult type to classify. The case walls are doubled in thickness, making the instrument similar to "false inner-outer" construction. The poplar case walls are faced on the interior by cypress walls fully covering the interior of the poplar walls above the soundboard. However, no suggestion that the body of the instrument is separate from an outer case. Length, not including bottom moulding: 1955mm. Width at case front: 743. Right cheek: 463. Soundboard averages 53 down from cap moulding, which is wider (12mm) than the two elements making up the case sides, the poplar walls about 6mm thick and the cypress interior walls about 4 mm thick. Poplar walls held by trenails into lap joints; cypress inner walls mitered together. Walls sit on case bottom. Plan drawing, photographs page 9 of this report.

Removable cypress nameboard (4 X 126mm). Cypress jackrail holders, ending in carved rolls.

The keyboard may have projected in front of the the case walls at the nameboard. The cheeks may have been scrolled from the nameboard down to the keyfronts. Presently the case walls extend to the front edge of the instrument, with battens added to contain a slip-in fall board.

Interior Construction

Pine belly-rails; upper and lower rails glued together without opening. Major alterations to the interior of the instrument from a Parisian worker, "A.W. Masson." See further under *"Altered States."* No evidence survives of original framing nor of original interior construction.

Portion of bottom to the rear of lower belly rail probably modern, mixed poplar and spruce. Bottom averages 14mm thick.

Walnut bridge, apparently original, now mounted on replaced soundboard. Tapered in height and thickness: 9mm thick by 10.5 high in bass; 8 x 10 at midpoint; 7 x 8 at treble endpoint. Straight bass section mitered onto main bridge.

Walnut wrestplank (45mm thick) and nut, including buff stop. Wrestpins set in straight lines. Wrestplank support blocks run between wrestplank and bottom. Ivory knobs with similar turned shape at both ends of buff stop, one end of rear register, and one end of front register.

Antique moulding on wrestplank, bentside, and tail of soundboard. Replacement moulding, somewhat less crisply cut and with differing profile, added to spine and to rear of gap. No evidence of raised hitchpin rail at bass end of case.

Playing mechanism

Disposition: < 8'
8' >

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[1] A fine review of Italian harpsichords is by John Henry van der Meer, "Panorama storico dell'arte cembalaria in Italia," *Clavicembali e Spinette dal XVI al XIX Secolo: Collezione L. F. Tagliavini* (Bologna, 1986), pp. 27–57.

Box slides presumably once moveable at least for tuning, as they have knobs. When received, the instrument was fitted with leaf springs screwed into the case walls, then bearing on blocks added to the ends of the registers. The springs served to hold the registers "on." No means of cancelling the stops. The buff stop pads bearing upon the longer 8' strings would thus be a mixed blessing in use, giving one buffed choir and one unaffected choir. The springs themselves are modern tempered steel, probably not replacing antique ones.

Speaking Lengths of Strings, MusicSources Harpsichord.

	< 8'	8' >
C/E	.591	1578
F	1575	1566
c	1128	1073
f	839	803
c^1	554	527
f^1	416	399
c^2	285	273
f^2	219	209
c^3	142	133

Poplar keyframe, 658mm wide, 338 deep in the bass; 298 in the treble. On average, 13 thick. Walnut balance rail overlapping the side rails. 41mm wide; 20 thick. Lapped into keyframe @ 120 from the front in the bass; @116 in the treble. Corners of keyframe lap jointed.

Beech rack 47.5mm high and 9 thick, nailed to back frame member (i.e. sits behind it). Slots slightly widened behind parallel cuts into face of rack. Keys guided at rear by wooden slips. Keydip limited through padding on front and rear rails. Rear padding might be antique (thick wool). No battens under keyframe, which sits on case bottom.

Keylevers of beech, 11mm thick. Tapered upward on underside of keyheads to 7 thick. Keylevers 313 long at the bass; 282 in the treble. Balance point 130 in the bass; 127 in the treble. Keylevers cut out prior to being plated with ebony toppings. These toppings are thicker than most, to 5mm thick. Keyheads 35mm long, marked with two score-lines, the rear one being the cutline. Two natural keyplates, b and c^1, replacements, having no score-lines. Edges of keyheads bevelled up to front score-line. Front lower edges of keyheads bevelled back to fit arcades at fuller height than would otherwise be possible on thin lever fronts. Boxwood arcades of mixed profiles. The majority from one cutter (see photos #1-3). A few others distinct from first group are replacements. These have been cut with their grain running vertically.

"D" keytails average 17 mm wide; other natural keytails not wider than 13, often less.

Sharp risers of unusual construction (see figure #1). Beech bodies stained black. Ivory toppings, 1.25 mm thick, glued to an intermediate layer of ebony, averaging 1.8 thick, prior to being glued to the sharp risers. Their assembly carried out meticulously, offering no reason for the laminated construction of the risers. The assembled risers are 69 long, with fronts cut at an angle of 60° to their bases. 12.5mm wide; no side-taper.

Figure 1. Sharp Riser, MusicSources Harpsichord

Box slides made of blocks between thin laths. Box slides 25mm high, 18-19 wide. The blocks at the ends of the slides are beech; so is the rear wall. The front wall is fruitwood. The blocks forming the interior of the slides have relief cuts on both of their wide faces. These cuts do not run the length of the blocks, but angle outward, terminating before the bottom of the blocks. The length across the openings is 621mm; 21 slots cover 294mm.

Jacks of fruitwood ["sorbo"?], averaging 100mm long, by 12 wide and 4 thick. The fruitwood tongues are 28.5 long, with their axles at 19 down from their tops. Axle diameter is 0.8, brass. The jack bodies have been bored to receive hog bristle springs, and the tongues carved to contain such springs. One damper per jack. The tongues are punched 1.5 for quill plectra, 8.8 from the tongue

top. The plectra generally slant upward from the horizontal by some 10°.

Furnishings and Decoration

Moulding running around the outer edge of the case, terminating at front battens holding the lockboard. Small cap moulding atop case walls, around 12mm. Case exterior painted a dark blue-green. Two-part lid, joined to the case with modern hinges. Interior of lid painted bright red.

Soundboard, added to the instrument 1940, painted with non-traditional floral decoration.

Stand

No evidence of original stand. Presently, the instrument is supported by three tapered legs, joined to the bottom.

Original and Altered States

The instrument retains its antique case walls and keyboard. The jacks, box slides, and interior thick veneering in cypress are original. The nameboard is original, possessing the same moulding profiles in unpainted form as those of the case, where the moulding profiles are rendered less exact by the heaviness of the paint. The jackrail does not repeat these profiles. The jackrail has two moulded ploughings in the top face; one side is similarly moulded. The remaining face is unmoulded. Worm-holes run deeply into the sides of the jackrail. The worm-holes are cut open along the bottom, showing that the jackrail was once at least 4mm deeper. At such a depth for the jackrail, the jacks would jam against it, without room to pluck the strings. The jackrail thus could not be original to the instrument, and impressions of its moulding profiles are not offered.

The jackrail is coated with a dark stain, as are all surfaces of cypress normally visible in the instrument. This stain was applied without removing the nameboard or other moveable parts.

Inside the instrument are signatures of a Parisian, Masson, stating his responsibility for the reworking of the interior of the instrument. This reworking was so thorough as to obliterate any evidence of the original framing and knees.

Twentieth-century inscriptions inside the instrument are the following:

1. On the Upper Belly Rail, in black ink:

répari par O-W [?] Masson à Paris / anno Domini 1918

2. On an added strut from spine to bentside:

répari par A-W [?] Masson à Paris[2]

3. Inside the keywell, under the keyboard, in ink:

Restored to playing condition by Lotta Van Buren/ New York 1942[3]

4. In the same hand, to the right of #3:

New soundboard installed 1940

If Van Buren added the soundboard now in this instrument, we may question whether her insistence on authentic restoration practices was carried out as she claimed. The soundboard averages 6mm thick. Twelve bars run from the spine or belly rail to the bentside at a 45° angle from the spine. The heavy bars are thinned toward their tips, but not under the bridge positions above them. Some notes are badly dulled. The antique bridge was removed from the discarded soundboard and re-used. The string scaling figures on page 2 reflect the placement of the bridge on this new soundboard.

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[2]The name is not listed in Norman E. Michel, *Historical Pianos* (Pico Rivera, 1963) nor in *The Pierce Piano Atlas* (Bob Pierce: 8th Edition, Long Beach, 1992), nor in French reference works I could find.

[3]Lotta Van Buren (1887-1960) earns some pages in Larry Palmer's *The Harpsichord Revival* (New York, 1989) pp. 39-45. She began her career as a player in Wisconsin. Visiting Arnold Dolmetsch in Haslemere, she learned maintenance and regulation of his instruments. She became his maintenance representative in the US. She worked at, and became head curator for, the Belle Skinner Collection, prior to its removal from Holyoke to Yale University. She both gave concerts and "restored" the instruments on which she played. Around 1940, Lotta married and moved to California, becoming "Mrs. Bizalian."

5. Inside the keywell of the harpsichord is this faint, pencil inscription:

> Inspectado por
> Barkin y Ormondroyd
> Ingenieros de
> Clavicémbalos
>
> Condición: ἄριστος

I render the inscription "Inspected by Barkin and Ormondroyd, Harpsichord Engineers. / Condition: Excellent." The names are strikingly non-Iberian. According to information from the harpsichordist Laurette Goldberg, the "Barkin" of the inscription would be Joshua Barkin, a California cellist who owned the instrument during the 1950s. To confirm my feeling that the inscription was intended to be leg-pulling or merely playful, I wrote an expert in Spanish harpsichords, Beryl Kenyon de Pascual, who kindly replied that she had never heard of "Barkin" nor "Ormondroyd" in Spain.[4] Barkin bought the instrument during the 1950s from Julius Wald, a San Francisco Bay Area harpsichord builder once working under Van Buren in Massachusetts.

Origin

Presented to MusicSources, Berkeley, California, 1993, by a San Francisco Bay Area donor.

[4]Personal communication, 7 June 1993.

Part II: Ascription to Maker

The next section of the report is an ascription of the instrument to a known maker.

The instrument lacks a maker's signature; no builder's marks remain inside it. In recent years, profiles of mouldings have attracted interest in helping to determine if some of the large class of Italian harpsichords now listed under "Maker Unknown" may be assigned to known makers. I regret the bases of these reclassifications are somewhat technical, but they are straightforward.

The method to reclassify an "Anonymous" instrument as belonging to the *ouevre* of a known maker runs like this: we must begin with what instruments make up and are certified as belonging to the maker's *ouevre*. Then we have to know what to look for as being congruent between these instruments and any instrument newly advanced as deserving to join the *ouevre*.

The MusicSources harpsichord, in its overall layout and in many of its details, is close to harpsichords known to be by Giovanni Battista Giusti of Lucca, who worked at the end of the seventeenth century.[5] For instance, the compass of the MusicSources harpsichord matches that of three of six harpsichords either signed by Giusti or highly likely to be by him. More importantly, the truth may lie in details. The scrolls of the jackrail holders are identical in many of the instruments, including those of the one reported on here. Information about the instruments follows in tabular form. First we need to name these seven instruments, including the one to be added to the six accepted as by Giusti. Much of the evidence has been collected from books, as I know well only the last two instruments listed here.

[5]Biographical details of Italian harpsichord makers are faint, even for famous ones like Cristofori. Nothing is known about Giusti, beyond his living in Lucca, west of Florence. Listings of his instruments in the standard works under "Giusti" need radical updating (viz. Donald Boalch, *Makers of the Harpsichord 1440–1840*, 2nd Ed. [London, 1974], s.v. "Giusti"). The promised 3rd Edition may correct much.

1. Leipzig, 1676, Number 73.[6]

2. Halle, 1677, Händelhaus.[7]

3. Tagliavini, 1679.[8]

4. Nürnberg, 1681, MINe 78.[9]

5. Berlin, "End of 17th Century" (Nr. 317).[10]

6. Smithsonian Institution, Washington, D.C., 1693, "Maker Unknown," but recently advanced to be by Giusti.[11]

7. The MusicSources harpsichord reported on here.

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[6]Hubert Henkel, *Kielinstrumente: Musikinstrumenten-Museum der Unversität Leipzig Katalog, ii* (Leipzig, 1979), #73.

[7]Sasse, Konrad. *Katalog zu den Sammlungen des Händel-Hauses in Halle, 5. Teil: Musikinstrumentensammlung: Besaitete Tasteninstrumente* (Halle an der Saale, 1966), No. MS–67.

[8]as cited in note 1, . . .*Collezione L. F. Tagliavini*, Number 1.

[9]Information available from two sources: (A) Plan issued by the Germanisches Nationalmuseum, Nr. MINe 78; (B) Friedemann Hellwig, *Atlas der Profile An Tasteninstrumenten vom 16. Bis Zum Frühen 19. Jahrhundert im Germanischen Nationalmuseum Nürnberg* (Frankfurt, 1985). Photo, p.10; moulding profiles, pp. 29 and 72.

[10]Staatliches Institut für Musikforschung Preußischer Kulturbesitz, *Kielklaviere. . . Bestandskatalog mit Beiträgen von John Henry van der Meer [et alia]* (Berlin, 1991), Nr. 317, pp. 78–82.

[11]*A Checklist of Keyboard Instruments at the Smithsonian Institution*, 2nd Ed. (Washington DC, 1975), #326.904. Plan by Scott Odell *et alia*, 1974. The instrument is dated 1693 but lacks other inscription. Denzil Wraight assigns the instrument to Giusti on the bases of a match between a moulding profile of known Giusti instruments and one on the 1693 harpsichord; also by matching arcades between signed Giusti instruments and those of the 1693 instrument. See Denzil Wraight, "The Identification and Authentication of Italian String Keyboard Instruments," *The Historical Harpsichord, Volume Three*, General Editor Howard Schott (Stuyvesant, NY, 1992), esp. pp. 119–123.

Comparison of Giusti Harpsichords, Signed and Attributed, To A Possible Addition To Them

	1676 Leipzig #73	1677 Halle, Händelhaus	1679, Tagliavini Collection	1681, Nüremburg	"Later 17th C." Berlin	1693, Smithsonian	Music-Sources, undated
Length (without mouldings)	2302mm	2060mm	2303mm	1947mm	1987mm	2342mm	1955mm
Width	887	760	865	749	760	848	747
Height	255	235	231	227	238	254	176
Right Cheek	523		494	484	525	495	463
Tail	278		261	258	263	265	218
Angle Spine—Tail	62°		61°	59.5°	61°	55°	59.5°
Bottom Thickness	14		14–15	13	11	13	14
Disposition	2X8', 1X4'	2 X 8'	2X8', 1X4'	2 X 8'	2 X 8'	2 X 8'	2 X 8'
Compass	GG/BB–c^3	C/E–c^3	GG–c^3	C/E–c^3	C/E–c^3	GG–c^3	C/E–c^3
Scale C^2 (Long 8')	274		259	264	280	275	285
Stichmaß	523		514	513	513	509	512
Natural key-plates	boxwood	boxwood	ebony	boxwood	boxwood	boxwood	ebony
Sharp riser, covering	ebony	fruitwood topped by ebony	ivory over blackened walnut	ebony slip on walnut	palisander over cypress	ebony slip on walnut	ivory over blackened beech
Arcade	match→	←match→	←match→	←match→	indistinct	←match→	←match
Natural Tails	E-C: 13.8 D: 16.3–17		E-C: 13 D: 17		"D-keys widened"	E-C: 13–14 D: 16.5	E-C: 13 D: 17
Tuning Pin Lines	8' note-staggered		8' note-staggered	8' staggered	?straight?	8' note-staggered	straight lines
Case Thickness	5–6mm.		2.7– 4.2mm.	spine: 14 bentside: 7	spine: 11.4; bs: 5–6.9	3.5–5.2mm.	10–11 mm.
Stop levers	Three levers on wrest-plank.		Blocked lever slots, all stops.	No hand stops.	Levers, now removed.	Two levers on wrest-plank.	Knobs on registers; no levers.
Jack spring	flat brass.		bristle.	flat brass.	flat brass.	flat brass.	bristle.

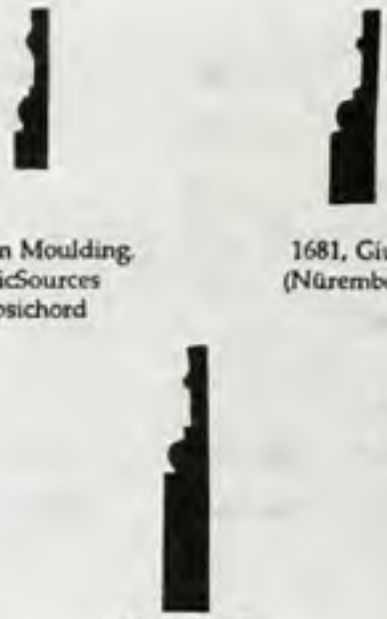
Restoration Report, *MusicSources* Italian Harpsichord, 1993

The MusicSources harpsichord has a size and scale comparable to the three other Giusti instruments of the same compass. But we need something more arresting to decide if it were by the same maker. Small details can demonstrate such familial identity. As with siblings, the instruments by a given maker are not identical. But there are certain particularities showing who is kin and who not.

Catalogs of musical instrument collections now offer images from impressions of the outlines of the wooden strips found at many points on Italian (and other) harpsichords. Some of the images of mouldings below are taken from such recent catalogs. Arguments using mouldings to identify the maker of an instrument first appeared during the 1970's.[12] In 1985, Friedemann Hellwig's *Atlas der Profile* offered a methodology and system of classification for the review of mouldings on keyboard instruments. Efforts are now underway to reproduce all mouldings for a catalog that perhaps will recast our notions of who made what.[13] Signatures, being notoriously unreliable on Italian instruments, may well give way to studies of these delicate strips of wood.

Each moulding bears a number. The prevailing system for such numeration is Hellwig's.[14] The moulding profile we are most concerned about is Number 4. This moulding is placed at the bottom of the case. Here are mouldings at the case bottoms for three of the instruments listed above.

Figure 2. Oulines of Bottom Mouldings on MusicSources Harpsichord and Two Signed Giusti Harpsichords.



Bottom Moulding, MusicSources Harpsichord

1681, Giusti (Nüremberg)

1679, Giusti (Tagliavini)

Ideally, the images should be identical.[15] In practice, mouldings are more likely than other areas of an instrument to suffer from the buffets of time, those at the top and bottom of instruments being at greatest peril. Irregularities aside, these moulding shapes are close enough to have come from the same tool.

We now have a few points on which to base a claim that Giusti made the MusicSources harpsichord. However, one moulding and some similarities in construction practice aren't sufficient to establish the claim.

A moulding differing from the others is a circular one, cut into the facings applied to the keyfronts

[12]Wraight, "Identification," cited in note 11, p. 94, for further history.

[13]Hellwig, cited above, note 9. The forthcoming work cataloguing Italian moulding profiles will be by Denzil Wraight, announced in his "Identification and Authentication of Italian String Keyboard Instruments" (cited above in note 11), p. 90.

[14]Hellwig, *Atlas*, pp. 34–40, expanded by Wraight, "Identification," pp. 158–159.

[15]Thanks to Peter Karsant, D.D.S., for making the impression behind the MusicSources image. The 1681 image is from Hellwig, *Atlas der Profile* (as cited in note 9), p. 72. The 1679 image is from the Tagliavini Collection Catalogue (as cited in note 1), p. 204.

below where the fingers play. These arcades are compared by showing photos against one another.

The arcade displayed on the left is from the MusicSources harpsichord. It is shown opposite arcades from other Giusti harpsichords.[16]

Photo 1. Arcades from the MusicSources harpsichord and the 1677 Giusti in Halle (=790)

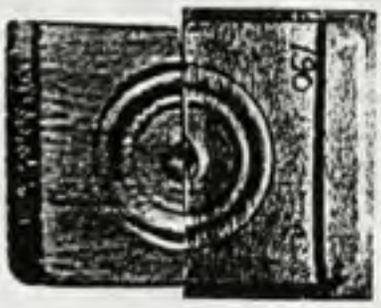
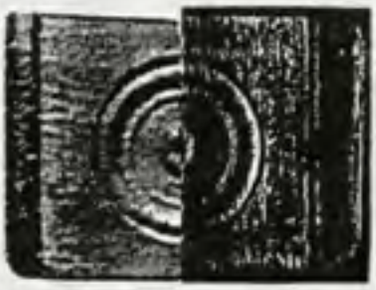


Photo 2. Arcades from the MusicSources harpsichord and the 1676 Giusti in Leipzig (=742)

Photo 3. Arcades from the MusicSources harpsichord and the 1681 Giusti in Nuremburg (=721)



The arcades are identical. What is offered as evidence for including the MusicSources harpsichord in the listing of instruments by Giusti is three-fold: (1) its family features of compass, layout, and size; (2) its sharing an important moulding, from the bottom of the case, with other instruments by Giusti; and (3) the identity of its arcades to other instruments by Giusti.

Although the history of this instrument is unclear and its present condition quite compromised by time, it tells us much we hadn't known about the instruments of Giusti. It sets a new limit to the smaller end of his work. It is the thinnest, two inches (50mm) less tall than any other instrument in the comparative table above.

The keyboard of the MusicSources harpsichord has no battens under the keys, as the others have. The action is similar to those of the three other smaller instruments with registrations of 2 X 8' and compasses of C/E-c^3. The instrument gives me the impression of a plain, smallish instrument, very carefully made where it would be worthwhile to do so, and quickly done throughout. It gives its present audiences pleasure and must have done so for centuries.

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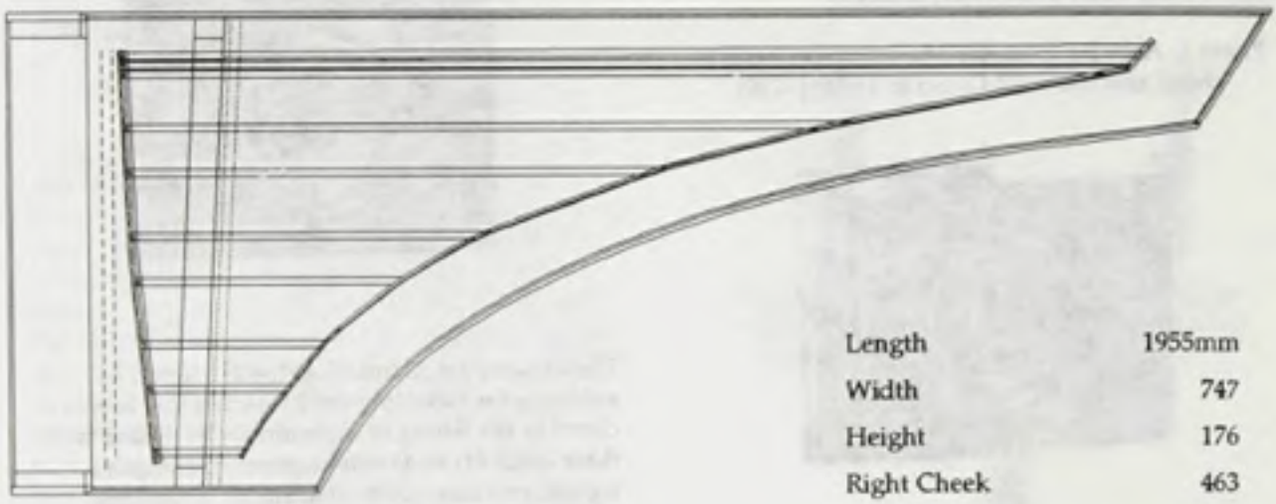
[16]The arcades on the right are from Wraight, "Identification," p. 120. Wraight reports that, because of difficulties in printing of his work, the moulding and arcade images given in the work cannot be used in comparisons, as they are not reproduced full size (telephone call to me, 10/93). Unfortunately, this failure to reproduce scale occurs also in the negative images included in the rear of the work. Wraight did not include a simple scale to measure against in his work.

Restoration Report, *MusicSources* Italian Harpsichord, 1993

Figure 3. Plan view of the MusicSources harpsichord. "C" and "F" keys plotted (also lowest "D").



Length	1955mm
Width	747
Height	176
Right Cheek	463
Tail	218

Photos 4 and 5. MusicSources Harpsichord: Two Views.

HARPSICHORD VOICING

Michael Cole

I have been told more than once that it is difficult to tell the difference between delrin and quill voicing. To prove the point one is generally asked to listen to a harpsichord voiced in delrin with an unspecified number of quill plectra distributed among them - and of course it is very difficult, if not impossible to pick out the foreigners in such company. When I was rash enough to assert that I could always tell which was the medium used, a helpful young man at one of our major keyboard collections was interested to put my self-professed ability to the test, and suggested that I listen to an old Italian harpsichord that he knew I had never seen before. I remember that it sounded extremely loud and bright, which is probably why he chose it, and I have to confess that it did sound for all the world like a delrin job - though I knew it couldn't be. Seeing my perplexity the young man smiled and we passed the matter off. Even now I wonder what manner of 'quilling' this could be: condor perhaps ?

I have encountered condor at other times in museum instruments. There is a place at Hampstead with a Kirckman harpsichord that was voiced in this way (at least when I last heard it), and to be sure it sounded very noble. Such an instrument when well tuned and well played (and I speak as one who listens rather than plays), is capable of persuading anyone to the Kirckman cause. It's not difficult to believe that the maker himself would have approved. Or would he ? He certainly did not use condor feathers himself, and neither did any other 18th century harpsichord maker that I ever heard of - unless it be some dilletante. And it's not hard to discover what materials Kirckman did favour: crow and raven feathers. Nor was he alone.

I have here a catalogue issued by Longman & Broderip about 1773 listing every sort of musical commodity, among which we discover that they sell feathers for use in harpsichord and spinnet - crow and raven quills. In the Broadwood Journals we find that Shudi and his son-in-law used just the same materials. Interestingly, even then, raven quills were at a premium; 50 raven quills cost 7 shillings, but for less than half that price you could have 500 crow feathers. This was quite late, 1784, when the piano age had already begun, when it was normal for one rank of unisons to have hard leather plectra - a sound that was rather more akin to the tone colour of the Zumpe-style leather-covered hammers. In France preferences for quills were much the same. For example the Encylcopedie Methodique, Arts et Metiers 1785 consistently marks crow as the medium to use. And if anyone should object that my sample of witnesses is weightedtoo heavily in favour of late sources we could turn to the Talbot Manuscript in the Christchurch College Library, which Hubbard has transcribed. "Quills crow" writes the indefatigable Talbot, and later on "for trebles crow, Raven best for large instr. with long octave for lowest 8 keys". We may presume that he means a fully chromatic bass descending to CC, and that the raven quills would be used up to D.

The message is plain; who would wish to contradict it? From this the tyro might assume that any antique instruments that have been brought to playing condition would have crow quill plectra, maybe even that those bands that pride themselves on the purity of their period instrument performances would be sure to use such instruments. How mistaken they might be ! I have to say that if there are any such innocents reading this quarterly they will be sadly disillusioned. Very few museum instruments are voiced in crow in spite of the plain testimony of the documentary sources, and although a few

professional harpsichord players do prefer quilled instruments, it is very rare to find one using the authentic choise of the old makers.

Does it make a difference ? Without a doubt I would say; not simply because it produces a sweeter sound, not simply because it makes such a difference to the touch, but because, if we are dealing with antiques, or instruments that purport to be copies, there is no honesty in using any substitute. I am as ready as the next man to keep supplies of delrin for use in instruments that are going to be heavily used, especially if I think it unlikely that there will be anyone on hand who is competent enough to keep the instrument in good regulation. For minimum maintenance delrin is clearly a sensible choice. What I am less happy about is the widespread use of turkey quills, condor quills, vulture feathers and any number of other exotic expedients when we know with perfect assurance that, at least for northern harpsichords, the invariable first choice in former times was crow and raven. We ought to look at its special properties.

To the beginner it might seem that one feather is likely to be as good as any other, but this is not so. And it is often difficult to persuade people of the differences. For example, a kind lady friend, who spends quite a lot of time on the golf course, always picks up for me any crow feather that she sees lying on the fairway. Good strong flight feathers are what we need, and I explain this to her. It is in fact just the first five primaries from an adult bird that are strong enough for the job. I show her, as I show anyone who enquires on the subject, how silky smooth the outer surface is; not blistered like chicken feathers or excessively shiny like most turkey quills. There is an inch or so where the feather meets the flesh that is white in colour and too soft for our purposes. The colour then changes to a silvery grey which after a further inch or so is transmuted into black. At most there will be two or three plectra to be cut from this grey-black area. Cut it in the form of a pen (it is very interesting that old sources so often speak of harpsichord plectra as pens, and of course, we still call the tool for the job a penknife). You discover that as a pen for writing a crow feather is all but useless. It is far too flexible to be at all controlable. This is of course its great virtue. It has splendid elasticity and flexibility. Cut a turkey quill and you see the difference immediately. It is hard and rigid. It is also full of white pith. Crow quills are full of nothing; they are just hollow tubes. My golfing friend understands all this yet she cannot resist bringing me other trophies from her afternoon ramble. Pheasant's tail feathers are a particular favourite. Unfortunately, as soon as you cut one you discover that it is nearly all pith with hardly any residual strength in the outer wall. Magpie's tail feathers are likewise irresistable; they can sometimes be just about usable in the four foot at the treble end but I would not recommend them. Picking them up on the golf course, you would not be able to tell crows feathers from rooks - the birds are so alike, and I think the feathers are too. I imagine that any member of the crow family, over a certain size, would have suitable feathers the necessary flexibity and durability. I gather that there are similar birds distributed in all parts of the world.

Obtaining these quills is not likely to be much of a problem. Here in Gloucestershire farmers (and 'sportsmen') are only too willing to oblige. Rightly or wrongly crows are seen as a pest. But for those who do not like to think of birds being killed on their account all is not lost. Every year after the breeding season, I'm speaking of July in this country, all birds

moult. Song birds stop singing, and all of their cousins go through a morbid phase. This is when my golfing friend finds most of her trophies. I have found that if you have a twice weekly search under the trees where crows habitually roost, you will find all the feathers you need. They will also be well-matured, strong quills.

VOICING WITH CROW QUILL

First examine your jack tongues. Most have been punched with a rectangular broach that is well designed for delrin but entirely unsatisfactory for quill If you are fortunate enough to find antique jacks undisturbed they are quite likely to show a more or less semicircular form, which at least preserves the curved upper surface of the plectrum, which is essential for the strength of crow quills. The best form is a crescent, making a tight fit all around the base of the plectrum. A tool for making a suitable broach is not difficult to contrive. I have found that a piece of silver steel rod, 2.4mm diameter can be ground down to a suitable taper and hollowed underneath. Tool steel would of course be better still. It wants to be polished when you have a satisfactory profile unless you want to have a fight every time you try to extract it from the wood.

Ideally the plectrum takes an upward tilt of about 5 to 8 degrees. On the other hand when working with old jacks one frequently finds that they are horizontal and, horror of horrors, sometimes actually tilted down. If you do not have any thought for conservation you can of course plug such a jack tongue and rebroach it. But if you would rather not interfere with the historical evidence crow quill will allow you a way out. When you have cut your 'pen' and jammed it in the tongue, run your finger nails (finger and thumb pressing along the top and the underside) along the quill towards the tip. You will find that it is possible to impart a curve to plectrum just as easily as to a piece of card or paper - and it retains this shape for a long time. This should give you the necessary upward inclination at the point where it meets the string. This gives essential security in engaging the string on the upstroke and an easy escapement on the return.

When you have all of your jacks ready and a supply of quills the business of voicing begins with the correct selection from among the feathers. Some quills are stronger than others and it is not always possible to tell until you cut them. Naturally you select the strongest for the bass. Look out too for any uneven spacing when the bridges were pinned. Longer reaches will tax your patience. Select your strong quills for this job too, and be prepared for a lot of fiddling to get a performance that matches the shorter reaches. Strip the feather in the area you expect to use, which I suggest will be the pearly grey to black part - about one inch from the end and extending to about a further inch and a half. The white part at the tip is rarely of any use.

With turkey quill, as with delrin, the material is vastly too strong for your purpose, so the business of voicing consists mostly of paring away the underside until the desired degree of flexibility is reached. Not so with crow. You choose the right quill at the outset and paring of the underside is hardly necessary at all. You cut to length in the normal way (upside down on a soft wooden block) being careful to cut always towards the tip, and terminating in a slightly oblique cut just as you would with delrin. Naturally you graduate the width of the plectra so that they are wider in the bass than the treble. A rule of thumb would be that in the bass the tip is about half of the width of the part in the tongue (can be more in some cases) but in the treble they taper to about one third of the width. With whatever medium, one observes

certain rules in setting up the voicing which have been adequately detailed elsewhere. For those who would like directions in this matter I recommend Dave Law's article in the (English) Harpsichord Magazine 1974. As with any plectrum, you initially clip off the back of your crow quill a little proud of the tongue so that, should you find it a little too weak, you can push it through a little farther for another try. If a plectrum is either too weak or too strong one of the first things to do is to take the offending jack out of the instrument and, substituting your finger nail for the string, bend the plectrum while observing from the side. It needs to bend in a smoothly uniform curve. If it does not you must decide whether it is your fault (because it is not tapering in size correctly) or whether the fault is in the material. If it is, replace the plectrum immediately.

A certain amount of adjustment of the strength of a plectrum is possible with crow just as with delrin or turkey, but the limits are much narrower. There is very little substance to cut away. In fact to ease a plectrum all that should be done is to pare away a little at the edges - effectively reducing the width. The basic voicing is done, as I've said, by selection not paring. The experienced voicer will notice other differences compared with other media. Firstly, that the plectra should be left a little longer than with harder materials. The tips may be visible for as much as a millimetre beyond the string. Experience will decide. It will also be found that the length is not nearly so critical: an over-length plectrum does not feel or sound out of place. Crow is a very forgiving medium. It yields. It caresses the string. And this is when you find out whether it is all worth the bother. You have a harpsichord fully voiced. You have balanced out your chords and your octaves in the different registers and you are ready to go. What differences will you notice ? Firstly, you will feel the difference. Crow quills are gentler. You feel a take up, a flexing and finally a release. This surely helps with more expressive playing. Secondly, you will hear a difference. Crow quill sets its own parameters. Fierce voicings are impossible (well nearly impossible) and I think, irrespective of the level at which you have voiced it, the harpsichord will sound sweeter. I think it is something to do with the partials that are suppressed by either the satin smooth surface of the quill (as compared with the hard, shiny surface of other plectra) and partly or alternatively, the curved yet yielding profile. The beginning of the note is certainly different. For want of a better way of describing it I would say that it is more sympathetic. With turkey quills (or goose, or condor etc) you can easily get a good imitation of delrin; with crow and raven quill, you never can.

PROBLEMS

In former times it was always complained of - quills needed to be replaced or adjusted too often. It was one of the chief rejoicings of the early piano players that their hammers did not need to be attended to as the quills did in harpsichords and spinets. Likewise, it was, and still is, one of the chief joys of a certain type of revival harpsichord that it does not need to be tuned so often as the more traditional type ! To what extent does one sacrifice sweetness of tone for convenience of use ?

Within hours of finalising the voicing you will find that some of the plectra begin to misbehave. Or so I have found. Odd plectra here and there develop a stiffness. The note becomes stiff, hard to play; maybe it will not play at all. This seems such a disappointment - can all of your efforts have such a depressingly short life ? The answer is no, not necessarily. The problem,

I have learned, is very easily tackled. We have a method which works like a charm. The stiffness is caused by a small patch of wear on the plectrum. Wear ? So soon ? Well, all I can say is that, if you inspect the offending plectrum with a magnifying glass you will see a small patch of grey, matt. roughness where it meets the string. Take the plectrum between your finger and thumb nails and draw towards the tip - once, that is all. Put it back in the register. To your profound delight it will play just as it did when you first voiced it ! Why does this happen ? I wish I could say that I knew. I presume that in such cases, and I stress that it is only in a few of the plectra, wear occurs very quickly and is just as easily solved by the method described. After a few days of playing in you should discover that such problems diminish rapidly. I repeat, if you have a problem, do not replace the plectrum automatically; try the remedy. Most quills soon settle down. If you have a problem that refuses to yield to this treatment, yes, replace it. I think it helps if you use only harder, well-matured quills. If you use quills from immature birds you will increase the problems. Also, do not take quills from birds that meet an untimely end in the early autumn when their feathers are relatively new.

Problem number two is to find quills strong enough for the bass. "Raven best for bases" Talbot would no doubt advise but, unfortunately this bird is now a protected species in Britain. Not that I find them to be anything of a rarity in the mountains of Wales, not fifty miles from here. I see them perching near the road as I drive over the Gospel Pass to Hay on Wye, eyeing me apprehensively as if they had heard something none too pleasant about harpsichord makers. Where they cast their feathers in that great wilderness heaven knows. But all is not lost because, although raven may be best, crow will suffice. The exceptional, strong feather will do the job right down to the FF on a Kirckman. It can be done.

SOME REFLECTIONS

I have asked some other harpsichord restorers and technicians why it is that they persist in using turkey quills and other exotics when they know this is historically incorrect. My persistence in persevering with crow quill is met with disbelief in some quarters. "Why bother ?" says one,"when turkey quills are just as good". "Condor feathers are the best thing I've ever found for the job" says another. In more thoughtful vein I have elicited a statement that crow feathers are not strong enough. "They can't be getting the same food as they used to eat" was offered as a half-hearted rationale. These comments are of course "unattributable" as they say in journalistic circles. But it does appear that the reason why substitute feathers are so widely in use is that the persons doing the voicing feel the crow quills are not strong enough for the level of voicing that is expected.

This brings us to the point of it all. If we persist in using different materials because we find ourselves disatisfied with the right thing what can we ever hope to learn ? And, more importantly perhaps, is it honest ? However well-intentioned we might be, no matter how much integrity we think we can muster, if we do not accept the parameters that we know to be truly historical, our aim will always be pulled off target. Rather like reading poetry in translation, we never quite capture the spirit of the original.

A FOOTNOTE

It may be that there are some people reading this who have a harpsichord in their care, voiced by someone else, and they wonder how to tell what sort of

quills have been used. I suggest that a few jacks be taken out and examined. First, look at the back of the tongue. If you can see white pith jamming the plectrum in the slot you are not looking at crow quill. Or raven. Or any other member of the Corvids. Turn the jack upside down and look at the underside of the plectrum. If you can see black and white zebra stripes running along the quill you are probably looking at black turkey; that is the commonest material. Crow and raven quills show a pearly underside, not unlike the inside of an oyster shell.

If you have a pith-filled type of quill you will need to do regular maintenance, lightly oiling the underside near the tongue to preserve some degree of flexibilty. If you leave them to their own devices they will become as hard as iron. Crow quills can be left alone for years.

CODA

There is much more that might be said on this subject but it is not unlikely that I have already over-taxed the readers' patience. Having little time to prepare such material and organise my thoughts I have simply sat down to the typewriter and dashed off whatever came to me most readily. I hope it may be of some use to someone. I would be delighted to hear of some others' experiences in this field and I do hope that no-one will find anything in this communication in any way offensive.

Milanese keyboard makers - 16th century

While researching Milanese violin makers, I came upon some documents regarding keyboard instrument makers.

In 1568 a certain Giovanni Antonio Brena (or Brenna) applied for a patent. In the letter he wrote to the city government, he states that he invented a new kind of alpicordo, or better, a new mechanism to modify the pitch of keyboard instruments without retuning the strings. As he explained, this was a very interesting improvement for musicians who wanted to play in ensembles with any other instruments. The Italian text is as follows: Gio Antonio Brena ... ha trovato con suo ingegno et mera industria uno modo altifitioso inusitato di alzar et basar li tuoni non piu' fatto ne' inteso da persona experta in tal arte con il quale si puo' acomodar dessi instrumenti in qual si voglia concerto quantonque intervengi diversita' de instrumenti senza alzar ne basar corde et con uno solo registro (transl.: Gio Antonio Brena found by his own genius and industry a new way to raise and lower the pitch of the keyboard, neither made nor known by any other expert in such art, with which any instrument could be accomadated to any type of ensemble, however varied, without raising or lowering the pitch of the strings and with only one register).
The mechanism is not precisely described. The letter ends with the request for a patent: Brenna wanted to be the only maker to be able to make instruments with this innovation for ten years.
The Governor of the State of Milan asked for comments by other makers, and received a lot of answers.
A monk named Stefano de Ferrari da Modena, living in Milan, stated that he had invented an instrument called clavacimbalo of which it was possible to raise and lower the pitch by a tone without shifting the keyboard and that he understood from many that a gentleman from Verona made a clavichord of which it was possible to raise and lower the pitch three tones by moving the keyboard (io ho fatto fare di mia inventione un instrumento detto clavacimbalo che si puo' alzare et abbassare un tono senza movere la tastadura. Et ho inteso da molti che un gentilhuomo di Verona ha fatto un clavicordo, il qual si puo' alzare, et abbassare tre toni movendo la tastadura). Stefano de Ferrari was not a maker, as he writes that he had the instrument made for him, although he invented the new mechanism.
Two musicians, Orpheo de Cornai and Camilo Marliano, reported that they had seen both organs and plucked instruments with such a mechanism in other towns before the "invention" by Brena.
Anyway, there was a real inquiry, and two important makers were heard from: Cristoforo Vavassori and Annibale de Rossi.
Vavassori claimed to have heard that the inventor of the new mechanism was a man called Brunetto who lived in Verona adding that by request he could have the mechanism adapted to his

instruments, and thus it was not right for Brena to patent it.
More complete is the statement by Annibale de Rossi, who reported that he already knew of the request by Brena, but believed there was absolutely no reason for taking it into account, since Brena had merely copied the new mechanism from a harpsichord he had seen in Ferrara. De Rossi suggested that Brena himself would have to confirm this statement if asked to. Anyway, he wrote a letter too, and this informs us of the importance he attached to this affair. In his letter Annibale emphasized his fame as a renowned harpsichord maker in Italy and abroad (e' notorio in questa citta' et altre de ittalia et fuori della virtu' tiene il supplicante in fabricar tali instrumenti di alpicordi), and repeated that the patent should not to be issued. He also affirmed the absolute superiority of his own instruments by referring to those of Brena, and to be ready to demonstrate that, if necessary. There is a very important historical fact we learn from this letter: Annibale's name was originally Annibale de Arosio, which was subsequently changed to de Rossi, a very common surname. Arosio is a small town about thirty kilometres north of Milan.
On the contrary, Giovanni Antonio Brena submitted testimonials from a few musicians to the Governor of Milan in order to demonstrate the originality of his invention. The letter is signed by seven men, including Gio Batta Perotto, organist of the Duomo, and Gio Battista di Stagnoli Veronese, probably an organ maker (maestro de organi).
The patent was not issued. Brena then wrote a second request to get the patent, but this is the last document regarding this story I was able to find.

There are two more documents of some interest: two letters were sent by Cristoforo Vavassori and Gio Antonio Masotto to the Milan city government at the end of the 16th century. In these letters, they testify that the keyboard instrument makers were not part of the wood workers' guild, the Scuola di San Giuseppe dei Legnamari. This powerful corporation tried to force Vavassori and Masotto to submit to its authority, for they used tools that were reserved to the wood workers. Vavassori and Masotto wrote that agents of the guild had come to their workshops and sequestrated their tools. They noted that the craft of wooden pipe organ building required the use of such tools, but theirs was not a similar type of work to that of the wood workers'.
It is quite interesting that at the end of the 16th century there was such a dispute. As I reported, 150 years later the harpsichord makers were part of the guild, although there is no reason to suppose that the organ builders were also members. Anyway, in the letter Vavassori wrote together with Annibale de Rossi in 1569 he defines himself as a harpsichord maker (faber alticordorum), while in this second document, dated 1596 he states to be an organ maker (maestro d'organi). In the other letter, Gio Antonio Masotto is called costruttore d'organi e regali (organ and regal maker) as well. Probably, during the second half of the century the harpsichord makers joined the corporation, while the organ builders never fell under its

jurisdiction. Vavassori was a famous organ builder: he made the second organ in the Duomo of Milano (the first one was built by Giovanni Giacomo Antignati). His father Bassiano and his son Giulio were organ builders as well. Gio Antonio Masotto was not so important, but was the maker of a famous organ in Masserano di Biella (1603).

Note: the above mentioned documents are in the Archivio Storico Civico of Milan. The references are respectively Materie 822,8 and Materie 684,4.

FoMRHI Comm. 1232 John Downing

An Alphabetical String Gauge System

Robert B. Armstrong in his book "The Irish and The Highland Harps",published in 1904, described three harps of the "neo Celtic" style (early 19th C.) that he had examined at first hand.
All three harps were partly strung with steel and brass wire which Armstrong thought might have been either the original strings or replacement strings of the same material and gauge as the original strings. Although these instru--ments were not true Irish harps, their stringing may have been representative of that of the last of the traditional "high headed" type of Irish harp still being played during the last decade of the 18th C. and, therefore, of some interest.

Unfortunately, in recording the string gauges, Armstrong used a gauge system unfamiliar to me. For example, a harp presented in 1872 by the Ven. Archdeacon Saurin to the Victoria and Albert museum was described as being fitted with the following stringing arrangement:

strings 1 to 17 - all gauge C, first octave .....steel

strings 18 to 26 - all between gauge D and E, 4th octave .....brass

string 27 - gauge D, 4th octave .....brass

string 28 - between gauge D and E, 4th octave .....brass

string 29 - between gauge E and F, 4th octave .....brass

string 30 - between gauge D and E, 4th octave .....brass

strings 31 & 32 - between gauge E and F, 4th octave .....brass

string 33 - missing

String lengths ranged between 2.75" (70mmm) to 42.5" (1080mm).

Can anyone provide information on the string diameters represented by this gauge system?

A c.1900 STRING GAUGE AND AN UNWOUND VIOLA C STRING

At the November Early Music Exhibition in London, Michael Heale gave me a string gauge that he thought was from early in this century and English. On one end, around the hole for hanging it up, is stamped 'J W' above and 'B S' below, and on the side is 'No 31538'. Above the hole is stamped 'REG. F. DEP', which looks rather French. But stamped elsewhere on the gauge are the instrument names 'VIOLIN', 'VIOLA' and 'CELLO' in English. The marks of the scale along one edge of the wedge-shaped slot for measuring string diameter are 1 mm apart. The number '5' is over the mark at the thin end. At 10 mark intervals apart are the numbers '10', '15' and '20', so each mark represents ½ a unit. The mark at 5 marks away from each number is longer than the others, at 7½, 12½, 17½ and 22½ units. This seems quite odd since it makes the scale hard to read. The last mark, at the widest point, is at 24 units. After putting a few strings of known diameter in the slot, it became clear that the unit is .1 mm, and the range of the gauge is from .5 mm to 2.4 mm, with marks at .05 mm intervals.

These intervals are 'grades', the traditional 19th century scale for strings, discussed by Hepworth (c.1900) and surviving today as PM (Pirastro Measure). But for the scale to measure 'grades', the numbers should be 10, 20, 30 and 40, twice what actually appears, which would make sense of the longer marks at 5-mark intervals. For the marks to represent thousandths of an inch (thou), the numbers should be 20, 40, 60 and 80, which is twice again.

Michael Heale had a pile of these string gauges, probably acquired at the sale of the effects of some old violin dealer. I suspect that the pile survives as a pile, and was not distributed to customers, because of a mistake in the numbers of the scale. My scenario of what happened is that the gauge was ordered by an English dealer from a French gauge manufacturer. The dealer wanted the units in thou rather than in the grades usually made. The manufacturer divided when he should have multiplied the original grade numbers by 2.

There are also marks showing the ranges of diameters of each of the strings of each instrument. These ranges should not be affected by the suggested mistake in the numbers on the scale. On the unwound gut strings, one mark serves for both the maximum thickness of the thinner lower-numbered string and the minimum thickness of the thicker adjacent higher-numbered string. This implies that the full range indicated for each need not have been used for each string. On the following list of the indicated ranges, in parentheses next to the diameters of the first three strings of the violin, is the row letter in another Comm of mine in this Q, to indicate the relative tension in historical perspective.

String Number	Violin			Viola			Cello		
1	.50(B)	to	.65(F)	.80	to	1.00	1.25	to	1.40
2	.65(-1)	to	.90(F)	1.00	to	1.17	1.40	to	1.70
3	.90(-2)	to	1.15(C)	1.17	to	1.35	1.70	to	2.15
4	.70	to	1.00	1.35	to	1.50	1.40	to	1.70

The violin string diameters indicated by the French string gauge c.1900 mentioned in the other Comm in this Q fit into the ranges given here.

Of particular interest is that, while the violin and cello 4ths are thinner than the 3rds, indicating wound 4ths, this is not the case with the viola 4th. An all-gut viola stringing around 1900 is a surprise. But it is just about believable, considering how low the tension gets on the 3rd, and particularly the 4th string. This implies that a particularly dark tone on the low notes on the viola was desired then, and low projection was not a problem.

Of course, there is the possibility that there was another mistake, and the 'C' and 'G' markings for the viola on the gauge were reversed. There is no internal evidence on the gauge to support a mistake conjecture, as there is for the other one. For that, one needs evidence from other French or English string gauges of the period. Does anyone have any?

 Ephraim Segerman

HISTORICAL VIOLIN STRINGINGS UP TO 1900

This Comm reproduces an NRI brochure I recently wrote with small changes to make it appropriate for a Comm, including the elimination of prices and references to them. The original brochure is available from NRI, under the same title, for the asking.

All of the information in this Comm is taken from *The Strad* (1988), pp 52-55 (Jan), 195-201 (Mar) and 295-299 (Apr), where there is further detail, information and explanation. The intention here is to offer guidance for violinists who would like to explore how the original stringings of baroque-, classical- and Romantic-period violins felt and sounded like, and how this might influence their interpretations of music from these periods.

This is the most ambitious way of attempting to eliminate the problem posed by modern listeners enjoying early-music performances using modern stringings while naively expecting them to be as historically accurate as scholarship can tell. Most violinists are unaware of the position of scholarship on this matter, and don't appreciate that there is a problem. If they come across the above-mentioned Strad articles or this Comm, they might try to avoid facing the problem by claiming that the evidence is 'not strong enough to be convincing'. As shown below, scholarship cannot accept this position. Trying to educate the public with the truth leads only to disappointment and confusion about what early music is about. The most practical honest approach is just to avoid the problem by refusing to be party to any claim of historical accuracy. An uncommon level of commitment to and curiosity about violin history is required for violinists to use the information on historical stringings that follows:

In the first Table we list the sources providing information concerning whether the four violin strings were at the same tension (equal-tension stringing) or, as is universal today, the 4th string was at the lowest tension, the 3rd had greater tension, the 2nd had greater tension yet, and the 1st had the highest tension of all (progressively-changing-tension stringing).

EVIDENCE OF TENSION DISTRIBUTION

Country	Equal-Tension Stringing		Progressively-Changing-Tension Stringing	
	Source	Year	Source	Year
England and France	Mersenne	1635	Sibire	1806
	Brossard	c.1712	Plessard	1874
	L. Mozart	1764	Bishopp	1884
	Fetis	c.1836	Heron-Allen	1885
	Savart	1840	French string gauge	c.1900
	Delexenne	1853		
	Savaresse	1869		
	Huggins	1883		
	Hepworth	c.1900		
Germany	L. Mozart	1756,1769	Spohr	1832
			Schroeder	1887
			Weichold	1892
Italy	De Colco	1690	Ricatti	1767
	Stradivari	c.1700	Ruffini	1883
	Tartini	1734		

From this Table we conclude that before the middle of the 18th century, equal-tension stringing was usual throughout Europe. At that time, progressively-changing-tension stringing was introduced in Italy in association with the introduction of a wound 4th string there, and soon became the usual type of stringing from then on in that country. This type of stringing spread to the rest of Europe by the end of the 18th century, probably in association with the popularity of Italian opera. Nevertheless, a large fraction of violinists in England and (especially) France still used equal-tension

stringing throughout the 19th century.

In the next Table, we list the evidence on the types of construction of violin 3rd and 4th strings used up to 1900. The first two strings were always of gut. None of the evidence distinguishes between low-twist and high-twist gut. Low-twist gut is necessary for the 1st string, and lasts longer for the 2nd string. Except for the Talbot ms, none of the evidence for the 3rd or 4th string distinguishes between high-twist and catline gut. A catline's rope construction is much more necessary for a 4th than a 3rd string. Where 'Wound' is listed, the source does not distinguish between open-wound and close-wound construction.

EVIDENCE OF VIOLIN 3RD AND 4TH STRING TYPES

(Not listed is all 19th century evidence indicating a Gut 3rd and Close-Wound 4th; the one exception, a German one, is listed)

Country	Source	Year	Third String	Fourth String
England	Mersenne	1635	Gut	Gut
and France	Talbot	c.1694	Catline Gut	Catline Gut
	Brossard	c.1712	Gut	Gut OR
			Open Wound	Close Wound
	Fouchetti	c.1775	–	Wound
	Laborde	1780	Open Wound	Close Wound
Germany	Meyer	1732	Gut	Wound (probably Open)
	Lohlein	1744	Gut	Wound (probably Open)
	Quantz	1752	Gut	Wound (probably Open)
	L. Mozart	1756	Gut	Gut or Open Wound
	Gunzelheimer	1855	Gut	Gut
Italy	Stradivari	c.1700	Gut	Gut
	Tartini	1734	Gut	Gut
	Ricatti	1767	Gut	Wound (probably Close)

The first evidence for the availability of wound strings is from 1664 (Playford), and the only evidence of their use before the end of the 17th century is for the lowest string of some bass instruments, usually to perform the functions of larger ones. As seen from the Table, the French started using an open-wound 3rd and close-wound 4th early in the 18th century, and this became their standard stringing through most of the rest of the century. While the Italians only used gut 3rds and 4ths, the Germans, strongly influenced by both the Italians and the French, adopted a compromise stringing with only a wound 4th. That this was open wound (or just gut) is deduced from Leopold Mozart, who indicated the the 4th was the thickest string. Since the late-18th century Italian progressively-changing-tension stringing spread to dominate Europe in the 19th century, and 19th century stringing involved a close-wound 4th, it is likely that the close-wound 4th was associated with this type of stringing from its beginning (Ricatti).

Before listing how heavy historical violin strings were, we first list the diameters or EDs (equivalent diameters in solid gut for the same weight) of all of the violin strings within the historically-indicated ranges, given at semitone-step intervals of heaviness. It is arranged so that the lettered rows are equal-tension sets. The rows marked -2, -1, +1 and +2 are needed to cover the diameters (or EDs) of strings used in progressively-changing-tension sets and not used in the equal-tension sets. Equal-tension sets will be identified by the row letters, while the progressively-changing-tension sets will be identified by the row for each string, showing well how the tension varies. The first string in each of the equal-tension sets is one semitone-step heavier than theoretical equal tension with the rest of the set would be, but it ends up close to the same tension as the others when it gets thinner from stretching.

HISTORICAL RANGES OF STRING DIAMETERS (OR EDs)

ROW NAME	VIOLIN 1st Diameter thou	mm	VIOLIN 2nd Diameter thou	mm	VIOLIN 3rd Diameter or ED thou	mm	VIOLIN 4th Diameter or ED thou	mm
-2							54	1.36
-1							57	1.44
A	19	.48	27	.68	40	1.02	60	1.53
B	20	.51	28.5	.72	43	1.08	64	1.62
C	21.5	.54	30	.76	45	1.14	68	1.71
D	22.5	.57	32	.81	48	1.21	72	1.82
E	24	.61	34	.86	51	1.28	76	1.92
F	25	.64	36	.91	54	1.36	80	2.04
G	27	.68	38	.96	57	1.44	85	2.16
H	28.5	.72	40	1.02	60	1.53	90	2.29
I	30	.76	43	1.08	64	1.62	95	2.42
J	32	.81	45	1.14	68	1.71	101	2.57
+1	34	.86						
+2	36	.91						

Listed in the following Table is the heaviness of the violin strings in the sets we have historical evidence for. In those sets with equal-tension stringing, the Set Name gives the letter of the relevant row in the previous Table plus, in parentheses, the type of the third string followed by the type of the 4th string (with 'g' meaning unwound, 'o' open-wound and 'c' close-wound). In those sets with progressively-changing-tension stringing, the rows in the previous Table are given for the first-to-fourth strings in that order. The string types for these sets are all with an unwound gut 3rd and a close-wound 4th. It is assumed that the first two strings in all sets were low-twist gut, and when the 3rd and 4th were unwound gut, they were (following Talbot) both catlines. It is also assumed that by the final third of the 18th century, wound 4ths had become so universal that rope construction catlines ceased to be made. Thus, in sets which had an unwound gut 3rd and a close-wound 4th, which date from then on, the 3rd was of high-twist gut.

EVIDENCE OF STRING WEIGHTS IN HISTORICAL SETS

	Equal-Tension Stringing				Progressively-Changing-Tension Stringing			
Country	Source	Year	Pitch Std	Set Name	Source	Year	Pch Std	Set 1,2,3,4
England and France	Mersenne	1635	-2	J(gg)	Sibire	1806	0	G,G,F,E
	Talbot	c.1694	-2 to 0	A(gg)	Plessiard	1874	0	G,F,D,A
	Fouchetti	c.1775	-1	G(oc)	Bishopp hvy	1884	0	G,E,D,B
	Fetis	c.1836	0	H(gc)	medium			G,E,C,A
	Savart	1840	0	H(gc)	light			E,D,B,A
	Savaresse	1869	0	F(gc)	Heron-Allen	1885	0	G,F,D,C
	Huggins	1883	0	F(gc)	French string			
	Hepworth	c.1900	0	C(gc)	gauge	c.1900	0	C,C,A,-2
Germany	Muffat	1698	-2 to 0	C(gg)	Spohr	1832	0	+2,J,H,G
				C(go)	Schroeder	1887	0	G,F,E,C
					Weichold mx	1892	0	H,G,D,B
					minimum			E,D,A,A
Italy	Stradivari	c.1700	-2	J(gg)	Ricatti	1767	-2	G,E,B,-2
	Tartini	1734	-2	I(gg)	Ruffini	1883	0	G,F,D,B
			FOR COMPARISON:		NRI	heavy	-1	E,C,B,A
					MODERN	medium		D,B,A,-1
					BAROQUE	light		C,A,-1,-2

When the violin began late in the 16th century, it was renowned for its loudness. This leads us to expect that the very heavy stringing in Mersenne's evidence (J sets) was universal in his time. It is possible that in Protestant Germany then, where the pitch standard (given by Praetorius) was a tone higher, the strings were two semitone steps lighter (H sets) to have the same tension and projection.

Later in the 17th century, the viol was the favourite of the French aristocracy, who insisted on playing with the violins, so violins adopted very low tension for balance. This stringing was exported to England in the Restoration, from where we have the Talbot evidence (A sets). In England then, the violin played at close to modern pitch in fiddle bands, but tuned down a tone to play with viols. Evidence from Prin (about marine trumpet and bass violin strings) implies that by 1742, French (and probably English) violin tension was up again, to that indicated by Fouchetti (G sets).

Muffat compared German and French stringing, and it is likely that the same strings (C sets) were used for all of the 18th century pitch standards. The Italians appear to have continued the early use of heavy stringing (J sets) to at least the middle of the 18th century. A piece of evidence from 1743 indicates that Tartini had recently increased his string-tension level, possibly up to the previous level which had been dropping.

There is no evidence about how progressively-changing-tension stringing progressed in Europe in the final third of the 18th century after its adoption in Italy. It was probably adopted in Germany before France. Sibire's early 19th century evidence shows a compromise between this stringing and equal-tension stringing. There is considerable evidence that violin string tensions went particularly high in the second quarter of the 19th century. This is reflected in Spohr's stringing (as heavy as the instrument could bear), and more mildly in Fetis's and Savart's stringings. The lower tensions after that are marked by similar but quite diverse stringings. Bishopp's 'light' stringing shows the beginning of a c.1900 movement in England and France for very light stringing, which developed into the Hepworth and French-string-gauge sets. That movement did not last, but the pressure for lower tension continued, presumably for less effort in playing and quicker response. Modern violin stringing has tensions very similar to Bishopp's 'light' stringing.

It is unfortunate that no stringing evidence is known for Germany in the late 18th and early 19th centuries, when much revered music (e.g. by Haydn, Mozart and Beethoven) was written. When the Italian stringing (as reported by Riccati) spread throughout Europe (with progressively-changing tension and the 3rd string unwound and the 4th close-wound), there was some compromise with local traditions in string heaviness. The Sibire stringing is an example of French compromise. The Germans were more receptive to Italian influence than the French, so one would expect the German compromise to be more Italianate. A set with string heaviness distribution such as GECA could be appropriate for this period in Germany. Since it happens to be Bishopp's 'medium' stringing, it also is appropriate as a good late 19th century stringing.

Many of the estimates made here when interpreting the evidence, and interpreting what stringings were used when evidence is lacking, can be argued with. Somewhat different interpretations might be just as valid. What is not valid is ignoring this evidence while claiming that one's modern stringing is as historically accurate as scholarship allows. The excuse behind this claim is that scholarship cannot say anything 'meaningful' about it because the evidence is so 'dubious', 'weak', 'fragmentary', or some other dismissive word or phrase.

Knowledge (other than of the personal type or of fashion consensus) is what scholarship produces. The authority of scholarship is based on objectivity in its handling of evidence and in its choosing of the generalisation that is best supported by the evidence. Judgement is very important in seeking evidence and thinking up generalisations, but is minimised in favour of objectivity when coming to any scholarly conclusion. Objectivity in handling evidence insists that, though we can think of many reasons why a piece of evidence could be wrong, unrepresentative or misleading, unless we have real evidence to the contrary, we must accept that it is true, representative and what it seems to be. This principle of conservation of evidence is necessary to avoid the maligning or ignoring of contrary evidence while promoting any theory one likes. This malpractice or false scholarship cannot lead towards objective truth. What is presented here IS the scholarly history of violin stringing until someone comes up with new evidence, or with an objectively better interpretation than this one which takes all of the evidence just as seriously.

FoMRHI Comm 1235 Ephraim Segerman

On Catlines and Pistoy Basses

I have not found a recorded use of 'Catlin', with or without an added 'e' or 'g', in a nautical context. This is in agreement with Catch in his Comm 1202. As I understand English pronunciation at the time, an added 'e' or 'g' would be silent, so all three words were homonyms. The kitten meaning (spelled with a 'g' on the end) would be appropriate for a lute string because one strokes it for pleasure. Since 'line' and 'rope' were synonyms, 'Catline' (spelled that way by Dowland) would also be understood to mean 'Cat-rope', although the latter was the traditional nautical term. This meaning would be appropriate for a thick flexible lute string with rope construction. I suggest that it was the coincidence of these two meanings that inspired the name used to describe this type of lute string.

'The peculiar construction of modern catline strings' Catch writes 'is based solely on the ingenious conjecture of Segerman ...'. Whether that construction is 'peculiar' (or the conjecture 'ingenious') depends on one's judgement, based on experience and prejudices. The motivation for postulating that construction had nothing to do with the name. We have strong evidence that gut-strung instruments did not have metal-covered basses available for them before the middle of the 17th century, and that their adoption was gradual after then. The expansion of open-string ranges by half an octave on many instruments late in the 16th century is unlikely to have been associated with increased tolerance for poor-sounding basses. Thicker ordinary gut strings, as are available for harp, demonstrate that poor sound. The motivation was to find some way besides winding metal around the gut to provide the required weight (for audibility of a clear tone) plus the required flexibility (for in-tune fretting and some in-tune harmonics) on the low-pitched strings of a late Renaissance or early baroque lute tuned two octaves and a half lower than the highest string. Rope construction is one such way, and support for its use comes from Mersenne's statement that gut strings were made and sold by rope makers. For more details, see Comm 773 (Q46).

Another way is by incorporating a slurry of metal or metal compound into the string when it is made and twisted up. Such strings would be strongly coloured, and they are now being made and sold by Mimmo Peruffo (his address is given in the List of Members 2nd Supplement, Oct. 1993). Dowland mentioned coloured strings and advised choosing the lightest colours. If the colour was associated with incorporated metal-compound loading, Dowland seemed not to have appreciated this virtue. Mace mentioned string colours, clear blue being the best. He also mentioned Pistoy Basses, which he believed were 'Thick Venice-Catlins, which are commonly Dyed, with a deep dark red colour. They are indeed the very Best, for the Basses, being smooth and well-twisted Strings, but are hard to come by; However out of a Good parcel of Lyon Strings, you may (with care) pick those which will serve very well. ... Your Pistoys, or Lyons, only for the Great Basses.'

Mace mentioned that Venice-Catlins were used for the 4th and 5th courses and most of the low-octave strings on the lower courses. There were seven of those others, so the Great Basses that used Pistoys and Lyons were used at most on the lowest three courses of the lute, all going to the special 4-course extension pegbox on his 12-course lute. The lowest course sharing the same nut as the high strings was two octaves below the highest string. So Pistoys were used only on strings tuned lower than two octaves below the highest string (on the same nut). That is just where I would switch from 3-strand catlines to 2-strand ones. Incidentally, after many years of making rope-construction strings, we at NRI have just discovered a way of putting much more twist into them, making them much brighter in sound. Being so 'well-twisted' could well be the factor that made Pistoys so good.

There are quite a few paintings which show strings of different colours. I have not seen any which show the Pistoy Bass colour where we would, from the above, expect it to be on the instrument. Whether or not Pistoy Basses were loaded with a metal compound, the evidence indicates that they were not a staple component of early stringing practices, as catlines and Lyons were.

The musicians I've talked to who have tried Peruffo's strings say that they sound very well. I'm sure that they would say the same about the open-wound and 'tigerline' strings that we make. With the evidence I am aware of, there is no difference in lack of historical justification for their use while claiming to emulate typical pre-1660 conditions.

FoMRHI Comm 1236 John Downing

Bogwood Again

According to tradition,Irish harp makers often used ancient timbers dug from peat bogs as material for their soundboxes.

In Comm. 1074 I speculated that this material might have been more stable than other more conventional timbers making it less liable to checking during seasoning - a major advantage when shaping large soundboxes from solid logs.

I have recently come across another reference to bogwood, or more specifically bog oak, in "Cassel's Wood Carving" published by Cassell & Co. Ltd. London in 1911 (see note 1). In a chapter dealing with woods suitable and commonly available for carving, bog oak is described in quite some detail. The following summarises the information.

Bog oak was used for making small carved objects - part of the peasant craft trade in Ireland. The wood was found embedded in the decaying vegetable matter of bogs and was often in the preliminary stages of putrifaction.
The wood was hard, close grained and capable of taking a high polish. It closely resembled ebony being almost black in colour but from time to time could be found with the characteristic medullary rays still faintly visible.
Bog oak required careful treatment after excavation from the bog as it was liable to violent splitting and checking if not properly stored and dried.
On removal from the bog, all sapwood and rotten areas were cut away and the log allowed to drain for a few days under cover. The logs were cut to the minimum length possible and then sawn into planks for drying. Preferably drying should be undertaken with the planks clamped in a frame to minimise twisting and warping.
Seasoning generally took around 3-4 years, the wood becoming much harder and more brittle as it dried. For this reason working or carving of the wood was usually undertaken before the wood was fully seasoned.

If this description applied to the seasoning of bog willow, as it most likely did, then my previous assumptions about the stability of this wood during seasoning are clearly incorrect. It would appear that bogwood has no advantages in this respect after all.
I would guess, therefore, that the main reason bogwood might have been used, given that it is an excellent carving material and presumably has good sound properties, is that it was more readily and cheaply available in the large sectioned logs required for the soundboxes.

In the light of the above information, the process of carving soundboxes was probably the same for both bogwood and green willow. Following initial draining of the log, it would have been carved to shape leaving excess thickness in the walls. After another longer period of drying, the carving would have been finished to final dimensions and the soundbox then left to complete the seasoning process before being used.

Note:
1. Re-published by Dover Books under the title "Manual of Traditional Wood Carving", edited by Paul N. Hasluck.

FoMRHI Comm 1237 John Downing

Below Bridge Bars in Lutes - A Missing Link?

Over the course of the years, I have come across three examples of instruments - an ud, a mandolino and a guitar - with barring systems that include a full length, transverse bar located between the bridge and bottom of the belly. These bars, unlike the small bass bars often found in surviving lutes of the 16th and 17th C. are of substantial depth - comparable to the main bars supporting the belly.
Sketches of the barring arrangements on these instruments is as follows:

Fig. 2 - North African Ud, date unknown but probably late 19th early 20th Century (author's collection). See also Comm #75.

Fig. 3 - Mandolino by Giovanni Guiseppe Fontanelli, Bologna 1736. Charles van Raalte Collection, Kilmarnock, Cat.#39

Fig. 4 - Guitar by Grobert, Paris, early 19th C. Musee Instrumental du C.N.S.M. Cat.# E.375 C278. (See also note 1)

These below bridge bars may be just another form of bass bar producing a similar acoustic effect.
Fig 5 illustrates one of the classic forms of late 16th C. barring found on a tenor lute by Michael Harton, Padua 1599 (see note 2).The distance between the centre of the rose and bottom of the belly is divided into 5 equal parts. The first two parts measured from the bottom of the belly are, in turn, divided into 3 equal parts. The bass bar is located on the first of these three parts and the centre of the bridge on the second.
Comparing this layout with that of the ud in Fig. 2, it can be seen that there is close agreement in the barring arrangement and that the below bridge bar of the ud is in the same relative position as the bass bar of the lute - suggesting that the two bars perform basically the same acoustical function. However, the physical differences between the bars - in particular, the structural significance of the full length transverse bar - might suggest that the function of this bar was to effectively shorten the vibrating length of the belly below the bridge - equivalent to lowering the bridge position.
I am not aware of any surviving European lutes that are fitted with these full length bars but one might speculate that the modern ud, representing as it does an unbroken tradition extending back to a time predating the European instruments, may still be barred today according to earlier traditions copied in the early lutes of Europe.

The geometry given by Figs. 2 and 5, locates the bridge at 1/6th of belly length. In Comm 1 and 196 it was proposed that some lutes of the early 16th C. might have been constructed with bridges positioned lower than this at 1/8th belly length i.e. if the vibrating length of belly between the centre of the rose and the bottom of the belly is divided into 5 parts, thenthe bridge will lie on the first part and the distance between the centre of the rose and front edge of bridge will be 4 parts.(See Figs. 6 and 7)
It was further suggested in Comm 196 that the earliest known design of lute given by Henri Arnault de Zwolle c1450 which,from its external appearance,

seems to have a bridge located at 1/6th of belly length, in fact (if the presence of the large bottom block is taken into account) had a bridge position equivalent to 1/8th of the vibrating length of the belly. (See Fig. 1). The bottom block is a redundant feature and its elimination by the 16th C. luthiers might have led directly to a low bridge position lute design. This block is not a feature of any of the surviving lutes from the 16th C. as far as I am aware.

Returning to Figs 2 and 5, if the distance between the centre of the rose and the front edge of the bridge is divided into 4 parts then it will be noted that the below bridge bars are located 1 part below the bridge which is the relative position of the edge of the bottom block on the Arnault de Zwolle lute.
Also, note that the shape of a typical bass bar is curved where it meets the edge of the belly - as if its original purpose was to re-define the lower edge boundary of the belly.
Perhaps the bottom block, low bridge, below bridge bar and bass bar are all features of lute design developed one from the other - a kind of Darwinian evolution of lute design?

The instruments represented in Figs 3 and 4 are not lutes but are related within the same organological classification and, therefore, may be of some relevance to this discussion.
Applying the same geometrical analysis to these, we find that the below bridge bar on the guitar is located in relatively the same position as that of the ud.
The bar on the mandolino is located at 1/8th belly length above the bottom of the belly - quite a bit higher than that of the ud. The bridge location is however, in the same relative position as that of the ud. (The position of this bar was measured through the soundhole, the rose being missing. I assume that I correctly recorded this measurement to represent the true bar location)

Conclusions

Based on the sketchy evidence presented here, it might be concluded that there is a connection between the design of lutes with high and low bridge positions - the link being provided by the presence of below bridge bars.

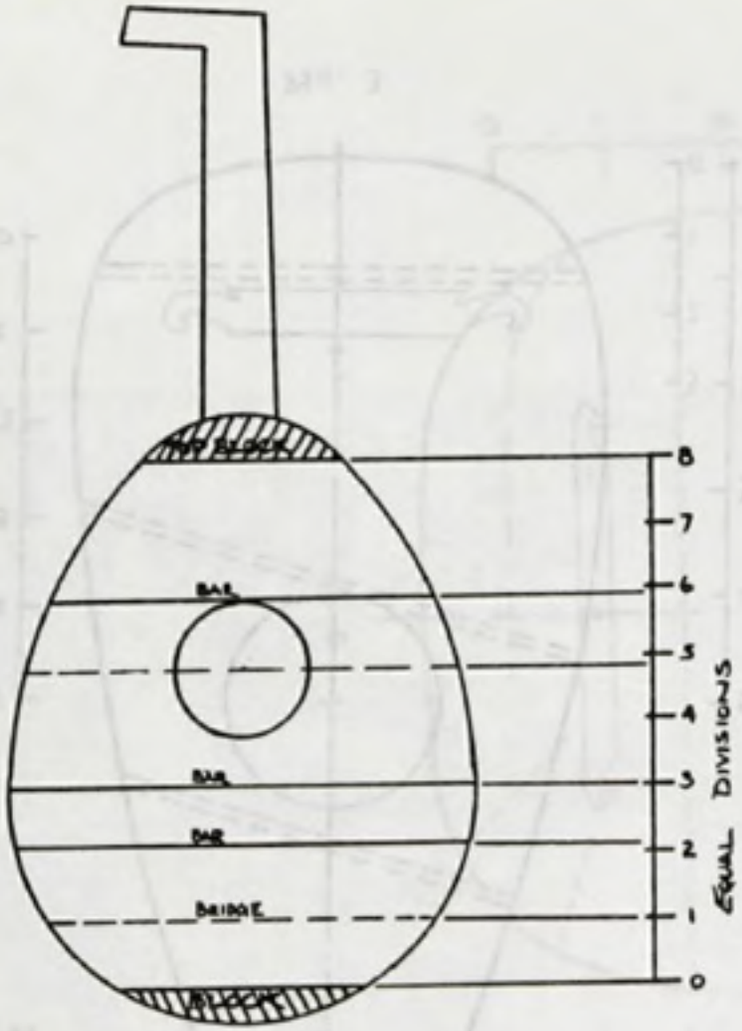
I am not certain about the relative acoustical implications the various arrangements of bars and bridges discussed . However, it can be stated that bridge position will influence "tone colour" as it determines the relative plucking point on the strings - a high bridge position resulting in the strings being plucked closer to the bridge than those associated with a low bridge.
Low bridge bars on lutes (and other related instruments) may have been introduced, therefore, to create instruments with the characteristic "tone colour" typical of a high bridge instrument but with the acoustic perfor--mance more closely associated with a low bridge position.

I would be interested to learn of other examples of instruments fitted with below bridge transverse bars.

Notes

1. Detailed drawing by Pierre Abondance is available from the Societé des Amis du Musee Instrumental du C.N.S.M. 14, rue de Madrid, 75008, Paris price 100 F.F plus post and handling.

2. See "On the Construction of the Lute Belly",Friedmann Hellwig GSJXXI p129



LUTE SOUNDBOARD BARRING - HENRI ARNAULT DE ZWOLLE
C 1450

Fig. 1

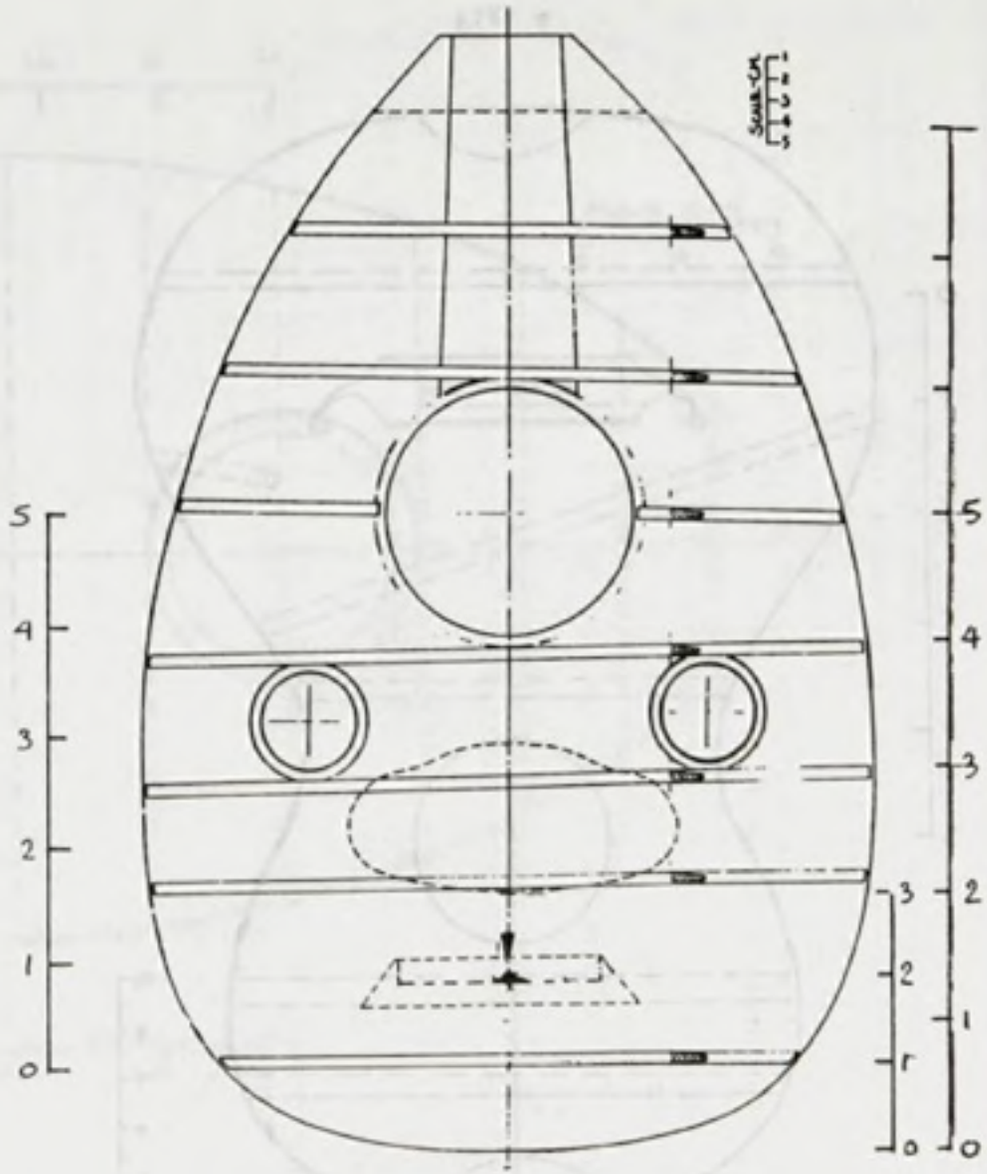


Fig. 2

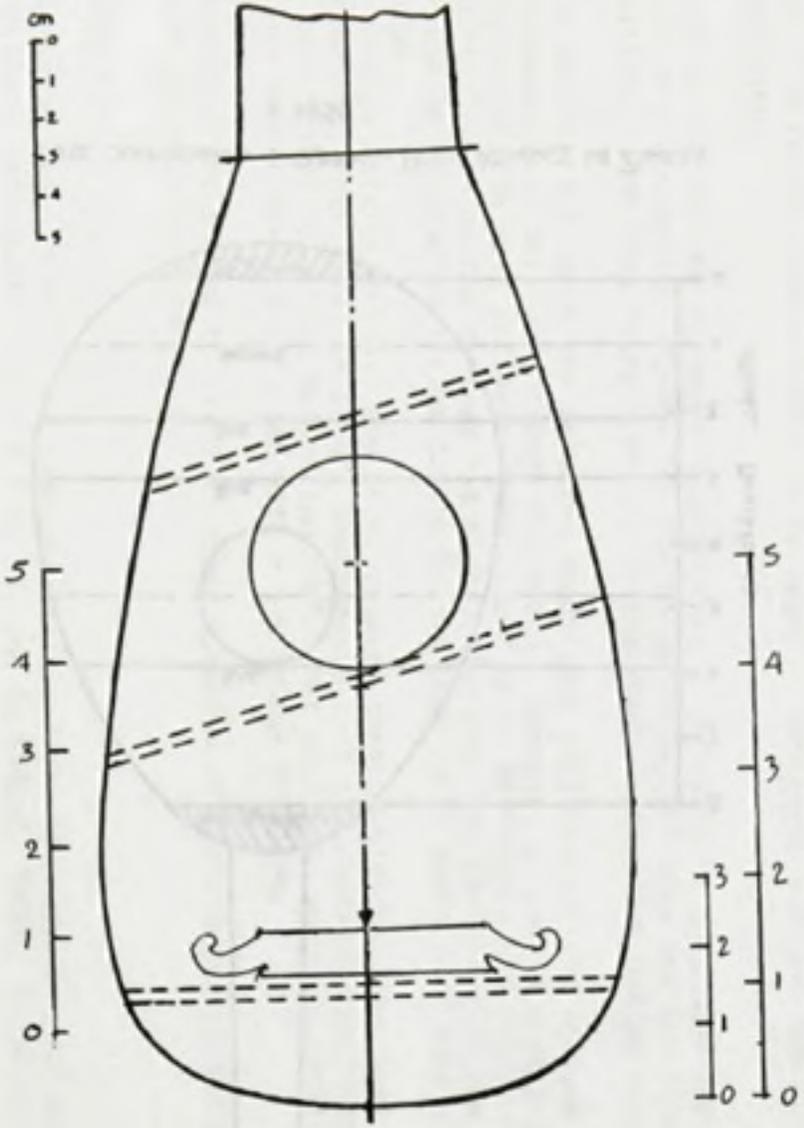

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Fig. 3

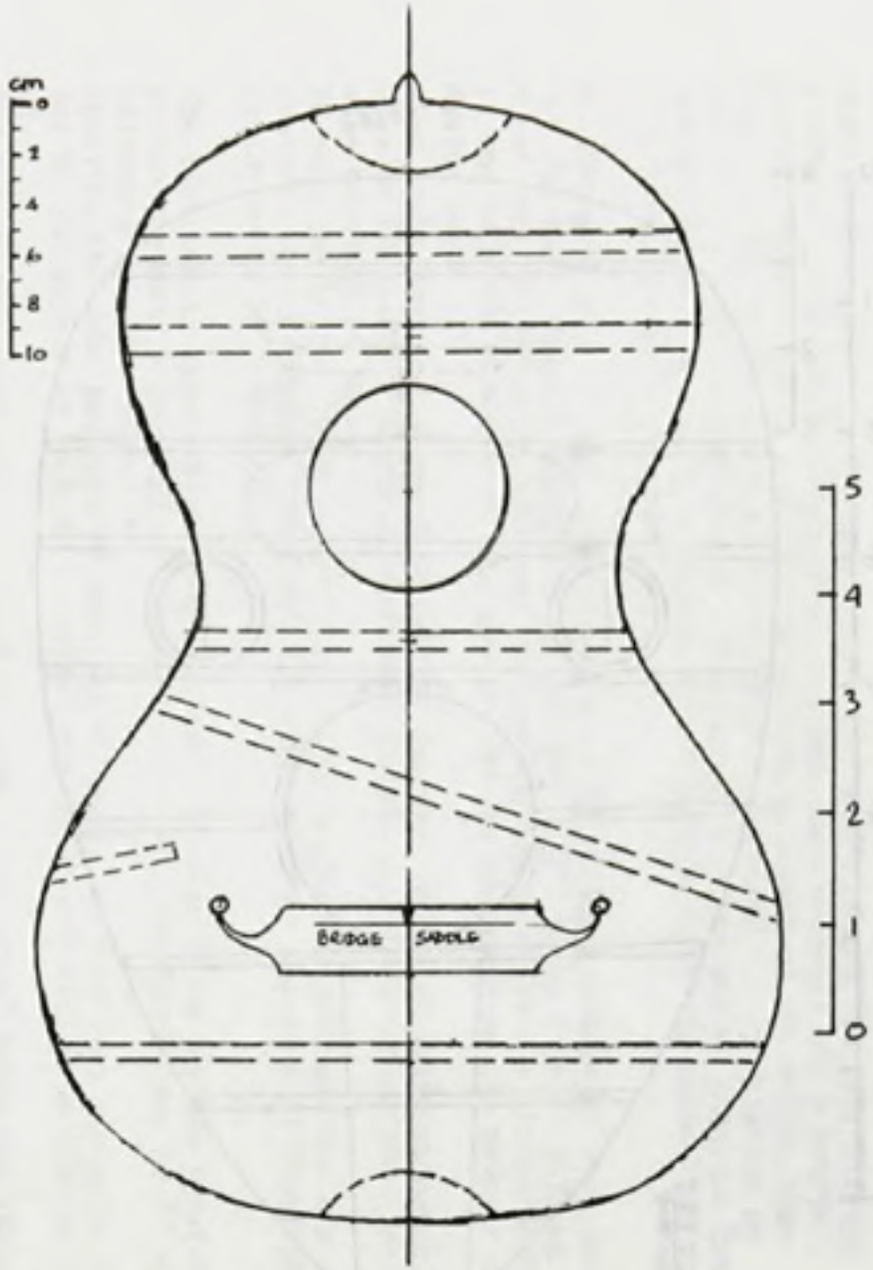
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Fig. 4

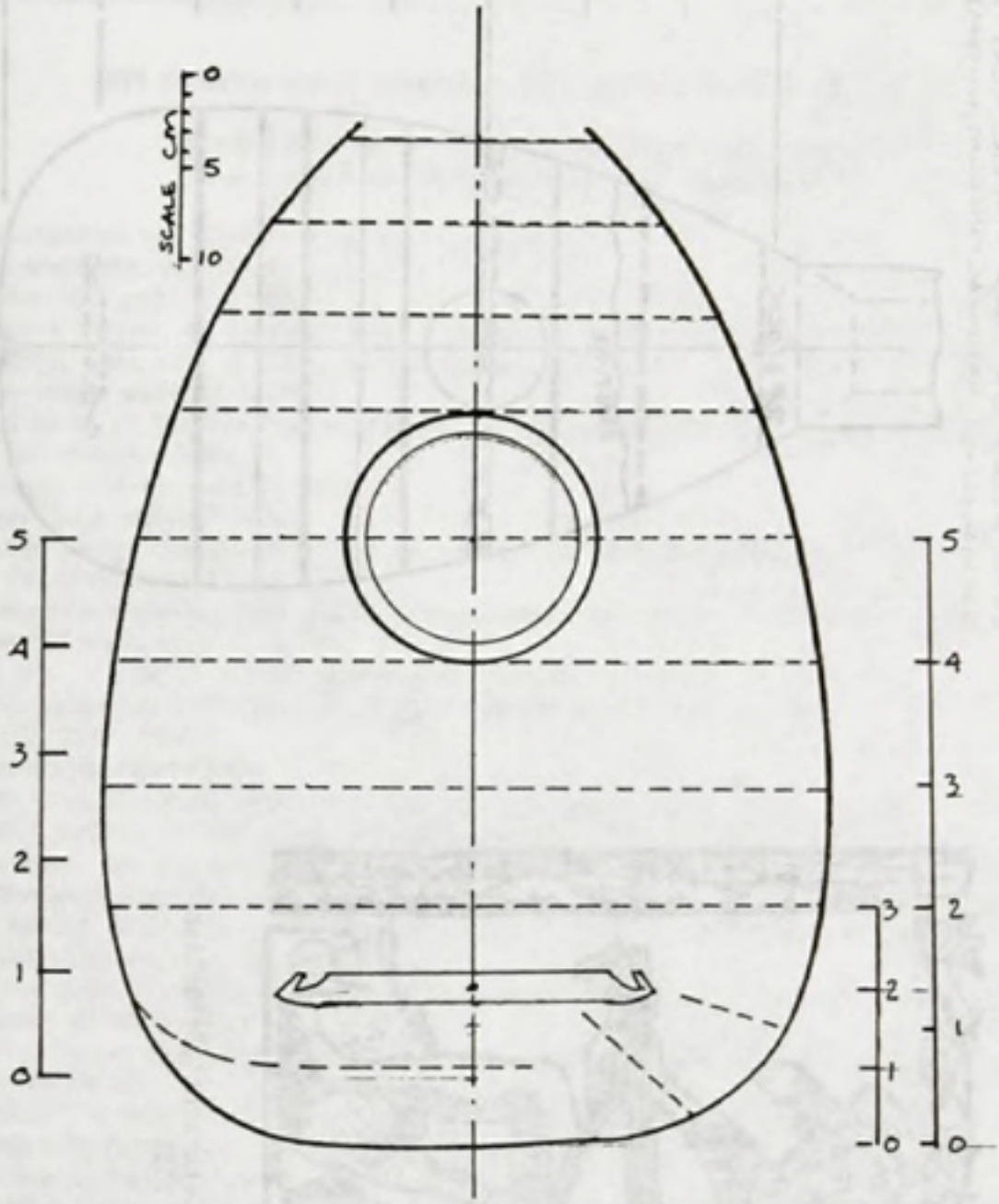

Fig. 5

Lute PLayer - 'Musica Getutscht',Sebastian Virdung, 1511

Fig.6

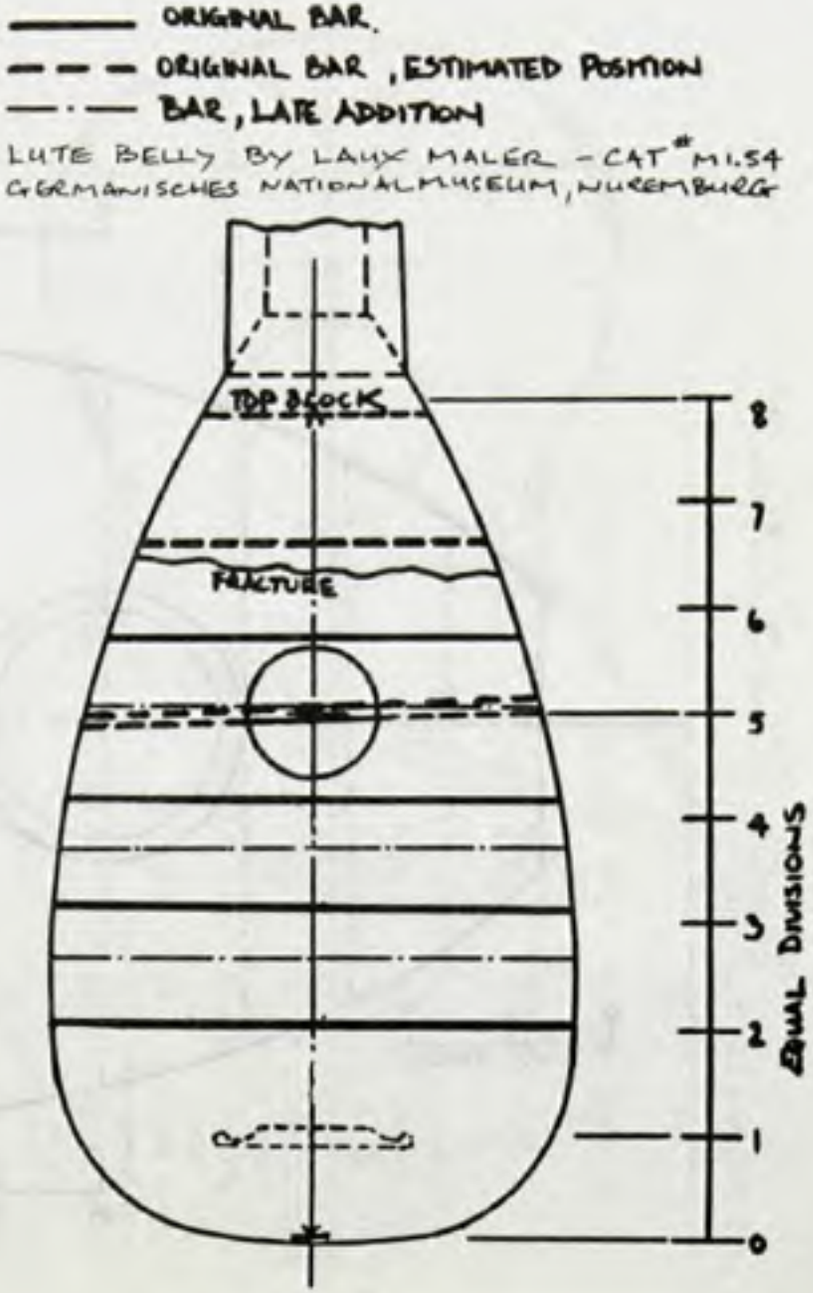

Fig. 7

1993 FoMRHI List of Members — 3rd Supplement as at 12 January 1994

*** in left hand margin - change of address or other change**
e-m - electronic mail; *+figs* - international dialling code

* Odd Aanstad; *+47 6937 7976; fax 47 6937 7376.*
* Ian Abernethy, delete: keybds; M.
* Dieter Arzt, code: D-71254.
Mark A Baigent, 44 Perryfield Road, Crawley, W Sussex RH11 8AB, UK; *0293-533179* (ob (mod, class, bar), ob d'am, cor angl, crmhrn; P).
* Rick Baines, code: M25 1NF.
Paul Baker, 21 Oakfield Avenue, Kingswinford, W Midlands OY6 8HJ, UK; *0384-295210* (ren gtar, symph; M, var, P).
* Nicholas Baldock, code: D-56368.
* Dieter Beck, code: D-79875.
Phillip George Bleazey, 63 Middleton Avenue, Milton Regis, Sittingbourne, Kent ME10 2JB, UK; *0795-470149* (trav; M).
* Werkgroep Bouwerskontakt, p/a de Helling, Rozenstraat 49, NL-6814 ED Arnhem, Netherlands.
* Manfred Brach, code: D-44795.
* Pål Bue, Tverrvn 27, N-4621 Kristiansand, Norway.
* Brian Carlick, Barn Cottage, Church Lane, Charlton on Otmoor, Kidlington, Oxon OX5 2UA, UK; *0865-331493.*
* John Catch; *0494-862624.*
* Lucy Coad, Greenway Farm, Bath Road, Wick, nr Bristol BS15 5RL, UK; *0272-374949.*
Alan Crumpler, 4 High Street, Leominster, Herefordshire HR6 8LZ, UK; *Leominster 3477* (psaltry, fidl, hrp, gittrn; M).
Atelier Marc Ducornet, 24 rue Jean Jacques Rousseau, F-93100 Montreuil, France; *48.51.93.96* (hpschd; M.R).
* Michael DuPree, code: 90403-5784.
Bernard Ellis, The Forge, Wigmore, nr Leominster, Herefordshire HR6 9LH, UK; *056886-462* (early str instrs; M).
S W Ettlinger, Royden Cottage, Cliftonville, Dorking, Surrey RH4 2JF, UK; *0306-883839* (clavchd; M).
* Bernard Folkestad, Kvennavegen 4, N-6100 Volda, Norway; *+47 7007 7649.*
* Fondazione Italiana etc, CP 615P [the rest as before].
* Matthias Griewisch, code: D-69245.
Giovanni Guida, Via Solferino 9, I-25122 Brescia, Italy; *+39 30-280209* (ww, esdp duct fl; R,P,coll).
Haags Gemeentemuseum, Stadhouderslaan 41, NL-2517 HV [Postbus 72, NL-2501 CB] 's-Gravenhage, Netherlands; *070/514181.*
Andy Hack, 75 London Road, Markyate, nr St Albans, Herts AL3 8JP, UK; *0582-841528* (trav, rcrdr; M).
Martin Haycock, 2 Charlton Mill, Charlton, Chichester, W Susses PO18 0HY, UK; *0243-811545.*
Francisco Hervás, Cadiz 3, Las Gabias, E-18110 Granada, Spain; *958-584161* (lute, vih, gmba, vln; M,R).
* Hubert Keller, code: D-46539.
* Peter Koval, 1888 Constance Drive, Vermillion, SD 57069-1045, USA.
* Tom Lerch, code: D-12047.
* Philip Lord, 2 Wayside Court, 4a Arlington Road, East Twickenham, Middx TW1 2BQ, UK; *081-744 9322.*
K M'Gowan, 9 Inglebert Street, London EC1R 1XR, UK; *071-837 8124* (ren wind; P).

- Darryl Martin, 13 Gayfield Square, Edinburgh EH1 3NX, UK; *031-556 8705*.
- Jeremy Montagu; *e-m: jeremy.montagu@music.oxford.uk.ac*.
  Jonathan Morgan, 33 Church Road, Teddington, Middx TW11 8PF, UK; *081-943 1873* (trav, rcrdr, crnett, cappd reeds; P,R,coll).
- Musée de la Musique, Cité de la Musique, Halle aux cuirs, 2 rue de la Clôture, F-75019, Paris, France. [this replaces Musée de la Conservatoire etc]
- Bill Napier-Hemy, 1870 Bayswater Street, Vancouver, BC, Canada V6K 4AY.
  Sebastian Nuñez, Da Costakade 8, NL-3521 VT Utrecht, Netherlands (lute, hpschd; M).
  Patrick D Olmsted, RR2 - site 20 - C7, Gabriola Island, BC, Canada V0R 1X0; *(604) 247-9154* (gtar, dbass, lute; M,R,P).
  Terence M Pamplin, Little Critchmere, Manor Crescent, Haslemere, Surrey, UK; *0428-51158* (gmba, baryton, m i techno, pfte, temperaments).
  Daniel Papuga, Kjelsåsveien 51-F, N-0488 Oslo, Norway; *+47 2222 9853; e-m: danielp@ulrik.uio.no*.
- Peter V van der Poel, Zr Spinhovenlaan 12, NL-3981 CS Bunnik, Netherlands; *03405-64488*.
  Jonathan Ranger, 5 Summerfield Road, Ealing, London W5 1ND, UK; *081-997 1793* (pfte, hpschd fam; C,R,coll, tuner).
- Felix Raudonikas, Volohonsky Eden, Neuestr.2, D-72070 Tübingen, Germany.

F John Rawson, 3 Downshire Hill, London NW3 1NR, UK; *071-794 4002* (hpschd, vrgnl, spnet, clavchd, frtepno; M).
  Carl Rennoldson, Chester Cottage, Upper Street, Kingsdown, Deal, Kent CT14 8DR, UK; *0304-362510* (early keybds; M,R,coll).
  Karin Richter & Malcolm Rose, The Workshop, English Passage, Lewes, E Sussex BN7 2AP, UK; *0273-481010* (Karin: hpschd, clavchd; M,R / Malcolm: strings, M).
  Malcolm Rose: *see* Karin Richter.

- Martin-Christian Schmidt, code: D-18059.
- Ekkehard Schulze-Kurz, code: D-7077.
  Harry L Shorto, 5 Denny Crscent, London SE11 4UY, UK; *071-735 7808* (trav, gmba, crnett, vrgnl; C,P).
- Steven Smith [not Stephen - apologies. jm].
- Pietro Sopranzi, Via C Colombo 27, I-35020 Albignasego (PD), Italy, *049/88 05 051*.
- Peter Spohr, code: D-60599.
- Len Stanners; *636 5203*.
- Charles Stroom; *e-m: charles@yc8.yc.estec.esa.nl*.
  Scott Wallace, Gentzg. 137/19, A-1180 Vienna, Austria (bows, med rot, harp, etc; M).
- Paul White, 1 Blue Mountains Road, Silverstream, New Zealand; *4-528 8842*.
- Carl Willetts, 9 Chattenden Court, Penenden Heath, Maidstone, Kent ME14 2AW, UK; *0622-678702*.
  Diana Wilkes, 18 Lyndon Avenue, Wallington, Surrey SM6 7JT, UK; *081-669 2797* (recrdr, crtl, etc; M).
- Alun C Williams, 60 Bavent Road [not Barent].
- Denzil Wraight, code: D-35091.