

FOMRHI Quarterly

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FELLOWSHIP OF MAKERS AND RESEARCHERS OF HISTORICAL INSTRUMENTS

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FELLOWSHIP of MAKERS and RESEARCHERS of HISTORICAL INSTRUMENTS

Bulletin 63

April, 1991

Some of the lateness this quarter is my fault. I only got back from Jerusalem on April 10th, and there was a pile of post over two foot high waiting for me here. I had to go through it, of course, and I had to deal with a fair amount of it before getting down to this as a good deal of it was urgent museum business, and that's what I'm paid to do, so it had to have the priority. Apologies to you and all, and don't blame it all on the printer or the post this time. I'll try to be quicker off the mark next time. Anyway, we had a very good time in Israel, and a holiday was badly needed.

FURTHER TO: Bull.62: Ed Tarr has sent the best suggestion yet for the German postcodes: "D-O-7030 Leipzig & D-W-7140 Ludwigsburg. This is the convention as of 1st October 1990". As you'll see in the List of Members, which comes with this Q, I've followed this convention.

Bull.62 also: Margaret Hood writes: "I note the exchange of letters on a substitute for ivory goes on apace, and I haven't noticed anyone mentioning bone — modern harpsichord and fortepiano makers have been using this obvious material for at least a decade — even some makers of modern grands use it instead of ivory for concert models. I'm sure it must have been the material used by the old woodwind makers before ivory became the rage. There are quite a few companies around the world processing it now. I will be in London in early July to read a paper on Nannette Streicher (the fortepiano maker, 1769-1833) for the 'Music & Gender' (what a grotesque title) conference at Kings College. Perhaps I will run into some FoMRHI members there." JM adds, probably unnecessarily, that bone was certainly used for some early key-boards, and, at the risk of annoying the makers of ivory substitutes, that bone feels a lot pleasanter under the hand than any substitute I've met yet. However, it's difficult for woodwind because of the problems of getting bone that will turn into rings of the right sizes and, if the ring, as most of them are, is somewhat bulbous rather than a straight-sided cylinder, of avoiding too many dark streaks from the capillaries.

SUGGESTIONS: 1) Bruno Gire writes:

I also take this opportunity to suggest the following about FoMRHI Qs :

As you are now extensively using computer and computerized text in the Q, do you think it would be useful to send you communications or other Q-related texts using floppy disks (of course when possible and when suitable with your computer) ? This would spare your time when paging and editing the Qs and sometimes spare space.

Looking at the development of personal computers - I found most of them now have 3"5 floppies and run softwares like Word, Works, Lotus (between which data exchanges are now possible) and by using built-in dictionaries you could easily correct texts submitted by non-english speaking people (like me !!) in less than a few seconds.

JM adds that I'm not wholly in favour. Anyone who wants to try this is welcome to do so, but I'd strongly suggest that you send hard copy as well. Computer disks can get corrupted in the post; whatever the theories may be, WordPerfect 5.1 (which I use; I don't know what Eph uses) doesn't always succeed in pulling in the other programs that it's supposed to be able to pull in. Finally, it means that Eph or I has to spend time printing out your Comms instead of you doing it. Anyway, if you want to try, my machine will read 5¼" and 3½", both low and high and density. I hope Eph will tell you what his reads in his Bulletin Supplement.

2) Jan Bouterse has a suggestion:

1- I don't know how the other Dutch FOMRHI-members pay their subscriptions, I do it by Giro. I think the cheapest way for you and for me. But nevertheless I have to pay on the £ 8.50 subscription about £ 3 or even more extra as "penitence". I think the other 29 or 30 Dutch FOHMRI-members have each to pay at least those £ 3 extra, that will be a lost of almost £ 100. Therefore I have a suggestion: let all the Dutch FOMHRI-members pay there contributions to me. I send you the money in one payment and pay therefore only £ 3 in place of $30 \cdot 3 = £ 90$ or more! Let the Dutch members pay to me the equivalent of £ 9.50 (for normal surface mail), they will also have a benefit of £ 2 and you and I share the benefit of $30 \cdot 1.00$ and that is £ 30! Let me know if you are interested in a co-operation like this. I think that the extra-costs for sending money to other countries will increase only in the next years!

I've told him that if he wants to make such arrangements, it's up to him. So long as we get the money, we don't mind how we get it. If such arrangements make financial sense in other countries, anyone interested in welcome to try doing the same. The Geographical Index in the List of Members is there to make it easier to be in touch with each other. The one essential is that we have the names of those who are subscribing.

PLANS AVAILABLE: Luis Nouel has sent three lists of plans, the Paris Conservatoire (note the new address), the Royal College in London, and the Guild of American Luthiers, any or all of which you may find here according to space. We've had the RCM not so long ago, and the GAL is a bit odd (what, do you suppose, is an Irish bouzouki? and the description of the tar and the samisen as a Persian and a Japanese banjo respectively is somewhat startling; perhaps to the GAL anything with a skin belly is a banjo!). We're always grateful for such lists, as an when you come across them and can spare them. Doubtless I should write to all museums periodically and ask for their lists, but I've not got the time to do it.

OFFER: Kimber Rhoads writes: "*I live in an area where pencil cedar (Juniperus virginiana) is prevalent and will gladly trade generous quantities of it for recorder and or transverse flute plans from medieval through modern periods*". JM adds that at the Bate Collection we regard our plans as our copyright and so do most museums; what people do with working drawings adapted from our plans for reasons of pitch etc (see REQUESTS below) is their concern, but museums regard plans as one of the few sources of income from which they can buy more instruments, and therefore deprecate people passing copies of them on to each other. Kimber hasn't renewed; address is: Rt 3, Box 51, Cedar Creek, MO 65627, USA.

PRAGUE EARLY MUSIC: You'll find a Comm herewith from David Freeman reporting on what's been going on there. There should have been a Comm in the last Q from Poppy Holden, describing her plans for a trip in June, which I hope will be in this one. She was asking for help, for things to take out there which would be useful to them. She tells me that she has already had a lot of generous response, including some money to help with petrol costs etc, buying plastic callipers, pitch meters, and so forth, a lot of CDs, some music, a harpsichord and two lutes, drawings (I'd already given Dave Freeman quite a lot of Bate plans), the Lute Society has given a set of its publications, and a good deal more. The Czechs are about the most active of the Eastern Europeans in Early Music (if anyone else is equally active, please let me know, and maybe we can start organising something), but they do need our help. Despite all the changes, there is still no hard currency available for frivolities like early music (it's odd how governments seem to think that symphony orchestras and operas are prestige affairs, whereas playing music really properly isn't) which means that they can't buy anything. Personally, my only regret is that it always seems to be Prague, which is rather like thinking early music happens only in London or only in New York, rather than the whole of Czechoslovakia. But maybe things will spread.

REQUESTS: Kimber Rhoads asks: "*Can anyone teach me (by mail — I live 1000 mi from anywhere) how to scale recorder and transverse flute plans from A-?whatever up (or down) to A-440 Hz?*". See above for address, under OFFER.

Bruno Gire has two requests regarding lutes:

Request for informations about lute bellies :

1- When building lutes with flattened backs (i.e. almost ellipsoidal section) one has to choose between having (a) all the ribs with the same maximum width but occupying unequal angular sectors as viewed from the bottom end, or (b) ribs of varying maximum width with equal angular sectors. As far as I know from originals, makers took the first option (equal width). Was there a reason for that (excepting aesthetics of course) ? Are there historic counter-examples, where aesthetic of end view prevailed ?

2- When looking at the bottom end of historic lutes with flattened backs one sees the rib bottom ends rarely meet all on the same point but rather the tips are spreaded on a 10 to 30mm (or more) intervale, along a line perpendicular to the soundboard, mostly cut short to the soundboard and always symmetrically. I can understand why rib tips are cut short, but I see no explanation why they don't meet on the same geometrical point. Could anyone gives his opinion on this ? Is this for strengthening purpose or a consequence of empiric calculation when designing the rib templates ?

Barbara Lambert of CIMCIM is editing the new version of the International Directory of Musical Instrument Collections. She asks:

WANTED: names and addresses of collectors and institutions with collections of musical instruments for new, revised editions of the International Directory of Musical Instrument Collections, (first published 1977), and the Survey of Musical Instrument Collections in the United States and Canada (1974). The International Directory is a project of CIMCIM (Comité International des Musées et Collections d' Instruments de Musique), a committee of UNESCO-sponsored ICOM (the International Council of Museums). The Survey of collections in North America is being prepared by a committee of the American Musical Instrument Society.

Private collectors and institutional collections whose names are received will be sent an information form to fill out and return. Private collectors concerned about security and privacy may have their collections listed anonymously, with only city, state or province, country, and a description of the collection. Collectors who choose this kind of listing can have requests to visit screened by a nearby institutional collection.

Please send names and addresses of collections everywhere except the United States and Canada to the general editor of the international directory: Barbara Lambert, 201 Virginia Road, Concord, Mass. 01742 USA.

Information on North American collections is to be sent to: William E. Hettrick, Music Department, Hofstra University, Hempstead, N.Y. 11550

I fear that the result is going to be as badly out of date before it appears as the last edition, for I gave her the information about my own collection and the Bate some two years ago, and both have grown very considerably since then. Still, please help her if you can.

BOOKS AVAILABLE: Jan Bouterse writes:

2- I have written a book on recorders, how to tune, making (little) repairs and how to clean and oil the instruments and so on. The book is in dutch language, is therefore not so interesting for english readers (a german edition is however in preparation) but I think you have to know that I have written it. The book can only be obtained by sending me 25.50 dutch guilders (that is about f 8, also not very expensive and it includes postage) on my dutch Giro-account (2218523, M.C.J.Bouterse, Alphen a/d Rijn, Netherlands). I will give you on a separate sheet a short summary of my book. Originally the book should be published by "Bouwerskontakt", but at the end they had no money or so and I published it myself. The ISBN-number is: ISBN 90-9003781-0. I hope you can announce the book in the next Q.

He has sent me a copy of the book and anyone who plays recorders and who reads Dutch well enough is welcome to review it. I'll send Eph Jan's summary to print, if he wants to, as a preliminary review; it's not normal for authors to write their own reviews but as reviews here are very often simply descriptions of what's in the book, I don't see why not.

Jan says also that:

3- Next month the new catalogue of the 17 Dutch recorders in the collection of the Haags Gemeentemuseum (The Hague, Netherlands) will be published, by Moeck Verlag, Celle, Germany. That will be an expensive book (perhaps £ 100) with drawings, photo's in full colour and with descriptions of the instruments, written by me. Why and how I made these descriptions I explain in the separate article for the next Q. The catalogue is written bilingual, in english and german. I am curious to read the review in one of the next Q.'s. (I you can afford to buy one of the books...).

JM adds that if Dr.Moeck would like to send us a copy to review, we'd be delighted to do so. We don't, as a matter of principle, ever buy books for review; the custom in Britain, anyway, is only to review books which have been sent for that purpose by the publisher. This is a legal matter; if you are invited to review (ie if you are sent the book for that purpose), you can say what you like; if you are not invited to do so, anything you say could be the subject of legal action.

Peter Bavington writes:

FoMRHI members may be interested to know that I have compiled an index covering all issues of the sadly defunct (suspended?) *Harpsichord and Fortepiano Magazine* and its predecessor *The English Harpsichord Magazine*.

I'd be happy to supply a copy to anyone who wants one in return for £2 to cover the cost of printing and postage.

OUP tell me that Kevin Coates's book *Geometry, Proportion, and the Art of Lutherie* is now available in paperback at £25.00. We reviewed it in Comm.730, Q 44, July 1986. So also is David Crookes's translation of Praetorius *De Organographia* at £14.95. We reviewed that in Comm.810, Q 48, July 1987. I don't think that it's necessary to review either again, though if enough of you say that it is, we will.

The Società Italiana del Flauto Dolce have sent me a copy of the first issue of their new journal, *Recercare*. It has nothing about recorders in it. There are several musicological articles, one by Lowell Lindgren about harpsichord makers and composers for the harpsichord in the correspondence of Giovanni Zamboni, and a very long one about harpsichord makers, organ builders, guitar makers, and makers of gut strings in Pinaroli's 'Polyanthea technica'. My rudimentary Italian won't cope at all, but I'll send it up to Eph with this, as he'll be interested in the string making, and if anyone else wants a crack at reviewing it, get on to him. I'll ask him to leave any review till next Q as we're late enough already with this one, and it's only just arrived, but if any of you want a copy in the meanwhile, it costs Lire 35,000 and their address is Via Confalonieri 5, 00195 Rome.

JOURNALS: Also just arrived are two major journals, the Galpin Society and the American Musical Instrument Society. I've not had time to more than glance at either yet. GSI 44 is mostly keyboard: portatives, early Spanish, instruments by Cristofori's assistant, clavichord in France, construction of an Italian harpsichord of 1571, plus one on Milan's vihuela tuning, one on the Tieffenbruckers and the business of Venetian lute making, and one on the Billingsgate

medieval trumpet. 220 pages of good meaty stuff. AMIS is the same length but only four articles, so they're likely to be even meatier: one on the Theeuwes claviorganum, one on all the Richters oboes (except our new one — see below; I told Cecil Adkins of it too late), one on collecting instruments in the USSR, and one on keyless double reed aerophones, a long-winded way of saying shawms. Both include reviews and so forth as usual.

I belong to both societies, which is how I get them (and why there's no more detail here; they are my subscription copies, they don't come for review). I also get the membership lists of both societies, of course, and it is a continual puzzle to me why so few of your names appear on their lists also. FoMRHI has done a lot of very useful work, but very little of what we have in our Comms is the basic research material and solid information that you get in both GSJ and AMIS-J. Alright, they cost money (though you could subscribe to both for what Early Music costs, and both are far more important than that, pleasant a read as EM usually is), but very little comes free in this world, and if you're working on instruments (and if you aren't, why are you reading this?) you really can't afford to do without GSJ and AMISJ as well as FoMRHI. FoMRHIQ may tell you how to build things, but it's AMISJ and GSJ that tells you about what you are building or playing.

PRIZES AVAILABLE: The American Musical Instrument Society offers the Frances Densmore Prize of \$500 for *the most significant article-length publication, published in English during the calendar years 1989 or 1990, which best furthers the Society's goal 'to promote study of the history, design, and use of musical instruments in all cultures and from all periods'.* Nominations (including self-nominations) and copies of the publication should be submitted immediately to the committee chair: Sam Quigley, Musical Instruments, Museum of Fine Arts, 465 Huntington Avenue, Boston, MA 02115, USA.

FoMRHI SEMINARS: The first two were very successful, and reports on both, by Penny Gouk for the first and Bill Napier-Smith for the second, will be found in this Q. There's another the weekend after next, again too soon to tell you about, but that's how they happen; we plan one, it's a great success and everyone wants another, so we fix the date there and then. If you're annoyed, another time come to the first one! There will be two more, planned for further ahead: **May 26th, Nuts and Bolts of Renaissance Technology**, and **June 30th, Instrumental and Vocal Pitch in England, c.1600**. Both will be here, in the Bate Collection, starting at 11 am and going on until exhaustion sets in. Both free, with a small charge for coffee and biscuits. You're welcome to bring in your own sandwiches for lunch; I do, too, so I don't lock up at lunch time.

MEETINGS: As well as those just mentioned, the Friends of the Bate Collection AGM is on May 5th, probably too soon for this notice to be much use. The Friends is going well and would welcome more members, especially those of you who make instruments from our plans, for the Friends helps us to buy more instruments and may help us to have more postcards and more plans published.

The American Musical Instrument Society will meet in 1992 April 27– May 2 in San Antonio, Texas. Offers of papers etc to Professor Cecil Adkins, Music School, POBox 13887, University of North Texas, Denton, TX 75203-3887, USA.

COURSES: Bernard Brauchli and others are running the usual courses at Magnano, August 16-25, covering singing (Eva Kiss), clavichord (Bernard), organ (Esteban Elizondo, harpsichord (Georges Kiss), organology (Alberto Galazzo), construction of keyboard instruments (Jörg Gobeli & Angelo Mondino). Further information from CMAM, Via Roma 48, I-13050 Magnano (VC), Italy.

James Tyler and others are running the usual course on Music & Dance in 16th & 17th century Florence, Mantua and Venice at West Dean College, August 24-30. Madeleine Inglehearn is teaching dance, Glenda Simpson singing, Duncan Druce violin, Ian Gammie viols, and Jeremy Barlow flute, recorder, and harpsichord; Jim Tyler is director and also teaches plucked strings. More details from West Dean College, West Dean, nr Chichester, W.Sussex PO18 0QZ.

Bate Collection Lute Continuo Weekend with Lynda Sayce is May 11/12. I'm hoping for a Recorders for Makers and Players with Alec Loretto and Alan Davis in late October or November, but I've not had a date from Alec yet; more details next time. The Bow-Rehairing Weekend is now fully booked, but there are still places on the Bow-Making Summer School with Andrew Bellis, August 4-9; if you're interested, let me know and I'll pass your name on to Andrew, who is running it himself. There are also still places for the Gamelan & Javanese Dance Summer School, July 14-19, and again I'll pass names on to the Oxford Gamelan Society. Trevor Pinnock and the English Concert are planning some courses here, but so far I've only got pencil dates; more information in July (the first date isn't until November).

EXHIBITION: The Early Musical Instrument Exhibition is at the Horticultural Hall, November 8-10. I'll be there, as usual, on a small table in some corner, and you'll be able to renew your subs, also as usual. I imagine that a fair number of you will be exhibiting, and many more of you visiting, so I'll look forward to seeing a good many of you. Those of you who are coming from abroad or the remoter parts of these islands are, as always, very welcome to build in a visit to the Bate as part of your itinerary.

BATE COLLECTION NEWS: (I'd sooner call it museum news, but there isn't anything from an other museum except a separate Comm herewith). Quite exciting. First, we've got the boxwood Richters oboe, thanks to the very generous responses of many of the Friends of the Bate Collection (a good number of whom are also FoMRHI members) and a final top-up from the Hulme University Fund. Now we are not only the only museum in this country with one of his ebony and rose-engine turned ivory instruments (see *Galpin Society Journal XLIII*, 1990, for copious details, including much detail on the technology thanks to friends who helped with that, and also Cecil Adkins's article in the new AMISJ, vol.16), but we are also the only museum in the world with a complete example of one of his boxwood oboes (the Horniman Museum has the only other, but it's not complete; the bell is by another maker). I have a strong suspicion that the ebony and ivory instruments were made for wealthy amateurs (one reason why so many survive, far more than oboes by any other maker of the period), whereas the boxwood were for the professional. I've only heard a few notes on ours so far, though I hope it'll be played more extensively at our Friends' AGM next month, but what I heard sounded wonderful. I hope we'll have a plan of it before long; Dick Earle has promised to come soon and draw one, as he did of the ebony and ivory one.

An anonymous donor has provided the money to buy for the Bate Collection instruments from the Michael Thomas Collection. These are arriving bit by bit, but so far we have the Joseph Tisseran double-manual harpsichord made in London in 1710 (this needs more work done on it to bring it into playing order), a Jean Goermans double-manual of about 1750, which is relatively untouched (it's said to have been in the same château since it was made until Michael Thomas bought it) and is in first rate working order. A big German-Flemish is on its way, more on that next time, and there are others coming as well. In addition we have so far a big double-manual of Michael's (French 18th century style), and a superb survey of clavichords, starting with a reconstruction of the Arnault de Zwolle, of c.1440, another of the Urbino Intarsia of c. 1480, a pairwise fretted of late 17th century style, and a polygonal wholly fret-free vaguely similar to Praetorius plate XV:2. Michael has promised to produce a copy of the Pisarenis triple-bridge instrument in Leipzig, and with that, and the other instruments we already have (Hieronymus Hass of 1743, anonymous German, possibly Deckert, c.1810,, Arnold Dolmetsch's no.1, and my John Rawson copy of Rodger Mirrey's triple-fretted German) we shall have a complete survey of the clavichord's development.

By the time you read this, we should have the next edition of the complete Check List of the Collection available, which will cost £2. I'll do a Supplement to the 1989 edition for those who have that; something around 50p in stamps, a dollar bill, or whatever you can send will cover it.

Another new publication available shortly will be a new description of the Retford Collection, which will not only describe all his tools and their use, but will include a proper catalogue of all the bows, with dimensions and weights, including those in the Retford Memorial Collection. This has been compiled by Andrew Bellis, to whom we are very grateful, and will cost £1.00. I'll probably keep the old Checklist available, for those who know what the tools are for and just want a list of what's there for 20p, but that hasn't the new full details of the bows in it.

CODA: That's it, but I've still got the List of Members to do, so I won't print this out till I've done that. That's done now and what little else has come in I've inserted above. We seem to be reverting to winter, but if we get a second spring and a decent summer, enjoy it.

DEADLINE FOR NEXT Q: 1st July, please, and we'll see if we can catch up with ourselves.

Jeremy Montagu
Hon.Sec.FoMRHI

Comms on Computer Disks (see Bulletin p. 3 above):

My PC clone takes both sizes of disks and the word processor I use is PC Write. If sent a disk with a Comm written using a different word processor, I could perhaps manually change the control characters to mine (it should usually be obvious, but not always). I can also check spelling. It is extra work for me, but I will try to do it (reluctantly) if it makes the difference between having a good Comm or not. If the computer used is not a PC clone, I am not sure that I will be able to read the disk.

Lute Backs (see Bulletin p. 4 above):

Lute backs may look like bellies (especially mine), but that is not what they are called. Probably influenced by the fiddle world where the term is more appropriate, the word 'belly' is confined to meaning the soundboard. Concerning Bruno Gire's requests, I can offer my opinions:

1. The maximum rib width defines the level of subdivision of the back cross-section curve as dictated by aesthetics and the customer's purse. If any widths are less than the maximum, more ribs are needed and there is more work making and fitting them than is necessary. So constant width is most economical of work for the desired aesthetic effect.
2. The more crescent-shaped a rib's outline is before bending, the more wood is needed to cut it from (this happens most with ribs that are neither near the central one or the end ones). The rib designs on surviving lutes makes this waste of material less than in Gire's suggestion. Another practical consideration is that in assembly, the ribs were usually nailed at both ends, and when the back was all assembled, the tail block was broken off and the damage covered by the outer and inner end clasps. So the nails had to be located under the end clasps and each had to be into a rib wide enough at that point to be held by it.

Oxford Meetings (see the reports by Penny Gouk on p.33 and Bill Napier-Hemy on p.36):

My two Comms on geometry and design in this Q were my contributions to these two FoMRHI meetings at Oxford (the first session in the second meeting was a continuation of the last one in the first meeting). My contributions are poorly represented in the reports largely because I didn't have the chance to say much of what I intended to. This was because of short time and a large fraction of it being taken up by vociferous objection to the method in general (my specific contributions not being discussed). Comms from the objectors, especially sensible ones like Comm 854 (showing how Coates's analyses can be misleading) are welcome.

15th Century Multipurpose Instruments (see the second report above):

I would like to fill in the gaps in the above report concerning my comments on the 15th century violetta in Bologna. My suggestion was that this was a multipurpose instrument (combining the wide fiddle with the narrow fiddle or rebec), as was the contemporary 15th century vihuela (which combined the wide fiddle with the lute and the 2-string reback, and later evolved into the guitar and viol). The vihuela was plucked like the lute, or bowed across all the strings like a wide fiddle (facilitated by the flat bridge), or the two end strings (tuned a fifth apart) were bowed individually in a vocal manner (using the waist cut-outs of the body to give the required bowing clearance angle). The violetta's lower soundboard was domed and narrower to give the bowing clearance angles needed for a rounded bridge where each of the four strings could be bowed individually in a vocal manner. The upper soundboard/fingerboard, being wide and flat, was used as a soundboard with a flat bridge for bowing all of the strings simultaneously. Bowing all strings simultaneously near a flat bridge emphasises the outer strings, but the strings are sounded more evenly if they are bowed farther from the bridge (a slightly rounded bridge, which I've never seen, is necessary for evenly bowing all strings near the bridge). The upper wider part of the body lowers the resonance pitch of the enclosed air in the body (compared to a uniformly narrow rebec) adding resonant support to the fundamental sounds of the lowest strings as well as adding warmth to the noises of string actuation (called 'transients'), the latter being the main acoustic function of the deep body on the baroque guitar. I hope that this makes more sense than the the reported excerpts of what I said.

Ricerca I 1989 (see Bulletin above p. 6)

From an instrument point of view, the Barbieri article is the most interesting. 'Polyanthes' tried to do the l'Encyclopedie job much earlier (1718-32). There are many interesting plates of the tools used. Some of the instruments plates are used here as space fillers on p. 70, 75 and 76.



société des amis du musée instrumental

du conservatoire national supérieur de musique

NEW ADDRESS : 209 AVENUE JEAN JAURÉS - 75019 PARIS - FRANCE

DIFFUSION DE DESSINS TECHNIQUES D'INSTRUMENTS DU MUSÉE INSTRUMENTAL

DESIGNATION	PRIX EN FF PAR UNITE	FRAIS D'ENVOI PAR UNITE EN FF		
		FRANCE	EUROPE	AUTRES PAYS (avion)
INSTRUMENTS A CLAVIER				
8 - PIANOFORTE CARRE, E-f ₃ . Anton WALTER, Vienne, fin XVIIIe s. Michel Robin, 1978.	150,00	15,00	28,00	35,00
9 - PIANOFORTE CARRE, E-g ₃ . ANONYME, Allemagne, c. 1800. Michel Robin, 1983.	150,00	15,00	28,00	35,00
12 - CLAVECIN à 1 clavier, G ₁ -c ₃ . Carolus GRIMALDI, Messine, 1703. Michel Robin, 1981. + notice.	180,00	25,00	50,00	150,00
13 - CLAVECIN à 2 claviers, F ₁ -f ₃ . Jean-Claude GOUJON, Paris, c. 1749 - Joachim SWANEN, 1784. Michel Robin, Pierre Abondance, 1981. 2 dessins techniques + notice.	250,00	25,00	50,00	150,00
14 - EPINETTE EN AILE D'OISEAU. F ₁ sans F ₁ #-f ₃ . Jean-Claude GOUJON, 1753 - Abbé Tapray, 1789. Pierre Abondance, 1981. + notice.	180,00	25,00	50,00	150,00
17 - CLAVICORDE, C-d ₃ . ANONYME, France ? mil. XVIIIe s. Michel Robin, 1983.	150,00	15,00	28,00	35,00
18 - TABLE DE CLAVECIN. ANONYME, Pays-bas, 1618. Pierre Abondance, 1982. + notice.	180,00	15,00	28,00	35,00

DESIGNATION	PRIX EN FF PAR UNITE	FRAIS D'ENVOI PAR UNITE EN FF		
		FRANCE	EUROPE	AUTRES PAYS (avion)
19 - PUPITRE. Andreas RUCKERS, Anvers, 1646. Magali Traynard, 1984. LUTRIN, ANONYME. Pierre Abondance, 1984.	150,00	15,00	28,00	35,00
20 - CLAVECIN à 2 claviers, soll-do6. Vincent TIBAUT, Toulouse, 1691. Michel Robin, Pierre Abondance, 1977, complé- té en 1987. + notice.	300,00	25,00	50,00	150,00

DESIGNATION	PRIX EN FF. PAR UNITE	FRAIS D'ENVOI PAR UNITE EN FF		
		FRANCE	EUROPE	AUTRES PAYS (avion)
INSTRUMENTS A CORDES PINCEES				
1 - LUTH à 11 choeurs, diapason : 680 mm. ANONYME, XVIIe s. Pierre Abondance, 1976/ 1980.	100,00	15,00	28,00	35,00
2 - GUITARE à 5 choeurs, diapason : 725 mm. ANONYME, Italie ? XVIIe s. Pierre Abondance, 1975/ 1979.	100,00	15,00	28,00	35,00
3 - MANDORE à 10 cordes, diapason : 355 mm. ANONYME, Italie ? XVIIIe s. Pierre Abondance, 1976.	100,00	15,00	28,00	35,00
10 - 4 EPINETTES DES VOSGES. ANONYMES, France, XVIIIe et XIXe s. BUCHE DES FLANDRES. ANONYME, Flandres, XVIIIe s. CITHARE. ANONYME, Allemagne, XVIIe s. Pierre Abondance, Pierre Jaccquier, Michel Robin, 1978.	150,00	20,00	40,00	150,00
11 - VIELLE A ROUE. LOUVET le jeune. Paris, 1733. Pierre Jaccquier, 1980.	150,00	20,00	40,00	150,00
15 - GUITARE à 6 cordes, diapason : 835 mm. GROBERT, Paris, c. 1820. Pierre Abondance, 1982. + notice.	100,00	15,00	28,00	35,00
16 - GUITARE à 5 choeurs, diapason : 665 mm. Jean VOBOAM, Paris, 1687. Pierre Abondance, 1982. + notice.	100,00	15,00	28,00	35,00
21 - LUTH à 13 choeurs, Johann Christian HOFFMANN, Leipzig, 1720. Joel DUGOT, 1987.	150,00	20,00	40,00	150,00

DESIGNATION	PRIX EN FF PAR UNITE	FRAIS D'ENVOI PAR UNITE EN FF		
		FRANCE	EUROPE	AUTRES PAYS (avion)
INSTRUMENTS A CORDES FROTTEES				
4 - VIOLE DE GAMBE BASSE, 6 cordes, diapason : 670 mm. Henry JAYE, Londres, 1624. Pierre Jacquier, 1976.	150,00	15,00	28,00	35,00
5 - PARDESSUS DE VIOLE, 6 cordes, diapason : 180 mm. Nicolas BERTRAND, Paris, 1714. Pierre Jacquier, 1976.	100,00	15,00	28,00	35,00
6 - VIOLON, diapason : 193 mm. François LUPOT, Orléans, 1772. Pierre Jacquier, 1979.	100,00	15,00	28,00	35,00
7 - ARCHETS (2 de violon, 1 de basse). ANONYMES, France et Louis TOURTE, Paris, mil. XVIIIe s.	100,00	15,00	28,00	35,00

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PLANS OF INSTRUMENTS

Technical drawings of the following instruments are now available. These dyeline prints are detailed full-scale plans on stout paper for the benefit of those wishing to carry out organological research or build copies.

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RCM No.

- 48 Cittern by Gieronimo Campi, Italian, late 16th century £10.00
Lacks rose and bridge. Overall length 728mm. Original string length 433mm approx.
(1 sheet, 850 x 600mm) Drawn by Ian Harwood, 1974
- 26 Chitarrone by Magnus Tieffenbrucker, Venice, 1608 £18.00
Stringing 6 x 2, 8 x 1. Body length 679.5mm. String lengths 933mm approx and 1700mm approx.
(3 sheets, 850 x 600mm) Drawn by Ian Harwood, 1974; revised 1977
- 171 Guitar by Belchior Dias, Lisbon, 1581 £22.00
Vaulted back, body length 365mm, belly not original.
(2 sheets, 1120 x 770mm, with additional notes)
Drawn by Stephen Barber, 1976
- 32 Guitar, attributed to Jean Voboam, Paris, c.1680 £22.00
Length of back 456mm. Bridge not original.
(2 sheets, 1280 x 950mm and 950 x 810mm, with additional notes) Drawn by Stephen Barber, 1979
- 46 Division viol by Barak Norman, London, 1692 £24.00
Length of belly 634mm. Present string length 658mm.
(2 sheets, 1370 x 1040mm) Drawn by Stephen Barber, 1976
- 63 Recorder (treble), I. Denner, Nuremberg, early 18th £6.50
century. Carved ivory. Pitch: A=415 approx.
(1 sheet, 585 x 470mm, with additional notes)
Drawn by Friedrich von Huene, 1968; revised 1978

- 1 Clavicytherium, ?German, c.1480 £37.00
 1 x 8. Present compass E-g²; original compass thought to have been E'E# F G-g². Overall height 1415mm. (1 sheet, 2360 x 1030mm, with additional notes)
 This new drawing replaces the less detailed one made by Derek Adlam and William Debenham in 1976.
 Measured and drawn by William Debenham, 1983
- 2 Harpsichord by Alessandro Trasuntino, Venice, 1531 £38.00
 Formerly 1 x 8, 1 x 4, now 2 x 8. Present compass BB/GG-c³; original compass thought to have been C/E-f³. Overall length 2250mm. Outer case not drawn. (1 sheet, 3480 x 1030mm, with additional notes)
 Drawn by William Debenham, 1977
- 175 Harpsichord, ?Italian, c.1575 £30.00
 Originally 1 x 8, now 2 x 8. Original compass C/E-c³; present compass C-d³ without C#. Overall length 1860mm. Lacks original outer case. (1 sheet, 2130 x 1030mm, with additional notes)
 Drawn by Grant O'Brien, 1974
- 3 Bentside spinet, English, 1708 £25.00
 Compass BB/GG-d³, the lowest two sharps being divided to give both the short octave and the sharps. Overall length 1680mm. (1 sheet, 1930 x 1030mm, with additional notes)
 Drawn by William Bright, 1975
- 209 Regal, German, 1629 £25.00
 Compass C/E-c³. Metal resonators. Overall length 1165mm. (1 sheet, 1875 x 1025mm)
 Drawn by Christopher Clarke, 1979

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A series of photographs of each of the above instruments is also obtainable. Details will be sent on request. (There is a large number for some of the keyboard instruments, so it is unlikely that a complete series would be desired.)

Prices: 4 x 6" prints £5-50 each
 6 x 8" prints £6-50 each
 8 x 10" prints £7-50 each

plus postage, and VAT for UK orders.

Plans, Photo, Slides 2 - (sent by L. A. Naval M)

INSTRUMENT	COST OF DRAWING	B&W NEGATIVE NO.	COLOR SLIDE NEGATIVE NO.
Clavichord (fretted, double- strung), Anonymous. Germany, 18th century (cat. # 60.1394)	\$35	56,341 56,341D	3/4 view plan view 74-12220 3/4 view
Clavichord (fretted, double- strung), Johann Adolph Hass. Hamburg, 1756 (cat. # 1980.0020.01)	\$35	83-4229 83-4230 80-1708	3/4 view plan view inscription on soundboard
Single-manual harpsichord, Anonymous. Italian "1693" (cat. # 326,904)	\$40	56,321 56,321A	3/4 view plan view 74-12218 3/4 view in outer case
Single-manual harpsichord, Joseph Ioannes Couchet. Antwerp, 1679 (cat. # 75.41)	\$40		
Music desk, from two-manual French harpsichord, Jean Mari De De Ban. Paris, 1770 (cat. # 73.29)	\$15		
Two-manual harpsichord, Iohannes Daniel Dulcken. Antwerp, 1745 (cat. # 315,758)	\$45	56,314 56,314A 56,314B	3/4 view plan view nameboard & keyboard well 74-12224 74-12217 74-12226 3/4 view plan view keyboards & wrestplank
English bentside spinet, Thomas Hitchcock. London, ca. 1710 (cat. # 62.382)	\$35	72-10425 72-10427 72-10426	3/4 view (lid open) 3/4 view (lid closed) plan view 74-12216 72-10427 72-10426 3/4 view (lid open) 3/4 view (lid closed) plan view

INSTRUMENT	COST OF DRAWING	B&W NEGATIVE NO.	COLOR SLIDE NEGATIVE NO.
Virginal (rectangular, quint pitch), Andreas Ruckers. Antwerp, 1620 (cat. # 303,543)	\$35	56,309 56,309A 56,309C 49,606 49,606A	3/4 view plan view jack rail detail of decoration detail of decoration 74-12222 74-12223 74-12221 74-12221 74-12221 3/4 view plan view detail of lid detail of decoration
Two-manual harpsichord, Benoiſt Stehlin. Paris, 1760 (cat. # 66,521)	\$45	61,272 61,272A 62,272B	3/4 view plan view keyboards multiple views of restoration available on request
Grand piano, Johann Ludwig Dulcken. Munich, 1790-1800 (cat. # 303,537)	\$45	56,409 56,409A 56,409B	3/4 view plan view nameboard
Fretless banjo, Anonymous. North Carolina, late 19th century (cat. # 65,716)	\$15	83-15600 83-15599 83-15598	front back side 74-956 3/4 view
Hammered dulcimer, Anonymous. American, ca. 1830 (cat. # 94,871)	\$15	78-4918	(The disposition of this instrument is bass= 6 x 1, treble= 11 x 4)
Plucked ("Appalachian") dulcimer, John Richmond Hinton. West Virginia, ca. 1850 (cat. # 67,12)	\$15	75-6802 75-6803 75-6804 75-6805 75-6806 75-6807	3/4 view front back side pegbox tail (The fretting system of this dulcimer is "non-standard," giving the tonic at the fourth fret rather than at the more usual third fret.)

All prices are postpaid and include mailing tubes. Drawings marked * are postpaid but are mailed folded rather than in tubes.

Division of Musical History
Smithsonian Institution
Washington, D.C. 20560
U. S. A.

Full Scale Instrument Plans



Our instrument plans are blackline prints, rolled face out and shipped in a sturdy cardboard storage box. Some plans fill two sheets, some are shipped with enclosures such as Data Sheets. Plans #7 and #10 are on 30" wide paper.

PLAN #1 - Schmidt Model 73 Autoharp
\$9.00/members, \$12.00/non-members

PLAN #3 - Irish Bouzouki (DS #230)
\$9.00/members, \$12.00/non-members

PLAN #4 - Hammer Dulcimer (DS #233)
\$9.00/members, \$12.00/non-members

PLAN #5 - Kasha Guitar Soundboard (DS #243)
\$9.00/members, \$12.00/non-members

PLAN #6 - '20s Gibson L-O Guitar (DS #264)
\$9.00/members, \$12.00/non-members

PLAN #7 - Martin Harp Guitar (DS #279)
\$12.00/members, \$15.00/non-members

PLAN #8 - 1918 Martin 1-18
\$9.00/members, \$12.00/non-members

PLAN #9 - Kamanché (Persian "Fiddle")
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PLAN #10 - 1932 Martin C-3 Archtop Guitar
\$12.00/members, \$15.00/non-members

PLAN #11 - Hardanger Fiddle
\$9.00/members, \$12.00/non-members

PLAN #12 - 1943 Hauser Sr. Classic Guitar
\$9.00/members, \$12.00/non-members

PLAN #13 - Flattop Bass
\$9.00/members, \$12.00/non-members

PLAN #14 - Tar (Persian "Banjo")
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PLAN #15 - Modified F3 Mandolin
\$9.00/members, \$12.00/non-members

PLAN #16 - Sami-sen (Japanese "Banjo")
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PLAN #17 - 6-cs Renaissance Lute, H. Frei c.1530
(Erlangen Lecture Series Plan #1)
\$9.00/members, \$12.00/non-members

PLAN #18 - 6-cs Descant Lute, Venere c.1580
(Erlangen Lecture Series Plan #2)
\$9.00/members, \$12.00/non-members

PLAN #19 - 8-cs Bass Lute, M. Dieffopruchar c.1600
(Erlangen Lecture Series Plan #3)
\$9.00/members, \$12.00/non-members

PLAN #20 - 10-cs Ren. Lute, M. Dieffopruchar 1612
(Erlangen Lecture Series Plan #4)
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PLAN #21 - 7-cs Renaissance Alto Lute, Venere 1592
(Erlangen Lecture Series Plan #5)
\$9.00/members, \$12.00/non-members

PLAN #22 - 13-cs Baroque Lute, Dieffopruchar c.1600
(Erlangen Lecture Series Plan #6)
\$9.00/members, \$12.00/non-members

PLAN #23 - 14-cs Archlute, M. Sellas 1639
(Erlangen Lecture Series Plan #7)
\$9.00/members, \$12.00/non-members

PLAN #24 - 1948 D'Angelico New Yorker guitar
\$9.00/members, \$12.00/non-members

PLAN #25 - "Moskvichka" Concert Prima Balalaika
\$9.00/members, \$12.00/non-members

PLAN #26 - 1923 Lloyd Loar Gibson F5 Mandolin
\$9.00/members, \$12.00/non-members

PLAN #27 - Baroque Guitar, Anonymous, c.1650
\$9.00/members, \$12.00/non-members

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1990 ACQUISITIONS AT THE FISKE MUSEUM

Musical instruments acquired by the Kenneth G. Fiske Museum of Musical Instrument of The Claremont Colleges in Claremont, California in 1990, according to Albert R. Rice, Curator, are as follows:

- 1990.1 Square Piano by Henry F. Miller, Wakefield, Massachusetts, circa 1886. AAA to c^{'''}.
- 1990.2 Reed Organ by John G. Earhurff, North St. Paul, Minnesota, 1887-97.
- 1990.3 Square Piano by Jonas Chickering, Boston, 1853. CC to c^{'''}, serial no. 14246.
- 1990.4 Halszither or Cittern of Swiss origin, circa 1830-50. 10 strings in double courses.
- 1990.5 'Tekniclavier' or Practice Piano by the Antha Minerva Virgil Co., New York, circa 1905. AAA to c^{'''}, 2 levers for click attachments, serial no. 395.
- 1990.6 Soprano Sax by the The Buescher Co., Elkhart, Indiana, circa 1922.
- 1990.7 Soprano Sax by C.G. Conn, Elkhart, Indiana, 1924.
- 1990.8 Soprano Sax (curved form) by the Selmer Co., New York, 1949.
- 1990.9 Keyless Fife probably made by the Penzel Mueller Co., New York, circa 1950.
- 1990.10 Anonymous keyless fife probably of US origin, circa 1950.
- 1990.11 Violin of Swiss origin (Innsbruck), probably 17th century.
- 1990.12 Sanxian or three-string fiddle of Chinese origin, 20th century.
- 1990.13 Di or flute of Chinese origin, 20th century.
- 1990.14 Di or flute of Chinese origin, 20th century.
- 1990.15 Xiao or flute of Chinese origin, 20th century.
- 1990.16 Xiao or flute of Chinese origin, 20th century.
- 1990.17 Cello of German origin, circa 1890.
- 1990.18. 'Perfected Practice Clavier' or Practice Piano by the Almon Kincaid Virgil Co., New York, circa 1895,. AAA to c^{'''}, 2 levers for click attachments, serial no. 6391.
- 1990.19 Harp made in Tlaque Paque, near Guadalajara, Mexico, circa 1964.
- 1990.20. Reed Organ by Mason & Hamlin, Boston, c. 1886-94. Three manuals, thirty-two stops, and a thirty-note pedal board.

LEICESTER EARLY MUSIC FESTIVAL. 1991.

Attendance at the 1990 Leicester Early Music Festival suggested a large amount of support. It is clear that the emphasis on making Early Music accessible to everyone increases potential audiences and fulfils a considerable need. It is, of course, very much in the interests of players and makers alike to promote professional concerts of Early Music and The Longslade Consort, with the help of NEMA and EMEMF is again promoting an Early Music Festival in Leicester in the Spring of 1991, (24-27th May).

For the 1990 Festival, 10,000 leaflets were distributed throughout the East Midlands, and nationally through National Early Music Association contacts. In addition, a series of advertisements were run both nationally, and locally. We had about 1,000 visitors to the Festival over the four days. There was press comment and local radio provided a 15 minute slot. Further, it attracted an audience far in excess of what might be expected from what is often considered to be of minority appeal only.

The 1991 Festival will run from 24-27th May (over the late Spring bank-holiday weekend). It will be centred in St. Mary de Castro Church in Leicester, which has become part of Castle Heritage Park, a prime tourist attraction. Following the tremendous interest in particular areas of this year's festival, there will be a special emphasis on the involvement of children (family day) and workshops and masterclasses. This year, we are exploring the dance/early music link.

Leicester Early Music Festival 1991 will be a high-profile event with wide exposure particularly to young professional families.

In order to promote the Festival and to provide a forum for professional makers and performers, we are offering free display space to makers with a request for an agreed donation should they wish to sell at the Festival. Early Music "buskers" will be permitted subject to vetting and agreement by the organisers. A collection may be taken in the Church when busking.

Any members of FoMRHI who would like to take advantage of this offer should contact John Bence as soon as possible. (address in the members' list).

Review of: Larigot, no.9, December 1990. *Bulletin de l'Association des Collectionneurs d'Instruments de Vent*, 93 rue de la Chapelle, Apt. 166F, 75018 Paris. Subscription is 130 French francs, plus 50F for airmail abroad, and back issues are 40F each or 100F for each year-set of three.

Journal of Australian Association of Musical Instrument Makers (JAAMIM), IX:2, November 1990. 35 Day Road, Cheltenham, NSW 2119. Subscription is \$20 Australian; back issues \$5.50 each or \$35.50 for the full set.

Larigot, as most of you will realise from the Association's title and from past reviews, is interested solely in wind instruments, and mainly those from the 19th century, usually second half of that century, onwards. JAAMIM is fairly heavily string-oriented, and mainly concerns itself with modern makers of modern instruments, though of course most of the modern instruments are the survivors or the modern forms of those in which we are interested, and thus some of their material interests us also.

Despite that statement, the front cover of JAAMIM this time has a photo of five and a half flutes, lifted from one of my books, and all my instruments, without any acknowledgement. All the more odd because the editorial refers to that book in a different context! I hope to receive an acknowledgement and apology in the next issue (I don't mind them using my photo; it's the lack of acknowledgement that I object to).

The contents include a profile of one of their, and our, members, Ian Clarke. Also an interesting article on violin restoring by John Dilworth, reprinted from the 3rd Tiverton Conference. His descriptions of technology are very summary, but his warnings against doing certain things are salutary and important. A short note on 'Improving Instrument Sounds by using Computer Spectrum Analysis' by Eric Adam is more an account of who is doing what in that line among their members than any description of what can be done in this way and how it is done, but the latter would involve printing programs, which is probably beyond the space that they can allow. Ray Holliday, the JAAMIM General Secretary and also one of our members is obviously one of the leaders in this, so if you are interested and don't know anyone nearer to hand, it might be worth getting in

touch with him. Another reprinted article is one by Karel Moens on 'The Stradivarius Quintet of the Spanish Royal Court', from *Celesta*, October 1986. Not all that communicative unfortunately, for it's almost all drawn from other sources. They are also starting on the accreditation discussion, and there is an initial article on this by John McLennan; as was said by a number of people, this probably isn't FoMRHI's affair, but nevertheless, sooner or later, someone is going to have to treat it as a serious matter for instrument conservators, certainly, and for restorers probably, in this country. A further reprint from the same issue of *Celesta* is one by Lode Bauwens on gluing, which would be useful if you're not experienced in dealing with hot natural glues.

Larigot starts, as usual, with reproduction of a maker's catalogue, this time Van Engelen Frères of Liège in Belgium. This is a very valuable custom of theirs, for it is never easy to come by these 19th century catalogues, and they are often extremely useful for identifying unstamped instruments, as well as for knowing just what any firm produced. The only frustrating thing is that they are very seldom dated, and this one is no exception. I wish that the editors would at least give us their guess. This is followed by an equally useful article, by Thomas Kiefer, on the production of saxophones by Buffet Crampon, with reproduction from their catalogue and that of Carl Fischer, as well as other illustrations, and a great deal of useful information. This is followed by a not very useful and fairly inaccurate short note on the Danish bronze lur, and that by an interview with a modern Californian trumpet maker, Thomas Zapata. For wind people with 19th century interests, Larigot is an important source of useful information.

Review of: Peter Spohr, *Transverse flutes down the centuries from all over the world*, Exhibition catalogue, Frankfurt, 1991, 90 pp, 126 instruments, each one illustrated; no price stated.

This is the catalogue of the exhibition of flutes in Frankfurt and Munich mentioned in the last Bulletin (p.5). It is printed in three parallel columns, German, English, and French, on each right-hand page, with a photo of each instrument, plus sometimes a significant detail, on each left-hand page. The paper is glossy, though slightly limp, so all the photographs are admirably clear. There are a few errors of translation in the English text, but none of any significance, and glancing at the French or German texts easily resolves them all.

Peter has deliberately included as many instruments as possible that were unknown to the public, many presumably from his own collection, and many non-European instruments also from the collection of Charles Tripp in Belfort, as well as a number from other private and museum collections.

The earliest flute is a mid-17th century two-piece instrument from Augsburg from the Germanisches Nationalmuseum in Nürnberg (the only renaissance one-piece flute is a reproduction), and there are two three-piece one-key flutes, one by an anonymous French maker on the Hotteterre model and the other, lent by Friedrich von Huene, by Naust. There are early four key flutes by most of the obvious makers except Scherer, Bressan, and Stanesby, and by some of the less obvious (eg Giuseppe Castel, though Langwill assigns a rather later possible date to him than Peter Spohr does).

There are many keyed flutes, many of them of considerable interest, for example a Stephan Koch with the low B \flat key for the right thumb instead of the more usual left little finger, and many interesting inventions such as the Wolf adjustable tuning slide, and the Gerock version of the conical Boehm, which includes elements more familiar from the Siccama system such as the third order lever for the right ring-finger,

but which is earlier than Siccama. An interesting variant is a wide-hole Nicholson with a one-piece body with the right-hand fingerholes offset to the outside. There is an outstanding selection of Boehm-system flutes, both conical and cylindrical, with a significant number by Boehm himself, and there are many variants on the two systems by many makers as well as most of the rival systems.

The final section is a small, about 25, but important group of non-European instruments, plus (I put it this way because only one is catalogued) another fifteen of the shorter New Guinea spirit flutes; by shorter I mean over a metre long, as distinct from the three-metre instruments. Some of these are illustrated in colour on the back cover of the Catalogue, and their heads are very beautiful art objects; only too often one sees the heads in art museums without the rest of the flute!

There is also an important appendix on details of the history, construction, and materials of the flute, including the London hallmarks for the period in which one is likely to find flutes, with their dates, a very useful list to have, though Edinburgh is also important, for example for John Mitchell Rose, who followed Monzani's example in many respects, including having his silver mounts marked. There is also a list of the French marks, which are unfortunately less useful for dating, for they did not change annually like the British ones.

This is the most impressive flute catalogue that I've seen, and a must for anyone working with flutes. Peter has given us no price or other details, but his address is in the List of Members, so if you want a copy, you'll have to write to him and enquire. The Exhibition ends on May 5th, so it's too late to say 'go and see it and buy a Catalogue there'.

Since no-one else seemed to want to tackle the Bouwbrief contents lists, I volunteered to do so, with all the inaccuracies that that may imply. Although I have mostly stuck to translating titles of articles, I would hope that the results will at least give readers some idea of contents, but if something more is wanted, they may be better off approaching the Dutch author or translator. There can't be many native Dutch speakers who know less English than I know Dutch. There are be one or two articles I might tackle, on subjects I am particularly interested in. Even then, it might be quite a time before I could approach the authors to approve my translation. Do I need to worry? Will the appearance of these lists arouse more reaction than their prolonged absence did?

All Bouwbrieft have sections on workgroup news and events and courses, but I have omitted these since none of the information in the Bouwbrieft I have borrowed is sufficiently current.

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| Tuning & Tempering | Rudolf Rasch |
| Violin making as a hobby (summarises making a violin) | Anton Maulstee |
| II Pianoforte III | Giuseppe Accardi |
| Computers & Music | Jan Bouterse |
| Computer analysis to get the sound you want. Bells that can be played in tune thanks to such analysis. The Archimedes in this context. | |
| The recalculation of Woodwind Instruments | Toon Moonen |
| This discussion concludes that the length of a higher pitched copy of an instrument should be reduced in comparison with the original by a factor representing the ratio of the A of the original to the A of the copy. Diameters should be reduced by this fraction raised to the power 0.678071903. For example, copying a 407 original at 415, lengths are multiplied by 407/415 (0.980722891) and diameters by 0.98868878271 | |
| Materials & Tools XI | |
| Joining bellies using a mechanical planer | Fried Manders |
| Imitation Ivory | |
| Discussion | |
| Figurazione | Sverre Kolberg |
| (Mr Holberg's approach (unspecified) is the right one) | |
| Response to the above by Toon Moonen | |
| Books & Drawings | |
| Drawings of Instruments in the Edinburgh University Collection | |
| Stringing a harpsichord (Flûte & Bec June 1988); Dulcimer note (Cithernieuws 3 of 1988); Wood Centre; Recorder investigation (Tibia 1/88); II Flauto Dolce 17/18; FoMRHI Quarterly | |

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| Instrument Acoustic and Perception: three aspects of music making | Aad Houtsma |
| Violin making as a hobby Part II | Anton Maulstee |
| Leierkasten, an encouragement to the making of a barrelorgan | Johan de Vries |
| II Pianoforte IV (concl) | Giuseppe Accardi |
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| Reviews: The Well-tempered Organ; Orgelinstrumente, Harmoniums (Karl- | |

Marx University); Reclams Musikinstrumentenführer; FoMRHIQ
 Holland's first classical instrument valuer
 The development of the Tourte bow (Arco 88/3,88/4)
 Alte Traversflöte massanalytisch analysiert (Tibia 1/89)
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- Violin making as a hobby Part III (concl) Anton Maulstee
 The influence of harmonics on the tone quality of organ pipes and the function of voicing J D Vlaanderen
 Signal Analysis on the Atari ST computers Manuel Op de Coul
 [A program under development but already functional and available at modest cost which produces a screen display and print-out of peaks of harmonics from a digitised sample of a sound]
 On Stanesby Junior Traversos Jan Bouterse
 [This article discusses Coolsma copies and Jan Bouterse's alternative approach]
 Trade Developments
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 Organ dimensions and the use of computers John Boersma
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- Harmonium Technical Aspects and Restoration I Hans de Louter
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- True & False (a discussion of pitch and intonation) Rudolf Rasch
 Conversation with Albert L. de Vetten, violin maker Rien Drolsbach
 Stradivari's Outline (trans) G. W Meinders
 Experiences in Converting a Cello to a Viola da Gamba Michiel van Eupen
 Harmonium Technical Aspects and Restoration III Hans de Louter

- Report on the Restoration of a Flute d'Amour (trans) Jan Bouterse
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 The "Von Bennigsen" bow, a new concept (trans) Henny Jansen in de Wal
 Comment on the Von Bennigsen bow Gerhard Landwehr
 Books & Drawings
 Reviews: Violin varnish, Picture Dictionary of Musical Instruments,
 500 Years of German Instrument Making, FoMRHI Quarterly
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- True & False II (concl) Rudolf Rasch
 Some Notes on Eight Dutch Oboes Jan Bouterse
 Signing, Dating, and Lettering Jan Burema
 A Good Tip for Sharp Tools Anton Wiegers
 Use a strop - try medical equipment suppliers)
 Harmonium Technical Aspects and Restoration IV Hans de Louter
 Materials & Tools XVII
 Metal reamers Jan Bouterse
 For Discussion
 Reaction to Harmonium Technical Aspects and
 Restoration III Jan Burema
 Books & Drawings
 Construction drawings of simple instruments André Classen
 Clavichord tuning and maintenance (Het Clavichord April 1990); Special
 Smits number of Het Orgel; Tuning recorders (The Recorder 1990);
 Problems in making copies (The American Recorder November 1989)
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 The story of a collection (Flûte & Bee January 1990)
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- Clavichord Tuning & Maintenance I Koen Vermeij
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 Notes on recorders (The Recorder, June 1990); maintaining recorders,
 and the oldest English oboe reed (Tibia 2/90); American museum
 instrument purchases; accordion maintenance (Harmonika International);
 FoMRHIQ
 The Measurement & Documentation Room of the Haag City Museum, and the
 Technical Drawings of Musical Instruments (list) Rob van Acht

FROM SMALL ACORNS - LARGE OAK TREES GROW

David Freeman

A PERSONAL REPORT ON EARLY MUSIC IN CZECHOSLOVAKIA

The beginnings of this article commenced as long ago as 1983, when the late Nancy Brien visited the European museums with Eric Moulder who had been awarded a Churchill Scholarship to measure wind instruments on the continent. One of the countries visited was Czechoslovakia and the Prague collection. Whilst at the museum Nancy met PhDr. Kopecká, a highly qualified and respected musicologist at that time employed at the Museum of Czech Music in Prague, who knew Susanna Tieze, one of the members of a viol consort with whom Nancy played regularly. Nancy promised to bring Susanna back to Prague for a visit. She also realised that there was a desperate need to help the early music enthusiasts to obtain suitable instruments. She had the idea of giving a course in wind instrument and viol making with the makers Jane Julier and Eric Moulder. Whilst this was being planned Nancy returned to Prague with Susanna as promised and I was invited along (as one of the viol consort) as co-driver.

Whilst in Prague I met my future wife and because of my repeated visits to Prague got involved in the project of the instrument making course. I married PhDr. Kopecká in December 1986 in Prague and spent a year travelling backwards and forwards from London to Prague, my wife being able to make only one visit to England, of three months, during 1987. For a variety of reasons Nancy's planned course did not materialise. Meanwhile my wife again visited England from late December 1987 until October 1988. Her visit started very sadly with the news that Nancy had died suddenly during Christmas 1987 whilst on holiday abroad. I took very early retirement from the BBC to come and live here in Prague and we moved in October 1988 and decided to resurrect the idea of Nancy's instrument making course in her memory, as there appeared to be official support for organising it. There was great enthusiasm again, but as before everything collapsed and it was at this stage, having arranged the tutors Barbara Stanley and Alec Loretto, that my wife suggested that we organise the course privately. I had already approached the British Council about travel grants and received much encouragement from Mr. J. Potts and from Mr. R. Cunningham. With the help of friends here I was put in touch with a furniture restorer who was building his own workshops and who very kindly offered to make them available for the course before he started to use them himself. To this man, Jan Dejmal, must go much of the credit for what has happened since.

The workshops were finished in time and from the 6th to the 19th September 1989, ten students, Barbara, Alec, my wife Michaela and I met for the first early instrument making course in Czechoslovakia (with no knowledge of the dramatic events shortly to take place in this country). The members, covering a wide age range from late teens to early fifties and from many different occupations, were mainly unknown to each other, but through the Early Music Society had heard about a course in Renaissance flute and recorder making and through this common interest were brought together in a suburb of Prague. They were at first wary of each other. They soon found however, that here were two lecturers who were interested in them as people and who wanted to help them. The atmosphere quickly thawed, an interpreter was discovered in the group and work began!

By the end of the course there was a very happy group of friends who had discovered common interests and friendship and with eleven flutes and recorders successfully completed were ready to go out and play them. I had joined the course myself, although I had spent much time at Barbara's workshops in England and already been taught some of the basics of instrument making. Much credit must go to Barbara and Alec who, despite tremendous language barriers, communicated their skills to the students and were able to send everyone away with well finished instruments. Towards the end of the course there was an open day and around fifty people gathered to see what was happening and to ask questions of the tutors.

From this course I decided the time had come to form a Society of Makers of Historical Instruments with the course members and other makers we had heard about so that the knowledge gained could be shared and expanded. Just after the revolution on the 25th. November 1989, the first meeting was held - and many people had more important things to be doing!! But it was a start. I was given much encouragement and an entirely free hand by the Czech Music Society under its Early Music branch to organise these events.

Meanwhile, my wife had thought of inviting Catherine Macintosh to come and hold a workshop for baroque and early classical violinists. I had decided that we needed some expert tuition in playing the renaissance flute and had approached Nancy Hadden and had also asked Michael Plant if he would be prepared to give a course in viol making. I approached the British Council again and they very generously paid the fares for these three visitors to Prague during 1990. So from Nancy's original idea we had started a series of making courses named in her memory and now were preparing playing courses as well.

On the afternoon of the 26th. May, the Czechoslovakian Viola da Gamba and Lute Society was formed with the aims of widening the knowledge of the repertoire and playing techniques amongst the few widely scattered players in the country. In the morning the Instrument Makers had met and many of these stayed for the start of the Gamba Society and there were members from all over the country - the societies are far from being just Prague members. It was decided to seek affiliation with the American and British Gamba and Lute Societies and this has been successfully accomplished.

June 23rd. to 26th. 1990 - Catherine Mackintosh's course started badly! Of the twelve people and two groups who had signed forms to attend the course - two came. One of the two groups for whom Catherine had been especially invited never came and the other missed the first morning. But luckily we had advertised the course fairly widely and other people came unexpectedly and the first day was quite full, of again, rather shy musicians - the first morning only one violin was produced and no music stands ever appeared except mine! Again the atmosphere quickly lightened as Catherine's charm and skill became apparent. By the end of the course much had been learnt, again, as with all the courses, there was great surprise that the tutors came here to teach for no fee because they cared about what was happening in central Europe. So much was beginning to happen because of this generosity of musicians from outside the country who were prepared to give their time to share their skills with the musicians of Czechoslovakia.

During August from the 18th. to 26th. we were pleased to have Michael Plant to give the second making course. His expertise in viol making and his excellent communication quickly made

this small course of five students an intensive viol making workshop. He had brought with him partly prepared instruments, a bass and a treble. We were fortunate to be able to use the workshop of a College of Applied Art in Prague (the course was being held during vacation time) thanks to the help of one of the course members Stefan Sukup (who also lectures in woodcarving at the college) and the support of the college staff. We had an excellent large and well lit workshop, with visits from interested lecturers and students from the college. Short lunch hours were the order of the day as much work had to be done. Apart from varnishing the bass was finished but the treble needed to go back to England for Michael to finish some of the work and we collected this later in the year whilst visiting England for tools, materials and plans (and to see my family during a very busy 'holiday/business trip'). As always the students (two of whom were already making viols professionally, one part time and the other full time) would have loved to have had a longer course, but again friendships and contacts had been made.

Just after this course finished we were delighted to meet Ellen Powers, the area representative for the Viola da Gamba Society of America, who had brought a box of strings, rosin, peg paste and other useful things for viol players. She was visiting Prague and had brought this gift, which was the outcome of a 'whip-round' at a meeting, from members in the States who wanted to help Czechoslovakian gamba players.

From the 2nd. to 5th. September we held the second playing course when Nancy Hadden came to instruct in playing the renaissance flute. We should at this time like to thank Prof. Vins who made available one of his schools of music and art free of charge, to help make this course as well as future courses and society meetings possible. His generosity has removed one of the difficulties of organising courses here - the venue. This course consisted mainly of members from the original 1989 workshop in flute making, but also had various visiting students interested to find out more about the flutes. I had introduced the renaissance flute at the Valtice Summer School of Early Music during June and some of these players were able to attend part of the course. There was already a small group of us playing flutes and 'big' recorders regularly so some experience had been gained. But now we learnt how we should be playing, how the embouchure should be formed and many other of the techniques peculiar to the renaissance flute. Nancy also spent some time with those interested in the Baroque flute. The usual pattern was followed of sad farewells and promises to return.

During a six week trip to England I was able to get a car load, full to the roof literally, of tools, plans and materials that were unobtainable here. This was a mixture of things I bought and other items that were very generously given, such as wood for viol making and a full set of publications from the Viola da Gamba Society of Great Britain. We were also lent a treble viol by friends in Berlin which is now on loan to a member of the Viola da Gamba Society.

What of 1991? The first event will be the publication of a magazine - a joint one this year for the two Societies we have started. It is being produced on the computer I purchased to help with all the work we are doing here (does anyone want to donate a double A4 monitor and card for an Apple Macintosh SE HD40 and a large external hard disk? I spend many hours every day in letter writing and organisation for the work we do here in front of this wonderful machine). Although I am retired, my wife and I now work from around 9.00am. until 11.00pm. most days preparing the courses, the

Festival, answering queries from England and arranging for visiting musicians to meet the right people here. Although the work is all unpaid, it is a wonderful opportunity to put back into music some of the pleasure I have received from it during my life so far. We have regular viola da gamba, flute and recorder playing evenings here in the house or at other friends houses which give a welcome break from the rest of the organising.

We have several courses planned with kind friends from England again giving their skills to help the musicians here. The first visitor will be Brian Wright from Cornwall, who is visiting the Viola da Gamba Society meeting to be held in Brno during March. Brian wrote to ask if he could visit us and we are taking the opportunity of holding a special Lute Society meeting. After which he will be giving a concert of guitar and lute music in Brno and a week later another concert in Prague in the Pálffy Palace

The second visitor this year will be Richard Boothby who is coming to give a viola da gamba and baroque cello course around the end of April. There is urgent need of gamba tuition although Siegfried Pank has been doing valuable work over the last few years at the Valtice summer school and is a much loved teacher there. This will probably take the form of two three day courses based in Prague.

The third course will be Poppy Holden's singing course in June. As many of you may already be aware, Poppy plans to bring a load of wondrous gifts to the people here. We hope to distribute some of these gifts in the following ways if Poppy agrees: viols and lutes we will loan out through the Viola da Gamba and Lute Society, a harpsichord and organ (a kit to be finished here) perhaps to be lent out through the music colleges, tools for loan through the Instrument Makers Society, music, CDs and other treasures may well be based at the 'Prague Early Music Centre' in our house, where we already have a large library of music, records, plans, magazines and journals that are freely available on loan to anyone who would like to make use of them. This collection has already benefited from the generosity of many individuals and societies in England over the two and a half years I have been here.

The final courses will be given by Dick Earle and his wife, Alison Bury. Dick will be giving a course in baroque oboe making as well as a short playing one. His wife Alison will give a baroque string class. The oboe making course although attended by several students will concentrate on one man who is keen to make early instruments professionally, rather than 'one offs' as an amateur. He is already producing some very fine prototype renaissance alto recorders and we hope these will soon be marketed here.

The final big project for 1991 is the first Festival of Early Music to be held in Czechoslovakia. This will rely heavily on sponsorship. We are very grateful to Apple Computer IMC-ČSFR a.s., The British Council, Czechoslovakian Ministry of Culture of the Czech Republic, Czechoslovakian Ministry of Education, European Cultural Club, ICI, Inexco Argosy Ltd, Price Waterhouse, Recruitment International Ltd. & SHELL for their support in this venture. This support is absolutely essential and without it there could be no festival because of the financial difficulties that still exist here. This first Festival of Early Music will be held from the 19th. to 27th. October in Prague. The main evening concerts will be held in the Valdstein Palace, in the Knight's Hall, by the kind permission of the Czechoslovakian Ministry of Culture of the Czech Republic and also the

Exhibition of Instrument Makers will be held here in a separate smaller hall. The early evening concerts will take place close by in the hall of the European Cultural Club in the Pálffy Palace. There will normally be two concerts each day, one at 5.00pm and the second main event at 7.30pm. At the same time there will be a small Exhibition of instruments made by Czech instrument makers and organised by the Society of Makers of Historical Musical Instruments. This exhibition will feature harpsichords, lutes, organs, recorders, viola da gambas as well as we hope, a display from the Early Music Shop from Bradford in England and a Multi-Media Music demonstration by Apple Computer IMC.

THE CONCERTS PLANNED
FROM SATURDAY 19TH. - SUNDAY 27TH. OCTOBER

1. day (no afternoon concert)		Mozart Flute Quartet	1930 hrs.
2. day Jaroslav Tůma - organ recital	1700 hrs.	Gioia Della Musica - orch.	1930hrs.
3. day Vaganti - choir	1700 hrs.	Musica Antiqua of London	1930 hrs.
4. day Glen Wilson - fortepiano	1700 hrs.	Petr Hejny - gamba	1930 hrs.
5. day Camerata Renesex - renaissance consort	1700 hrs.	Catherine Mackintosh & Glen Wilson	1930hrs.
6. day Collegium Flauto Dolce - renaissance consort	1700 hrs.	Still to be decided	1930 hrs.
7. day Duodena Cantitans - choir	1700 hrs.	Musica Antiqua Praha - baroque group	1930 hrs.
8. day Vladimír Rusó - harpsichord recital	1700 hrs.	Baroque Opera	1930 hrs.
9. day Irena Troupová & Mathias Wilke soprano and keyboard	1700 hrs.	Musica Aeterna - orchestra	1930 hrs.

That concludes the plans for this year, what of 1992? The Early Music Festival will hopefully become an annual event and we plan that the 1992 Festival will be based on the 'Discovery of America'. We are hoping to invite Circa 1500, Fretwork together with Michael Chance and also we are exploring the possibilities of getting The Musicians of Swanee Alley here. Courses may involve lute making and harpsichord making, but we have no further firm plans as yet. Money will continue to be the main restricting factor as we may have to get sponsorship for the courses as well as the Festival. We shall have to see how the wind blows and how this will affect the growth of the oak tree.

One final thought. Many people have said "why is all this effort and generosity needed", or "anyone can buy old instruments cheaply in Czechoslovakia". Maybe they could a few years ago, but not legally and at the expense of instruments being stolen from collections. The fact remains that I know of two harpsichord makers, one full time viol maker and one part time maker, three people making lutes, one maker starting to make recorders and that's it! No crumhorns, harps, baroque cellos or violins, fortepianos, shawms etc. There are one or two people making single one off instruments now, but not full time. Another comment from a lady from Berlin (West) when in Berlin (East) was "we all have such lovely viols, why do you play on such awful instruments when you

could buy ones like ours". My answer would be how many people would pay two or three years salary - around twenty to thirty thousand pounds for a bass viol? That is the cost here with the existing exchange rate (that is two or three years salary) and it would take about thirty years allowance at present to be able to legally change that much money into hard currency. The question is answered! There is still a desperate need for help and we are very grateful to all those who are helping.

FoMRHI Comm 1027

A VANLOAD OF INSTRUMENTS TO PRAGUE, JUNE 1991

You may have read elsewhere that in April 1990 I was in Prague, performing with and teaching some of the many excellent Czech performers of early music who are as yet virtually unknown in the West. They told me that it's been very hard for them to keep in touch with current Western performance practice - they haven't had access to recordings, books or decent instruments.

In spite of these disadvantages, they were so good that I played them on Radio Three's "Mainly for Pleasure", and they have been invited to perform in several British music festivals. I'm going back in June 1991 to do some more teaching and performing, with financial help from the British Council. David Freeman is organising the course with the Prague Early Music Society.

Rather than just fly to Prague, do the sessions and go home, I'd like to share this opportunity to offer practical help to Czech musicians.

I'm looking for a van to drive to Prague, to carry the many gifts that are being donated by musicians and friends in Britain. So far, the van will contain a harpsichord, some beginners' lutes, a tenor viol kit, a cornamuse, a renaissance flute, a Knole organ kit, a virginals, several keyboard instrument plans, tools, books, research materials, sheet music, CDs, and music journals.

Some people have given money, which is currently being held in an interest-bearing account by the Early Music Centre: this will either go towards the cost of the van, or, if I can borrow a vehicle, the money will be spent on measuring tools and pitch meters.

Radio Three will be lending recording equipment so that I can make a programme about the trip for Music Weekly, and there may be TV coverage and other publicity.

If anyone would like to help, please contact Poppy Holden at

109 Grove Hill, London E18 2HY, tel 081-530 5404

FOMRHI Comm 1028

P. Gouk

MUSICAL INSTRUMENT TECHNOLOGY IN SEVENTEENTH-CENTURY ENGLAND
Meeting at Bate Collection of Historical Instruments, Music Faculty,
Oxford, 3rd February 1991.

The reason for calling this meeting was because a conference on 'The development of a skilled workforce in London c.1550-1750' (marking the beginning of a new research project) is taking place at the Institute of Historical Research, University of London on 11 May. In my opinion, musical instrument makers should be integral to such a project. As in the case of other crafts, the following kinds of information has to be established: what instruments are extant and what can we learn from them? Which were made in London and which were imported? Do we know who made them? Where did the makers live and work? What role did immigrants play in introducing new skills and technology to the city? Jeremy suggested that we call a FOMRHI meeting to find out who might be interested in these questions. Thirty-eight people turned up at this meeting, four of whom were willing to give papers, an indication of how much interest there already is in the subject.

Jeremy began the proceedings with the provocative remark that he couldn't think of any new technical innovations in the seventeenth century at all - what was new in the musical field was the ways in which existing technologies were applied. Peter Holman's paper on 'The origin of the baryton' illustrated this kind of technological transfer very clearly. The eighteenth-century baryton, shaped like a bass viol, with six or seven bowed strings and a set of auxiliary metal strings, is thought to have been related to the seventeenth-century English lyra viol, apparently a small bass viol with sympathetic wire strings lying under the ordinary strings that could also be plucked with the left hand. The evidence for the lyra viol in Praetorius (1618), Bacon (1627) and Mersenne (1635/1648) does not tell us whether such an instrument was a novelty limited to James I's court or more widely known; only John Playford in his Musick's Recreation on the Viol, Lyra-way (1661) claims to have seen many examples, all of which had fallen into disuse by that time. As Holman observes, one reason for this may have been the problem (noted by Bacon) that there were not enough wire strings to vibrate in sympathy with all the notes that could be obtained on the gut strings. At the end of the seventeenth century, the 'baryton', now associated with German players, had between ten and eighteen wire strings, thereby offsetting the deficiency to some extent.

Until now, Playford's claim that Daniel Farrant was the 'Inventor of the Baryton', has never been seriously challenged, but as this paper demonstrated, there is at least one rival contender. In 1608/9 the musician Peter Edney and instrument maker George Gill, both courtiers, proposed a monopoly for making lutes, viols and violins 'with an addic[i]on of wyer stringes' for which they claimed sole invention. Arthur Gregory, a customs officer at Lyme in Dorset, had already invented an 'improved viol', of this type, which Gill had made for him. Holman's inquiry into the careers of these men reveals just how misleading it is to ascribe the 'invention' of the baryton simply to one individual rather than exploring the circumstances in which the development of this instrument occurred in English court circles before 1610. According to Holman, a key event in the process was the introduction of the Italian theorbo to England around 1605 and that the baryton was 'nothing more than the application of the theorbo principle to the viol'. Whoever invented it may have also been responsible for devising several plucked instruments with a secondary row of wire strings.

A lively discussion followed the presentation where various problems with Holman's hypothesis were raised. There was a feeling that the theorbo may not have been the sole catalyst for the invention, if indeed it was one at all. What may have been more relevant to the virtually simultaneous development of the lyra viol and various other instruments which exploited sympathetic resonance in this period was the availability of a new kind of wire string made in South Germany from the late sixteenth century (see FOMHBI Comm 548 by Cary Karp). These had a much higher tensile strength than gut strings, could be tuned to a higher pitch, and produced much better harmonics. Their potential seems to have been explored by instrument makers and musicians in a variety of ways who were experimenting with ways of extending the decay rate and augmenting the volume of sound produced by instruments.

Although this was the only paper which addressed the question of specifically English music technology of the period, the other contributions of the day all raised relevant issues. Donald S. Gill began his talk on 'Paper organ pipes' by explaining the background to his own attempts to manufacture organ pipes of this material. He first found a reference to them in a nineteenth-century book and then became interested in the portable organ in the Victoria and Albert Museum made by Gottfried Fritzsche of Saxony in 1627 which has 120 pipes all made of paper. At this point in the proceedings the advantages of airing one's ideas to like-minded enthusiasts became very clear: Donald was instantly bombarded with references to other books on paper pipes and examples of surviving instruments such as that made for Isabella d'Este by Lorenzo da Pavia.

Having assumed that Fritzsche had used pasteboard (sheets of handmade paper glued together with flour and water paste) for his pipes, Donald experimented with various types of paper (eg colour supplements) wetted, glued and rolled around a mandrel to make his own versions. His account of the various details of construction, problems encountered and adjustments required ended with a demonstration of the most successful pipes he has produced to date. Donald went on to raise some very interesting questions: why did Fritzsche and others use paper? How far back does this technology go? One reason to favour paper is its relative lightness. As he pointed out, if the portatives shown in medieval illustrations of angels had metal or wooden organ pipes, the larger ones in particular would have been extremely heavy. On the other hand, an instrument with paper pipes might weigh as little as six pounds and would be much more portable. Since no example survives from the period, it might even be conjectured that portatives always had paper pipes. In the discussion which followed, it was suggested that another reason for using paper was that it did not require the secret skills of the metal-working crafts and an instrument could therefore be made without infringing guild regulations. Another point raised was that different techniques were clearly used at different periods; Fritzsche's pipes seem to have been an imitation of metal pipes, whereas those of the d'Este keyboard seem to have been made for reasons other than portability.

After lunch Graham Lyndon-Jones and Peter Harris gave a presentation on their reconstruction of the fagot - a transitional instrument of three joints described in Mersenne's Harmonie Universelle (1636; English translation by Chapman, pp. 372-3), of which type no examples survive. As their talk revealed, many problems were encountered in the process of reconstruction. In the first place, Mersenne's rather sketchy specifications don't seem to correspond with the illustrations, and these have to be reconciled in some way. While something can be gleaned from these sources about finger-hole placings, for example, details about the crook, bore, angles of the holes and other details essential for producing an accurate

reconstruction are simply lacking. In order to produce a workable instrument at all they had to use a process of trial-and-error, drawing on their experience of making copies of dulcians and early bassoons. Not being an woodwind expert myself, I was in no position to judge the authenticity of the beautiful and elegant models which they brought along for us to examine and discuss.

David Owen informed the group about some interesting information that has come out of a local history project on inventories and wills in Cheshire. The 1692 will of Polycarpus Caesar, a maltster of Nantwich in South Cheshire, includes references to a bass violin, a bass viol, 2 citterns, 1 kit, 1 spinet, 4 flagelets, 2 curtals and 2 trumpets with strings (tromba marina). This account led into discussion of the production and distribution of woodwind instruments in early modern England, and the obviously central role that the immigrant Jewish family of Bassanos played in this activity from the mid-sixteenth century. There is clearly a rich vein of information waiting to be tapped in local resources of this kind.

The day ended with a talk by Ephraim Segerman on 'Arching systems in viols and violins', with particular reference to a John Rose viol in the V&A. At this point in the meeting I had the feeling that this discussion was part of an ongoing debate among FoMRHI members. It seems to boil down to the question of whether craftsmen used geometrical techniques to help them design their instruments, or whether this is a post hoc assumption by people analysing the curves on extant instruments. How one defines geometry in the first place is part of the problem. There was obviously a great deal of tacit knowledge and empirical skill passed on from master to apprentice. Yet what the connection actually was between their empirical geometry of modulus and proportion, the geometry in contemporary theory books, and the geometry of modern analyses such as those of Coates, remains to be seen.

In sum, we had a good day talking and arguing about lots of things. As far as the question of seventeenth-century English music technology goes, I don't think many answers were given, but I hope that the questions posed may lead people to think more about the larger picture of craft skills that their own individual concerns fit into. It was agreed that another one-day meeting should take place on 'Musical Instrument Technology 1450-1550' which was on Sunday March 17th, and now two more meetings on related themes are planned at the Bate on 28 April and 26 May; details of these can be obtained from Jeremy Montagu or Lewis Jones when they are available. Further details about the London project can be obtained from me.

Penelope Gouk, St. Catherine's College, Oxford OX1 3UJ

Musical Instrument Technology 1450-1550 Bate. Collection March 17, 1991

Guastalla

Bruno, - Critique of "Geometry, Proportion and the Art of Lutherie"

Bruno made the case that the author had read too much geometry and proportion into the instruments, and had worked from drawings which were distorted. Bruno compared drawing and photo of Strad fiddle-head; they were clearly different.

Eph Segerman and Lewis Jones both said that a certain amount of geometry and prop. must have been used in instrument design, but with a certain amount of divergence from this in the actual making. Bruno recommended Whittkower's Architecture in the Age of Humanism, the chapter on harmonic proportion.

Lewis Jones - 15 C. Violetta in Bologna

One of the few surviving 15th C. stringed instruments. Owned by St. Catherine of De Vigri, abbess of a monastery in Bologna, b.1413 - d.1463. This instrument is in a glass case as part of a shrine featuring St. Catherine's remains. Documented by Marco Tiella in an article appearing in the 1975 BSJ. Features drawings and photos (some discrepancies between the two). St. C. accompanied herself in the performance of "laude" with this instrument. Nothing known about this music. 17th C. documents record the moving and mending of the violetta. Lewis showed us copies of Marco Tiella's drawings which are full size, too simple, contain irregularities.

Construction - Body is one piece of maple, from a small tree. Some pith included. Knots in shoulders. No cracks. Large peg at bottom. One piece, top to bottom. Kidney-shaped sound-holes. Bridge and pegs are ivory. No finger-board glued to neck. No evidence of frets. Body hollowed out with gouge. Two-part soundboard joined by fir or softwood bar. Upper s.b. is maple, quarter-sawn from a larger tree. Joint in one corner of s.b. Rough gothic rose cut straight into s.b. Single 3mm wide diagonal bar across inside of s.b. This is only bar visible. s.b. is 3mm thick at rose, thinned towards bottom. Lower s.b. is quarter-sawn softwood, single piece, even thickness, slightly dome-shaped, annual rings 1.5 - 2mm apart. All parts are glued together, no fasteners used. No varnish. Possibly burnished or oiled (or egg-white?). Tool-marks on contours and curves - not overly fussy. Ivory fittings are flawless. Evidence of playing wear. Pegbox narrow, tail flat and decorated with scored lines with pigment rubbed in. Pegs are heart-shaped with 1.4mm dia. holes for strings. Nut is ivory with shallow 1mm wide notches. Curve of bridge allows playing of single notes. Stout bow is original.

Much discussion of the technical possibilities of old fiddles - single notes or melody with drone. Tinctorus' reference to 3-string fiddles capable of single notes is read and discussed. Curved and flat bridges co-existed for years, written music no help with this problem.

Bow as long as instrument, dark brown wood of fine texture. Possibly brazilwood. Hair held by turned ivory bead. Stick almost straight, carved not turned. Restrung and repaired in 17th C.

Bridge is now glued to upper s.b., but wear-marks indicate it was once on lower s.b. close to tail-piece.

Lewis then showed a series of slides of paintings and intarsias depicting 15th C fiddles, many with two-part soundboards.

1. Assisi intarsia c.1480 Choir stall decorated with scene including 3-string fiddle.
2. Painting c.1490 - 4-string rebec. Two part s.b., bridge on lower part.

3. 5-string instrument with curved bridge on two-part s.b.
4. Urbino intarsia. 4-string fiddle, kidney-shaped holes on upper s.b., bridge on upper s.b.
5. Siena intarsia. Kidney-shaped holes, trestle-shaped bridge on lower s.b. Upper s.b. overhangs lower.

Eph points out that a curved bridge is necessary when playing all strings equally otherwise outer strings will dominate. Brief history of vihuela and how it may have "evolved" into viol and guitar. Eph suggests that larger upper s.b. could have been intended to resonate with lower frequencies of the playing noise, that is the "chaff" or the scrape of the bow at the beginning of the note.

Matthew Spring - Hans Oth Gittern in Wartburg Castle

Gittern made 1450 by Hans Oth of Nuremberg (b.1434, d.1463). Picture and description in 1974 Lute Soc. Journal. Also called mandora. South of Alps called chitarra or mandora. (Matthew passes around his own, very good, set of photos) This instrument made from one piece of wood. Very intricate rose. Unusual acorn shape on headstock. Back shaped like pair of buttocks. All maple. Rose very close to neck. Belonged to Ludwig Beckstein, Romantic poet. Strings 44 cm long. Modern bridge. Weighs 1 3/4 lbs. Soundboard is spruce, two matching halves. Tuning not known. Chris Page suggests gittern tuning was same as oud, down by fourths from middle C, but this instrument is too small for this tuning. Perhaps was one octave above this.

Gittern makes a convenient rhyme with "tavern" and Shakespeare uses this to tell of louts with gitterns causing trouble and getting locked up, etc. Stout, one-piece construction would make for an instrument which could survive a bar-room brawl. Easier to build than a lute, thereby cheaper. Up to 1420, there was always one lute player and one gittern player in the employ of the English royal court. Many sizes. "Mandora" means small bow.

General discussion about accepted names for old instruments. 1977 GSI article in which Laurie Wright cites old manuscript with marginal drawings as reliable source for correct contemporary instrument names.

Lewis Jones' 15th C Instrument Slides

1. Ducal Palace at Urbino, intarsias in the study. Decorated 1470's. Clavichord, recorders, lute, lira da braccio, written music. Jeremy notes discrepancies between clavichord in intarsia and reconstruction in Bates Collection. Tangents are not solid bars, but are actually staples. First clear depiction of dovetail joints.
2. Early 16th C choir stall intarsia in Genoa. Lute, 3-string fiddle, sets of viols, spinet, reversed harp. Crude work. Sets of instruments shown.
3. Painting - Modena 1460. Lira da braccio. Possibly transposable by moving bridge. Angel bowing near middle of string. General discussion of reliability of iconography as source for historical playing technique - did models or artists know how to bow a fiddle?

Tentative plans made for next seminar. April 28 - Same period but focus on musicology. Possibly Peter Holman on sets of instruments and pitch standards. May 26 - Nuts and bolts of renaissance and medieval technology - wire-drawing, woodwork, glues, metalwork, etc. Penelope Gouk suggested inviting in some science and technology historians.

F. Raudonikas. COROLLARIA TO THE MODAL SCALE THEORY (summary)

1. On meanings of pitch-symbols. The author attempts to find a place for musicology among natural sciences. From this standpoint the value of musicology is that its formal means, along with their usual assignment, deal also with hearing as the psychological phenomenon. The epistemological effectivity of pitch-symbols is estimated. Among of others is clarified that a two-dimensional text does not verify the two-dimensional structure of pitch-relations, if the durations of tones are translated.

2. Dynamis in the Old Greek theory. The dynamical ideas are considered, which have been presented in Old Greek musical theory. Dynamis has a considerable cognitive competency. Misunderstanding of dynamical aspect is an important reason for the ineffectivity of modern musical theory.

Edited in collection of scientific works of Leningr. St. Inst. of Thea. Mus. & Cinem. (in Russian) "Problemata musicologica 5. The music, language, traditions". Leningrad, 1990. P. 56 - 69.

THE PROPÆDEUTIC SUPPLEMENT. The musicological modus may be defined as a combination of intervals. But modus is "a particular form or manifestation of some underlying substance, or of some permanent aspect of such a substance" /1/ and in order to take a combination of intervals as the modus it's necessary to point the substance. Any combination of intervals contains a property which is recognized by the hearing (i.e., the observing consciousness) as the image, state, or character, of which infinite manifold is the questioned substance. By characterizing the structure and metrics of the space of pitch-perception, /2/ Pythagoras discovered the formal (i.e., independent from consonance etc. properties of intervals) aspect of this manifold. In such an aspect the combination of intervals is (or not is) modus of the conditions of combining. The last ones are represented by Pythagoras as a kind of law, which may be to get such an interpretation:

The state or thesis of degree \mathbb{J} is expressed as $\mathbb{J} = M\mathbb{U} - \mathbb{U}$; (1). There are the relative frequencies B (ambitus) and M (modul) such that $M < B$ and $M = \log_B M$. Argument \mathbb{U} is a whole number, which takes any values. obtaining of \mathbb{J} for some sequence of values \mathbb{U} is called the evolution of modus. Set of values of the argument defines the number of degrees and if this set contains \mathbb{U} values (except the 0) the modus has $\mathbb{U} + 1$ unrepeated (inhomonymous) degrees. This set characterizes the volume of evolution of the scale. $\log_B B - 1$, therefore the unit characterizes the relation of homonymity (repetition) so as homonymous degrees are \mathbb{J} and $\mathbb{J} + \mathbb{P}$ (\mathbb{P} - the whole number). The value of ambitus is an original condition, therefore already at $\mathbb{U} = 0$ modus has $\mathbb{J} = 0$, $\mathbb{J} = 1$, i.e., the bass and the descant boundaries. The others \mathbb{J} are defined in homonymity of boundaries (i.e., $0 < \mathbb{J} < 1$). The metathesis \mathbb{U} is such a whole number that $0 < (M\mathbb{U} - \mathbb{U}) < 1$. The meaning or dynamis of degree \mathbb{J} is expressed by mantissa of relation \mathbb{U}/\mathbb{U} (ascended dynamis) and $(\mathbb{U} + 1)/\mathbb{U}$ (descended one). The characteristics there remain constant and point the combinatoric state of modus.

When we represent resolutions of equation (1) for fixed w relatively Descartes coordinates (\mathbb{J}, \mathbb{U}) then collineations of \mathbb{J}, \mathbb{U} are called the dynamical lines and characterized by constant values of \mathbb{J} . The structural situation represented by dynamical lines is called a dynamical figure and prove to be the highest demonstrative representation of the syntactic peculiarities of modus.

In such geometric representation we get a discrete subgroup of Euclidian group which contains two incollinear transfers (homonymous & inhomonymous ones) and rotation on π (inversion). In the Hilbert's classification the group has an index $II, 2\alpha$ and is a crystallographic one /3/. The system of tones putting in a ground of our traditional orthography is one of the infinite number of the particular cases of this group. The equal tempered fretboard of guitar serves as an example of one-dimensional projection of group $II, 2\alpha$ evolved by $B = 2, M = 7/12, \mathbb{U} \geq 11$.

The evolution in which ambitus is constant and modul has any values in limits $0 < M < 1$, forms the three-dimensional continuum. To transformations of group $II, 2\alpha$ there is added the rotation from 0 to $\pi/2$ with simultaneous shift of centrum from $M = 0$ to $M = 1$. Centrum runs along the axis which is incidental with $\mathbb{J} = 0$ and perpendicular to plane of original group $II, 2\alpha$. Taking the ambitus as the continuously changed value, we get the complete group of the Pythagorean equation of the modal scale. This group is the four-dimensional homothety of the three-dimensional continuum.

/1/ Webster's Third New International Dictionary of the English Language unabridged. Cop. 1971 by G. & C. Merriam Co. P. 1451.

/2/ The space of pitch-perception corresponds to the axis of frequencies in the physical acoustics. The numerical structure of last axis is known from the devices *catas*, while in the space of pitch-perception the ear measures. The results of both kinds of measurements prove to be mutually inlinear - the arithmetic progression of perceived values is mapped by geometric progression of frequencies. The metrics of the space of pitch-perception is defined by that the doubling of frequency has a meaning of the recurrent operation. These two conclusions follow from the Pythagoras experiments with monochord and may be called the first and the second laws of Pythagoras. In the XX century Weber discovered that the first Pythagorean law has an extension to the energetic aspect of sound-perception (law of Weber-Fechner).

/3/ D. Hilbert, S. Cohn-Vossen. Anschauliche Geometrie. Berlin, 1932. Kap. II, §§ 5, 12.

FOMRHI Comm 1031

Felix RAUDONIKAS.

The Pythagorean System of Musical Tones. Part 2.

S u m m a r y

Thethetic projection of the three-dimensional continuum (i.e. the space of perception of all scales with given ambitus and given number of degrees) was used for the auscultation researches. Quantization of continuum was discovered on a few areas in each of which the musical character of scales is recognized as the same despite considerable variation of intervals. It follows that properties of the scale recognized by ear are independent from the properties of intervals recognized separately.

The modified auscultation researches demonstrate existence of generic (i.e. immutable under change of number of degrees) identity of scales characters. On this basis the diversity of musical characters distinguished by ear is reduced to a ranged set of original qualitative distinctions or spectrum.

The space of perception of all scales with arbitrary ambitus and arbitrary number of degrees is the four-dimensional continuum. Metrics of the four-dimensional continuum, based on the spectrum of qualitative distinctions, allows to obtain a taxonomic descriptions which may be considered as the COMPLETE MODAL SYNTAX (i.e. the description of all intonation-structural conditions of arbitrary musical form).

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Part 1 - in Probl. Mus. No. 2. "The aspects of theoretical musicology". Leningrad, 1989. (Summary - Comm. 959)

Part 2 - in Probl. Mus. No. 5. "The music, language, traditions". Leningrad, 1990.

FOMRHI Comm.No. 1032

John Catch

Singing Lessons for Wood

The belief that wood (and other materials?) must "learn to sing", like belief in extra-sensory perception, is ancient, persistent, and widely held. But no maker, it seems, has tried to put it to practical use. Why not teach the inexperienced wood by pumping in recordings by master players, twenty-four hours a day? (It might indeed be an infringement of copyright or performing right--).

The Buzzing of Wound Strings

I. THE PROBLEM

Buzzing occurs in traditionally-made metal-wound-on-gut strings (like those we make at NRI) when the metal windings are loose and they rattle against the core and especially against each other. The metal wire is wound very tightly over the core when the string is made, the wire tension being so great that it presses grooves into the gut core. When a string is put on an instrument and tuned up to pitch, the tension stretches the core elastically and it gets a bit thinner. The windings ride in the grooves as the core stretches and so get separated a bit, with the diameter of their turns decreasing slightly. The core diameter decreases more than the winding diameter, creating some looseness. Some of that looseness is taken up by relaxation of the gut surface that had been compressed during the winding process. The remaining looseness causes a soft buzzing of the windings rattling against the core. As long as the windings are confined to their grooves, so that the much more noticeable buzzing of windings against windings is prevented, a sound results that is considered normal for wound strings.

Greater looseness of the windings that will allow windings to slap against windings can result from various circumstances. These can be:

A. The core becomes thinner than it would normally be when just tuned up. This can be because:

1. The gut is dryer than it should be. Gut gets thinner with lower moisture content and thicker with higher moisture content. Its moisture content depends on the relative humidity of the air surrounding it. We dry the gut almost completely before winding, but it picks up some moisture from the air during the winding, ending up with a moisture content that would be in equilibrium with an atmosphere at about 30% relative humidity. So a normal string can buzz if it is played in an extremely dry atmosphere of considerably less than 30% relative humidity. This is very rare. Such buzzing would disappear when the humidity becomes more normal.

2. The gut has thinned because of inelastic stretching. We pre-stretch gut cores at playing tension for about two weeks before winding on them. The criterion for ending the pre-stretching is that we cannot notice any further stretching on successive days. This avoids the wound string experiencing the rapid stretching of gut early in its life. But gut does continue to stretch slowly as long as it is under tension (thinner gut, being closer to its breaking tension, stretches faster than thick gut). This will eventually lead to the string becoming buzzy. There is no way of avoiding this process except by detuning strings when not in use.

B. The windings have a cylindrical diameter that is greater than it would normally be. This can be because:

1. The metal temper was wrong, being too springy to let it wind tightly enough. We check this carefully on every reel of winding wire that we use.

2. The tension put on the winding wire during the winding process was not great enough, resulting in the grooves in the gut made by the wire not being deep enough. The most important aspect of the training of a string maker is to learn to feel the appropriate tension with which to feed each type and diameter of winding wire, which very often is the maximum beyond which the wire stretches by necking and then breaks. Our string makers are well trained and quite consistent.

3. After the string is made, high relative humidity swells the gut core, which stretches the windings to a larger diameter. At this high relative humidity there would be no string buzzing, but when the humidity subsequently lowers and the gut core contracts again, buzzing occurs. This is by far the most common cause for buzzing. The spell at high relative humidity could happen in the obvious way of being exposed to wet weather or the not-so-obvious way of being

enclosed in a space at normal temperature and humidity which gets cooled down, reducing the capacity of the enclosed air to retain moisture, and thus automatically increasing the relative humidity. Following are various aspects of string care for avoiding such buzzing from humidity cycling:

a. We seal the string in an air-tight plastic envelope immediately after it is wound. The plastic is highly resistant to the passage of water vapour through it, but it can't be completely so. After weeks in a very high humidity environment, it is possible that enough vapour will pass through the plastic to swell the gut sufficiently to lead to buzzing. If this occurs, it is after we send the string out, since we are careful not to let the humidity get high where we store our string stock.

b. If one opens the string packet before it is needed for the instrument, it becomes much more vulnerable to become buzzy when it is finally used. This should be avoided.

c. After the string is put on the instrument, one can avoid it experiencing high humidity by not taking the instrument out of its case for extended periods of time when the humidity is particularly high. The case would have to be fairly air-tight so the high humidity air cannot get in. The case would also have to be fairly insulating thermally so that its contents do not have the chance to get very cold. Leaving the instrument out of its case in a room that is heated during the day but not at night is particularly dangerous. The relative humidity shoots up as the room cools at night.

d. If a string has become buzzy, one might try to correct this by tightening up the winding. This can be done by detuning the string and turning the peg so that the string goes straight through it (with no turns on it). Grasp the string with the fingers, one hand on each side of the peg. Roll the string between the fingers of both hands as much as one can in the direction of tightening the windings. This is anti-clockwise when looking down the string towards the bridge. While keeping the string in the maximum-rolled condition with the hand on the vibrating side of the string, use the other hand to turn the peg to tune the string up again, thus locking in the new twist. If successful, this will only cure the buzzing until the next time the string is subject to high humidity.

e. If one can't avoid high humidity circumstances, buzzing can be avoided by keeping the string continuously at high moisture. For this one must keep the instrument in a case with a humidifier included. There are commercial humidifiers sold both for this purpose and for preventing the cracking of the instrument wood which can occur at low humidity. A traditional method involves keeping a piece of cut fruit in the case with the instrument.

C. The grooves in the gut that the windings ride in can be damaged mechanically by handling.

1. This can occur by binding of the winding wires by defective grooves in the bridge or nut when tuning up.

2. It can also happen by bending the string too sharply any time between its being made and its being installed on the instrument. That could be at our workshop before the string is packed, or with the player after taking it out of the packet.

II. OTHER PROBLEMS

Often buzzing has been found not to result from any fault in the string. Though induced by the string's vibration, the buzzing can come from:

A. a badly fitted bridge, where parts of the feet vibrate against the soundboard,

B. a badly cut nut, where the string is supported on the pegs-side of the nut and slaps against the bridge-side,

C. a loose bit of string in the pegbox, vibrating against the pegbox or peg, or

D. bits of the instrument's body that should be glued together are unstuck and vibrate against each other.

III. THE MODERN ALTERNATIVE

In the middle of this century a new kind of string construction was invented to avoid the problem of buzzing. In this construction there is a layer of highly compressible plastic floss placed around the gut core before the metal is wound on (the plastic is either wound on or stretched on as a stocking). This prevents the metal winding from making grooves on the gut core and the floss allows the metal windings and the core to freely slip past one another. The metal windings, which are pressed against one another on the string in the packet remain in contact as the string is tuned up to pitch. This prevents the harsh buzzing of windings slapping against windings. It also makes it unnecessary to make the string grooves in the nut and bridge freely slipping. The softer buzzing of the metal windings against the core would be enhanced because of the greater looseness, but this buzzing is cushioned by the plastic floss. The vibrational energy lost in this cushioning reduces the brightness and power output of the string, giving it a different tone colour than a traditional string. This is a price that modern players are willing to pay for insurance against buzzing and the increased pitch stability that this construction provides. The latter is the case because the windings, being against one another, provide an excellent barrier against moisture exchange between the atmosphere and the gut core. An additional advantage of this kind of string construction is that flat metal windings of ribbon shape can be used. The resulting flat surface makes a greater area of contact between the string and the bow hair, quickening response time. Without the plastic floss to dampen and cushion vibrations, ribbon windings on gut always lead to immediate buzzing.

Strings of this modern type of construction are the mainstay of quality strings in the world of modern bowed stringed instruments. The world of early music is divided concerning their use. Those who follow the original philosophy of the movement - that one should use equipment as close as possible to that originally used at the composer's time to most faithfully fulfill his expectations of performance when he wrote the music - shun these modern strings and go to the trouble of avoiding buzzing using traditionally-made strings. Those who consider early music as a repertoire and style in which they want maximum freedom and convenience in expressing their musicality will use any innovation that they can get away with, including modern types of strings, that avoids distraction from their creative intent. Many (if not most) are confused about their philosophy and avoid the issue, just wanting to get on with their jobs of being musicians. The early music audience is similarly divided between those who expect historical accuracy, those who are only concerned with the attractiveness of the music offered to them, and those who are unaware of any problems in expecting both.

Those musicians and listeners committed to maximum historical fidelity to the composer's intentions are the true modern innovators, because their philosophy is unique to this century. The others who focus on optimizing the act of communication between performer and audience are following a philosophy that has been traditional throughout the history of music. The only aspect of this situation that we are judgmental about is that we deplore the deception of lack of openness and honesty practiced by very many performers, to whom historical accuracy is of secondary importance, when they are trying to broaden their appeal to include listeners who expect that authenticity.

THE STRINGING OF ENGLISH AND GERMAN GUITARS

There are many wire-strung cittern descendants (then called 'guitars') in collections, occasionally with remains of strings that could possibly date from the original musical culture that the instruments were built for, but with no way of being sure. Contemporary information on stringing is needed. I know of no original stringing specifications for the English Guitar, but I do know (thanks to Stuart Walsh) of specifications by l'Abbe Carpentier published c.1771 in Paris for what he called the 'Cytre' or *Guitthare Allemande*. His 8-course instrument with 18 $\frac{1}{4}$ pouce (50.6 cm) string stop was tuned to e',c#,a,e,d,A,E,D at opera pitch (2 to 3 semitones below modern). His firsts were No 7 white metal (.270 mm iron), seconds No 6 white metal (.302 mm iron), thirds No 3 yellow metal (.426 mm brass), and fourths either No 1 yellow metal (.540 mm brass), metal wound on No 4 white metal (.380 mm iron) or metal wound on silk. These 4 courses were all unison pairs. The 4 bass courses, not specified quantitatively, were of metal wound on gut or silk. They usually were single, but if paired they had a high octave of plain gut. Appropriate proportions were to be observed for the wound strings, which probably refers to weight, so that tension would stay the same.

Carpentier sometimes had to play with a violin at a pitch a semitone higher, when his strings gave too dry and hard a sound and were liable to snap. He specified a compromise stringing that worked at both pitches, with No 8 (.239 mm) iron firsts, No 7 iron seconds, No 4 brass thirds and the same fourths (in all options) and basses as above.

The 18th century French string gauge system used here had six gauges for a factor of two in diameter, or two semitone steps of diameter per gauge difference. The term 'semitone step' refers to a factor of a twelfth root of two ($2^{1/12}$) in diameter or length, and a sixth root of two ($2^{1/6}$) in tension. We assume that for each string there is an ideal diameter and the chosen gauge is the closest to it. So one may be up to a semitone step away from the ideal tension or diameter just because of the limited choice of diameters available. Such tension variation is much less noticeable with metal stringing than with gut.

We can calculate a tension-difference profile relative to a reference string (here chosen as the No 1 brass option for the 4th course, the same for both sets) by multiplying string diameter by the ratio of frequencies in the tuning and the square root of the ratio of densities, converting the product to semitone steps of difference of tension between the string and the reference string. For the first set the tension profile is -1,-2,+1, 0. I interpret the intention of this set to be equal tension except for the iron second course being one gauge thinner, probably to provide a smoother transition between iron first and brass third in the shimmer or ring of the metal tone. For the compromise set the tension profile is -3,-4,-1, 0. The first and third course strings are thinner by one gauge since they are nearest to breaking, and metal strings drawn thinner are stronger. The seconds are thinner as well to maintain balance as before. The tension on the unvarying No 1 brass e string would be about 5 Kg if the pitch standard were 2 semitones below modern, and 4 $\frac{1}{2}$ Kg if it was 3.

Now let us consider the English Guitar, a very close relative of Carpentier's German Guitar. Carpentier mentioned it, giving no more than its tuning: g',e',c',g,d,c (the fifth course is e in English sources), and calling it '*Guitthare Anglaise*'. The string stop on surviving instruments is typically 42 cm, which is a little over 3 frets (semitone steps in length) shorter than the German Guitar. The tension-length principle suggests that its string tensions would be less by half that, or 1 $\frac{1}{2}$ steps lighter. The pitch is 3 semitones higher assuming the same pitch standard (Carpentier stated that opera pitch was the same in Madrid, Berlin, Vienna, Paris and London). The steps in length cancel the steps in pitch, making the steps thinner in diameter equal the steps lighter in tension (1 $\frac{1}{2}$ steps). The resulting calculated stringing for the English Guitar (equivalent to the first set for the German Guitar) is: 1st: .26 mm (10.2 thou) iron; 2nd: .29 (11.4) iron; 3rd: .37 (14.6) brass; 4th: .50 (19.5) brass or metal wound on silk or on .35 (13.8) iron; 5th and 6th metal wound on gut or silk. For the wound strings of the 4th, 5th and 6th courses, the equivalent diameters in solid brass are: .50 (19.5), .59 (23.2) and .74 (29.1), and in solid gut they are 1.24 (48.8), 1.48 (58.3) and 1.86 (73.2). The 5th and 6th courses are single.

CULTURE MATHEMATICS AND DESIGN OF EARLY INSTRUMENTS

Let us consider an early maker who is generating a new instrument design. Meeting the expectations and preferences of his customers is his first priority. After taking these expectations and preferences fully into account, there is considerable left to the maker's own judgement concerning acoustic, aesthetic, utilitarian and construction factors in the design. Taking this judgement fully into account, he very often finds a range that a particular design dimension or curve shape can vary over without apparently reducing how well any of these factors are served, and so the precise decision (which he has to make) has to be an arbitrary one. How such arbitrary decisions are made is the issue here.

The simplest way to make such a decision is to copy the dimension or curve from another instrument. Another is to pick an arbitrary length in the middle of that range (perhaps at a prominent mark on a rule), or to draw some appropriate shape by eye, using drawing aids if helpful.

These approaches to the arbitrary practical and aesthetic aspects of a design seem quite appropriate to modern craftsmen and artists, who often can't imagine that there can be any other. When appropriate, one copies that which has been successful in the past, and when it is appropriate to be creatively individualistic, one places trust in one's aesthetic instincts, and has faith in decisions which come out of one's unconscious with a minimum of rational involvement.

The culture of an early craftsman or artist was much more strongly religious and servile than today. He saw his role as a servant to his patrons and to God. Their judgements of him were often not understandable to him, but he accepted their right to judge his work because they were who they were. It was the cultural norm for him to try to influence these judgements by acting towards them in a particularly servile way (trying to please their vanity), as well as to serve their concepts of beauty and good taste. Part of that culture was to believe that God created His order of the universe associating beauty with certain simple numerological and geometrical relationships. Particular numbers, certain series of numbers (and proportions between members of these series), particular geometrical figures and geometrical constructions with compass and straight-edge, all had the aura of divine beauty. Advanced thinkers who didn't see the hand of God in most of the day-to-day fortunes of people (as most did) were still thoroughly immersed in the cultural association of beauty with numerological and geometrical factors. These factors were the language of a universal theory of beauty.

Things changed mostly in the 19th century. Philosophers such as Goethe and Schiller boldly expressed the new idealism. The artist or craftsman then saw himself as knowing better than his patrons or other customers, being a proud professional in his field. He created taste rather than follow it, and he did not need to be any more servile to others than was commercially necessary. Mathematics developed greatly along rationalistic lines, and the old association between beauty and particular mathematical relationships lost repute amongst the mathematically educated, considered to be mere mysticism. This association was also rejected by the artists and craftsmen (who usually were without that education) in their new masterly pride in their subjective aesthetic understanding of their fields, admitting no factors other than that understanding as possibly being relevant. To these 'romantic' artists and craftsmen, freehand drawing was considered essential for aesthetic vitality, and anything calculated or geometrically accurate considered rigid and without soul. Any 'objective' theory of beauty, be it in mathematical or psychological or any other terms, became an anathema to them. These attitudes are still very prevalent today.

With this historical understanding, let us now return to the early maker designing his instrument. He had to fix dimensions and curves which are arbitrary within the practical and aesthetic limits set by his customers and his own judgement. The general size and look of the instrument was clear in his mind, and he probably could sketch it. But the shape could be

stretched or squashed (or a curve made shallower or tighter) a bit here or there with no harm to the design concept. According to his own culture, he should grasp these ambiguities as opportunities to build aspects of universal beauty into his design. He could thus 'integrate' his design by relating dimensions with others by either a geometrical construction or a 'good' proportion. Curves could result from the geometrical construction directly, or geometrical construction or proportions can be applied to radii or positioning of arcs of circles.

There is a purely practical factor here as well. For storing their craft knowledge, people then relied much more on memory and less on paper than today. As far as we know, they didn't have files of drawings of their designs. Molds store design information, but they can be lost, broken or stolen. The maker probably felt that he needed to be able to generate his designs whenever he wanted to from memory alone, and what better way is there than remembering a few basic dimensions and then remembering the steps in generating enough of the rest of it with proportions and geometrical construction using straight-edge and compass?

We can expect that proportions and geometrical construction, when applied to gross aspects of the design, were more important to the early maker than applying them to finer detail, and so at some point he quit playing the geometry and proportions game and finished off the details of his design by quicker means. This point probably varied considerably from maker to maker, from design to design by the same maker, and perhaps even from instrument to instrument of the same design.

Reconstructions of these design methods today from surviving instruments (and artistic depictions of instruments) are necessarily conjectural. Their historical relevance is most convincing when they are simple and involve gross aspects of the design, and they are least convincing when they are complex and involve detailed aspects of the design. Many modern geometrical analyses of the designs of early instruments (including my own), attempting to be complete and consistent, could well go rather further with the process than the original maker would have considered worthwhile. How much further, we will never know.

Those who romantically appreciate instrument design, including specialists in the fiddle trade, feel that designs sullied by proportions and geometrical methods lack aesthetic dynamism. Such qualities have certainly been lost in geometrical analyses that have been faulty. Also, vigour can be created in the process of craft execution of a more bland original design (the character of an instrument is contributed to both by the design the maker worked from and his craft style and methods). So mistaken analyses and analyses that lack the aesthetic vitality of the instrument it is associated with cannot discredit the method (as some have tried). Also, perhaps it is too much to ask of someone who is thoroughly trained in the current consensus of what looks good (e.g. in women or lutes or whatever) to have enough historical objectivity to accept the likelihood that the consensus 4 or 5 centuries ago could be different; that aspects of the products of early craftsmen and artists that we admire today could differ considerably from what their intentions and satisfactions were when they created them. Appreciating these intentions and satisfactions is not necessary for modern practitioners who use the products of early times for modern purposes, but it is necessary for the historian who tries to understand and reproduce what was then. Trouble occasionally arises because it is important to makers of romantic persuasion to believe that their subjective understanding closely follows that of the old masters they venerate and emulate, so they object vigorously when a historical researcher apparently implies otherwise by discussing proportional and geometrical methods.

I find geometrical methods of drawing and analysing instrument designs both satisfying and practical. It feels creative to discover a straightforward geometrical construction that could easily have been what the original maker used (though I will never be able to prove that this is true). I find it very practical, especially in scaling up from a picture of an instrument of which there are no surviving examples. The designs I often draw and give instrument makers to fill orders are usually made by geometrical methods. These are also useful to me by providing a semi-rational criterion for speculating about what the original design shape was when an instrument seems to have been distorted in time or the design carelessly executed.

I would not recommend these methods to makers who do not enjoy using them, as there are others available that could be more to their taste.

SOME GEOMETRICAL ANALYSES OF ARCHINGS

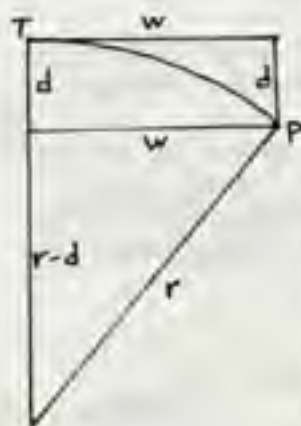
A geometrical analysis of a surviving shape from earlier times can only be an approximation to that shape. There may be other analyses of that shape that are just as accurate. Any claim that a particular analysis was how the original design was generated implies the opposite, i.e. that the surviving shape is an approximation to the geometrically generated shape. This can never be established beyond doubt, but this does not reduce the usefulness of such an analysis.

For instance, since the analysis given here of Strad's system works for Sacconi's arching drawings of the violin, viola contralto and violoncello, I used it for the arching of a Strad tenor viola we made, with confidence that the style of arching was consistent with Strad's, as understood by Sacconi. I hope that those who claim that Strad's archings differ from Sacconi's reports will publish this information in an equally precise form for the issue to be explored further. There may be an objective tool here to distinguish between different systems which has previously been discussed only subjectively.

I've applied the Rose viol arching system given here to versions of that instrument scaled up to full consort size and scaled down to original tenor and treble sizes. Even if my analysis bears little resemblance to how Rose actually did it, this approach is bound to capture more of his individual style (at least in doing that instrument) than the guesswork and working-by-eye usually used in these circumstances. When scaling, I use Schelleng's criterion of scaling arching height and belly thickness by the square root of the general dimensional scaling factor, with excellent results.

Dealing with large radii

Some of the arcs involved in archings, especially longitudinal archings of larger instruments, have radii which are inconveniently large to draw with any ordinary compass. One could use (and I have) a long stick with a nail through it near one end, the point of which is held in place by an assistant while one draws with a marker clamped to the stick at the appropriate distance from the nail.



The main alternative methods involve finding two points on the curve and filling in inbetween. We assume that we know one of these points (call it T) and the tangent to the curve extending from T. We also assume that we know the magnitude of the radius (call it r). At a distance along the tangent from T (call it w), the curve is deflected from the tangent by an amount d. That point on the curve is P. From Pythagorus, $(r - d)^2 + w^2 = r^2$, from which we get $d/w + w/d = 2r/w$. If w is much bigger than d, d/w is very much smaller than w/d and so can be neglected, leaving $w/d = 2r/w$ (this approximates the circular arc by the parabola $w^2 = 2rd$). For example, if w is 10 times d, d/w is only 1/100 (1%) of w/d, and neglecting d/w gives 1% as the maximum error. So to find an appropriate point P on the curve, we pick a convenient w, say with r/w being an integer, divide w by twice that integer, and we have d, which gives us point P on the curve.

Once we have the tangent, tangent point T and another point P, there are several ways of drawing the curve. amongst them are:

1. Take a uniform flexible stick and bend it by holding the ends, one in each hand, and rotate. Match the centre of the stick (between the two hands) to the tangent at T, bend till it passes P, and have an assistant mark, using the stick as a template. Such bending (with a torque at each end) creates the appropriate parabola.
2. Take a uniform flexible stick, tie a gut string on one end, and fit a tuning peg on the other end to tighten it. This allows one-man operation. The resulting shape happens to be a sine curve, but if we use only the central 1/2 or 2/3 of the stick's length for marking, it is a very good approximation to a circular arc or parabola.

FOMRHI Comm 1037

THE DESCRIPTIONS OF THE DUTCH RECORDERS IN THE COLLECTION OF THE "HAAGS GEMEENTEMUSEUM". The Hague, Netherlands. - Jan Bouterse

The collection of the Haags Gemeentemuseum is important for anyone who -like me- is doing research on dutch recorders. Therefore I was glad to hear that a catalogue of those instruments was in preparation (1990) and that there was no need for me to make all the time-consuming measurements in the museum. Two (of 17) drawings for the catalogue (by Hans Schimmel and Vincent van den Ende) were already published and could be obtained in the museum-shop. But it was obvious that for me those drawings gave not enough information: only the length- and width-dimensions (with an accuracy of 0.01 millimeter....), the bore-dimensions and some information of the pitch of the notes. And even worse: the danger arose that after the publication of the catalogue (March 1991) it should be impossible for me and for anyone else to do any research on the instruments. Why: the museum wanted to save the recorders for damage caused by taking measurements. That is not a bad reason to save the instruments, though I think that other factors played a major part in the obvious decline of the quality of some of the instruments in the past 15 years. The result of my comments was that I was allowed to make descriptions of the instruments and that these information was added to the new catalogue.

I could find only two examples of other catalogues with more or less usable descriptions of recorders: the catalogue of the collection of the Karl Marx-Museum in Leipzig ("Flöten" by Herbert Heyde) and the drawings by Fred Morgan of the recorders of the Frans Brügger-Collection. In the Heyde-book the descriptions are all given very systematically, together with some measurements. Unfortunately mainly the measurements were given used by Heyde for his theories on "Mensuren". Anybody who understands the sense for research on musical instruments of a notion like "Spiegelver-schränkte Analogmensuren" (and so many more untranslatable concep-tions) is a very clever fellow. An other problem is that Heyde gives information about sound- and speaking qualities of the in-strument in very unclear and unexplained terms. I know: it is very difficult to explain to anyone else the sound of an instrument but if you do so in a book or article you have to give definitions of all the "subjective" terms you are using. I think that Heyde was more or less obliged to use the rather rigid schemes of all the Leipzig-catalogues, and I think also that on this moment Heyde should not use his system of "Relative Mensuren" to discriminate between recorders. Nevertheless: the "Flöten"-catalogue is or was one of the first attempts to give systematical information on recorders (and other woodwinds) and to classify the instruments. Morgan gives in his drawings of the recorders in the Frans Brügger Collection (published by Zen On in Tokyo) between the abundant amount of measurements and details some interesting remarks on the sound of the instruments, on wood-structures, on finishing-details of chamfers etc. He is not systematically in these things, perhaps because the drawings are made in a fairly long period. The advantage of Morgan is that he is an instrument-maker and that his drawings are good usable (but not perfect) for making copies of the recorders. But a good introduction to the drawings is missing so that we are not sure about some things (undercutting of the fin-gerholes, ovality of the bore, cracks on the instruments, etc.).

Both the publications of Heyde and Mortan are not easy to read and understand. That is no problem for me, I enjoy some intellectual challenge. But I was convinced that the technical terms for the new catalogue in The Hague should be clear and without confusion for any reader and also that every recorder should be described systematically and that information on the sound- and playing qualities of the instruments should be as objective as possible.

I have made a checklist for my research on the recorders. In this list the following items:

A- First survey

- 1- name of the collection, collection-No. of the instrument;
- 2- history of the instrument;
- 3- materials (wood, silver, brass, cork, etc.);
- 4- is the instrument complete, are there any not original parts: is there an original case, is the instrument belonging to a pair or group of instruments;
- 5- traces of repairs and restaurations;
- 6- major damages, crooked parts, dirt or mould etc.;
- 7- existence of other measurements, descriptions, literature.

B- Second survey

- 1- about the materials: kind of wood, quality of wood, place of the recorder-parts in the wood-log; the same on ivory etc.;
- 2- about staining and other surface treatment, polish and the colour;
- 3- about the stamps: legibility and place of the stamps;
- 4- traces of former playing (worn fingerholes, fading of the colour in some places etc.) and maintenance (traces of pushing sq. hammering the block in and out).

C- Survey of the finishing of turnery and reaming (bore) and fingerholes

- 1- about the turnery: the overall shape of the profile, the finishing of the details;
- 2- the centricity of the bore and the sockets, ovality of the bore;
- 3- the finishing of the bore: traces of reaming (reamer-ends), polishing etc.;
- 4- fingerholes: placing of the fingerholes (in a straight row or otherwise), undercutting (undercutting with a knife or with special undercutting-tools), finishing of the hole-corners (on the surface of the recorder and inside); also: traces of enlarging or fillung up fingerholes with wax etc.

D- Windway, window, block and labium

- 1- windway: centricity, transverse-curvature, slope and concavities, shape of windway-opening at player's-end and at window-end. Visibility of labium-corner looking through windway. Also: irregularities in the windway: roof of windway sunk down etc.;
- 2- window: shape of labium-corner, slope of the walls on all sides of the window;
- 3- block: finishing of surface, slope, concavities, transverse-

curvature, direction of the wood-grains;

4- chamfers (blockchamfer and topchamfer): the finishing (clean od rough), the shape (slope) and regularity (same profile on the whole width or not);

5- labium: shape, slope of the side-walls, traces of chisels;

6- under-labium (candle-flame): length and regularity, thickness; of labium-corner, traces of chisels, indications of sinking of the labium.

E- Playing qualities of the recorder

1- which notes are good and which are not good playable: range of the instrument;

2- the stability of the lower notes with increasing wind-pressure, presence and purity of (striking) upper-harmonics;

3- speaking of the more difficult notes, e.g. in the third register and the fork-fingerings of the second register;

4- presence of annoying noise (and on which notes), wolves, and "under-harmonics" on third register-notes;

5- pitch of the notes and the most convenient fingering on the recorder;

6- possibility of the recorder for flexible playing, fast repetition of notes;

7- sound-characteristics of the recorder, perhaps as a Fourier-analysis;

8- changes of the playing qualities of the recorder after a short period of playing.

Some comments must be given here.

Ad A-2: Information about the history of particular recorders is very rare; curators of collections were in the past not always interested. Every change of owner (not at least when the recorder is dealt on an auction) means a new gap in the knowledge of the history of the instrument. Ad A-3: if you are not sure about some materials you can note (e.g.): "key looks like silver". Ad A-5: It is a bad thing that too many restaurators do not make any report on repairs or restaurations of recorders. It is often quite unsure what they have done with the instruments. Ad A-7: a real problem is the impertinence of some people who take measurements on musical instruments not to give their information to the owner.

Ad B-1: I am often not sure about the species of the wood of which the recorder is made (or the block). Stained fruit-woods are difficult to determinate, also many tropical hard-woods (palissander, rosewoods, black woods) and I can tell you that I know something about wood-determination because I spent many hours on the University (Wageningen/Netherlands, Forestry) behind the microscope to learn something about the subject. The more you know, the less you will give sure statements after only superficial wood-watching. Microscopic research is needed for real reliable statements, but unfortunately you must make a little (but unforgivable) destruction in the wood of the recorder. About the place in the wood-log: I have seen quartered wood (radial section) on the front of the recorder (near the fingerholes) but also on the sides or intermediate. Sometimes the heart of the (box)wood was seen (in recorder-feet); once I saw a foot reamed through the heart of the wood.

About the quality of the wood: I have seen boxwood very regular, slowly grown, sometimes beautiful flamed and from thick logs but I have also seen irregular wood from very small logs or with big nodes. (boxwood was used on most dutch recorders) Ad B-3: the place of the stamp on the foot of recorders made in three parts can be down-left or down-right, or just below the 7th fingerhole. That gives us information how the recordermaker thought how the instrument should be played: with the left- or with the the right-hand below. Ad B-4: nail-grooves on the thumbhole can also give us information about left- or right-hand playing in the past.

Ad C-1: information about turnery is not very important for people who wants to make a good-sounding copy of the instrument: it can be very important for people who wants to know the links between the several recordermakers. A problem is that if you want to give information about the turnery you will need to give names to the various turnery-details on the recorder-surface. Such terms do not exist in dutch language so I had to invent those terms. Ad C-2: some recorders have no perfect centricity, caused by inaccuracy when placing the wood between the centres on the lathe, but possibly caused by reaming the bore after the turnery was finished. Ad C-4: It is not easy to make a good drawing or description of fingerhole-undercuttings. It is not always possible or allowed to work with dentist-plasticine, but it is perhaps the only way to get an objective impression. Undercutting in modern times (for instance on hole 5 in order to realise Dolmetsch-fingering) is mostly more irregular and course than the original undercutting. The shape and finishing of the corners of the fingerholes gives us information if the holes are enlarged on the outside.

Ad D-1: A great problem is that blocks may not (or even can not) be removed on old recorders. But even after removal it is quite difficult to judge if the slope of the windway-ceiling is up or down, or axial. Even accurate measurements cannot always give us perfect information: e.g. step-measurements or measurements of the thickness of the labium-corner are sometimes very tricky (and/or dangerous to do) and slight mistakes or changes in the position of the measurement-tools have relative great effects on the results. Ad D-2: some recorder-makers (Terton) made nearly always asymmetric labia. Ad D-3: I have seen more than one boxwood-recorder where it seems that the block (cedar?) has shrunken less than the wood of the head: important information! Ad D-4: chamfers are sometimes badly visible, or dirty, or very small, or very irregular and then probably not in original condition. About chamfers and steps: if you are not able to judge the dimensions and qualities with your eyes, you will also not be successful in making exact copies even using the most sophisticated measurement-tools. But for a good description you will need to have measurement-results. Ad D-6: it seems that some recorder-makers (Steenbergen) had difficulties in making short and clean candle-flames, others (Van Aardenberg) had no problems at all. Ad E: it is important to give the information as objective as you can. I know, it is not always allowed the instruments to be played at all or to be played so long that you can get a good impression of the sound-characteristics and other qualities. Some smaller or greater problems (open cracks, bad fitting tenons, dirty chamfers and block-surface) can destroy any usefulness of your opinions. But nevertheless, under E-1 to E-6 I have tried to find some

"objectively" observable points. I think that moist points are clear, under E-4 I mentioned "under-harmonics". On some recorders you can hear playing the f3 (on an alto-(=treble)-recorder) an other note, about an octave lower (sometimes very distinct). That "under-harmonic" sounds alone if you blow very softly with the same f3-fingering. Ad E-5: on some recorders it is quite unclear which fingering should be used. Two major problems: Dolmetsch-fingerings are sometimes possible if hole 5 is relatively large but on many old recorders I have seen that the fingering 0 1 2 3 4 . 6 7 for b1-flat (Dolmetsch) is too low and 0 1 2 3 4 . 6 . is too sharp; also in the second register the fingering ø 1 2 3 4 . 6 is too low for b2-flat and both ø 1 2 3 4 . . 7 and ø 1 2 3 4 . 6h (hole 6 half-covered) are too sharp. Unclear also the fork-fingerings for b1 and b2, often too sharp. Another problem is how to play the very low third-register-notes on recorders with relative long feet. On some instruments the whole third register plays (speaks) well, but most of that notes are between 50 and 100 cents too low (Van Aardenberg)! Ad E-7: everybody knows the importance of environmental acoustics on the sound of a musical instrument, and who is playing. I myself can hardly hear any difference in the sound of an old instrument and a simple factory-made (plastic) recorder on broadcast or records (if both instruments are played well). But with closed eyes and even with gloves on my fingers I "feel" and hear the difference directly if I can play the instruments myself. Fourier-analyses are only an extra-help for us in judging the recorder-sound.

Well, many points on my check-list, and I think (and hope) that some points will arise some discussion. Some points are not so important for recorder-makers but can be interesting for me and for every researcher who wants to know more about the relations between the recorder-makers. Most makers had their singularities: for instance Steenbergen was very good in wood-turning and had the most excellent stamps on his instruments.

In the new catalogue of the Haags Gemeentemuseum only a part (but it is the main part) of my investigations is published, the catalogue is written in english and german. Within a year my complete descriptions not only of the catalogue-instruments but also of about 30 other dutch recorders and traverso's (with drawings and photo's) can be consulted in the documentation-centre of the Haags Gemeentemuseum. A problem can be that on the moment most descriptions are in dutch language.

It is important (I think) for the benefit of the old recorders and for the future of the research that more co-operation will grow between musea and researchers. That means: generosity of both musea and researchers to exchange measurements and other information. It is also important that woodwind-makers, restaurators and researchers will have respect for the rules of conduct that every museum and collection should maintain. It is not uncommon that (smaller) musea do not know the most fundamental rules in conservation of their musical instruments, or even worse (and also reported in important musea): they know the rules but they have no money or the skill to do the proper things.

FoMRHI Comm 1038

Summary

Jan Bouterse, "De Blokfluit, Handleiding voor Aanschaf, Onderhoud, Bijstemmen en kleine Reparaties", 1990, Alphen a/d Rijn Netherlands. ISBN 90-9003781-0

The english title could be: The recorder, a manual for buying, up-keep, tuning and little repairs. The manual is written for sellers of recorders, (good) players and teachers, recorder-makers and repairers and for anyone who wants to know more about the origin of the recorder-sound (and so on).

The book begins with the chapter: what is a good recorder. Various requirements for a good recorder are discussed: it is almost impossible to find a recorder that suits every player and every music well!

The most important part of the book deals with the tuning of all the tones of the (treble-)recorder with Dolmetsch-fingering. There are schedules how to tune other types of recorders. Information is given about the several tuning-systems and how to judge the correctness of the recorder-tuning. Tuning is not only a matter of adjusting fingerholes, often the dimensions of the bore are more important if there is something wrong on a recorder. Information is given about the critical places of the bore for several tones, how to check and how to adjust (if even possible for amateurs) those places.

For a good understanding of recorder-tuning information is given about the physics of (recorder-)sound, on the difference between the sounds of the various registers etc.

About the repairs: it is important for a recorder-player to know what are the dangerous and difficult (and expensive) repairs on the instrument, and what are the minor ones. Only a few repairs can be done by amateurs; information is given about courses and workshops (e.g. Bouwerskontakt) where you can learn how to clean a recorder and how to remove a block without damaging it.

Warnings are given not to repair your recorder if you have no experience or if you are not completely sure of the causes of the problems.

All pictures and schedules in the book are computer-made, there are no photo's in the book.

A german edition is in preparation, in the moment it is not sure which "Verlag" brings the publication.

I hope that with this information it is for you more or less possible to review the book, or (perhaps better) to announce it the pages of a Q.

FoMRHI Comm. 1039

Bruce Haynes

Appeal for pitches of original traversos and recorders

I am writing a book on the history of pitch in the 17th and 18th centuries and would like to request information from anyone with information on the pitches of original flute-type instruments.

As outlined in Comm.890, "Generic 415," recorders and flutes can be valuable indicators of historic pitches. I have started a database of the pitches I have collected so far, and include here its present contents. If, as I hope, there are enough corrections and additions, I will be glad to send in a revised version (which can also be sorted in various ways -- any requests?).

Aside from the question of present playing condition, the major problem with analyzing pitch information from recorders is to identify their nominal pitch. An alto "in G" at A-415 (Cammerton) could also be "in F" at A-466 (Chorton), etc. There are some J.C.Denners, for instance, at A-480 or 430, depending on how they were used. Any suggestions on how to deal with this question would be very welcome.

I would appreciate any information you care to send and will be glad to acknowledge it in my book. Please include (if possible) the following data: maker, date, present location with ID number, playing condition, and the name of the lowest note.

Bruce Haynes, 3589 Ste-Famille, Montreal H2X 2L2, Canada.

Recorder pitches (list as of January 6, 1991)

Compiled by B. Haynes

(The first number is the sounding length of the instrument; the last is its pitch)

Anciuti Alto 415. Graz 440 about
 Anciuti Alto 419.5 V & A 440 about
 Anon Alto 454. Formerly D. Munrow. 392
 Anon Alto 445.7 Nice 410 ?
 Anon Alto in F 382. Vienna [No mark] 460 about
 Anon Sopranino in F 213.6 Miller 465 about
 Anon Alto in F 383.8 Paris E 681 466
 Anon Alto in F 411. Vienna [Marked Bressan] 466 about
 Anon Alto 359.9 Brüggen (Bone) 480
 Anon Alto 373.5 Boston MFA (Ivory) 480
 Anon Alto 377.8 Vienna [Carved ivory] 494 about
 Anon Alto Bartlett, Dr. Edw. ? Shortened [? 408]
 Beukers Soprano 302.6 The Hague GM 415
 Bizzy, Charles Alto 456. Miller 1055 Poor. 392 about
 Boekhout Alto Paris ? 392
 Boekhout Soprano 299.9 New York Met 89.4.912 409 about
 Boekhout Alto 440.8 Moeck 410
 Boekhout Bass 859. Huene 415
 Boekhout Bass 865 Brussels 1040 [415 ?]

Boekhout Sopranino 213.5 Japan [? 465 about]
 Bradbury Alto 460.3 NY: Metropolitan M.A. 392
 Bradbury VF 527.9 Edinburgh 405
 Bressan Voice Flute in D Higbee 403
 Bressan Voice Flute in D 542.9 Brünnen (boxwood) (Oler) 403
 Bressan Alto 450.2 Brünnen 1 Shortened but restored 403-405
 Bressan Alto 451.2 Prague 405
 Bressan Alto 450.5 Brünnen 2 405
 Bressan Alto 444.5 Harvey, R. 408
 Bressan Tenor in C 606 Chester 408 ?
 Bressan Alto Berlin 410
 Bressan Alto Hunt 410
 Bressan Voice Flute in D 541.7 Brünnen (maple)(Oler) 410
 Bressan Alto 449.8 Miller 410 ?
 Bressan Alto 452.2 Chester 410 ?
 Bressan Tenor in C 618 Milan 410 ?
 Bressan Bass 891 Norwich 410 ?
 Bressan Bass 893.5 Chester 410 ?
 Bressan Tenor in C 599.5 Huene 410 about
 Bressan Tenor in C 597.8 Oldham 410 about
 Bressan Tenor in C 600.4 Braunschweig 410 about
 Bressan Voice flute Oxford (Pitt Rivers) 415
 Bressan VF Miller Bad 415 ?
 Bressan Alto [443.] Huene Now 414 SL 435.6 [410]
 Bressan VF 536.8 Huene Edge damaged [415 ?]
 Bressan 4th Flute (Soprano in Bb) [330] Brünnen (Hunt) Now 420 SL 322.7 [c410]
 Cotton Alto in G 348. 483
 Debey Alto 438.6 The Hague ? 410 ?
 Denner, J. Tenor in C 571.1 Brussels 1026 409
 Denner, J. Tenor in C 603.8 Rosenbaum 410 about
 Denner, J. Alto 438 RCM 414 about
 Denner, J. Alto 435.2 Nürnberg 415
 Denner, J. Alto 439. Copenhagen 415
 Denner, J.C. Alto 436.8 Staeps 415
 Denner, J.C. Sopranino 226.9 Basel 1878-19 Fair 415 +
 Denner, J.C. Bass 907. Munich 179 Good 415 about
 Denner, J.C. VF 513.1 Nürnberg 208 Good 415 about
 Denner, J.C. Alto Linz 157 Poor 415 about
 Denner, J.C. Alto Linz 158 Fair/good 415 about
 Denner, J.C. Bass Berlin 92 Poor 415 about
 Denner, J.C. Alto 433.1 Huene 415 exact
 Denner, J.C. VF 507.5 Buser 417
 Denner, J.C. Alto Linz 156 Good 460 about
 Denner, J.C. Alto Bavaria (private coll.) 460.
 Denner, J.C. Bass 852.2 Nürnberg 88 Fair 466
 Denner, J.C. Tenor in C Brünnen Plumwood 473
 Denner, J.C. Alto Bavaria (private coll.) 1. 480 [430 if in F].
 Denner, J.C. Bass. Bavaria (private coll.) 2. 480 [430 if in F].
 Denner, J.C. Bass Bavaria (private coll.) 3. 480 [430 if in F].
 Denner, J.C. Bass in F 785.9 Munich Mü 173 K30 Ivory 480-87
 Denner, J.C. Alto 377.9 Prague 487
 Denner, J.C. Bass Nürnberg 214 Good; foot not orig. 494 about
 Denner, J.C. Sopranino 234.5 Brussels Marked D Early design; 1 pc. 499
 Denner, J.C. Soprano 282 Eisenach 1 pc; 1682 [465 - 470 ?]

Denner, J.C. Alto 415.3 Rosenbaum Poor. c489 [c440 if in F].
Denner, J.C. Bass Nürnberg 213 Fair/good c489 [c440 if in F].
Dupuis Tenor in C 592.5 Brüggen 398
Dupuis Alto in F Paris 368. Barely playable 421
Eichentopf Tenor Stockholm 165 Fair; out of tune. 415
Eichentopf Alto 434.8 Nürnberg MIR 200 Good. 415 exact
Fische Alto Stearns Coll. 494 about
Gahn Alto 434.5 Stimmer 415
Gahn Alto 377.2 Zürich 489
Gall Alto Brüggen Good 460
Haka Soprano in C 297.8 Brüggen 415
Haka Soprano 297.5 Edinburgh Ivory 1-pc. [? 409]
Hallett, [? Benjamin (London, b.1743)] Sopranino in F Brüggen About 410
Heitz Alto 450.4 Brüggen 403
Heitz Alto 443.4 Horniman 203 (ivory) 413 ?
Heitz Alto 435.9 Vienna 415
van Heerde Alto ? 437.8 The Hague GM Foot by Boekhout 415
van Heerde Alto 437.2 Edinburgh 422 ?
Hotteterre Alto in G Paris 979.2.8 Poor. 386
Hotteterre Alto Miller 326 395
Hotteterre Bass 935.2 Paris E 589 C 413 Poor 404 about
Hotteterre Tenor in C Paris 979.2.9 406
Hotteterre Tenor in C 615.1 Paris E 509 C 402 408
Hotteterre Tenor in C 618.5 Brüggen 408
Hotteterre [Voice flute ?] Leningrad 405 412
Hotteterre Alto 435.6 Paris No nr. Ex Thibault 415
Hotteterre Bass Paris 979.2.10 415
Hotteterre, L. Alto 468.5 Miller 326 392
Hotteterre, L. Alto 400.1 Munich 63053 Head by J.C. Denner [415; 466 if in F]
Hotteterre, Nicolas Bass Paris (private; ? = Kaltenbach) 400 about
Hotteterre, Nicolas Alto Rosenbaum. Not in tune. c395
I.C.G. Soprano 303.5 Paris Ivory [? 410]
Kenisgerger Tenor in C 615.7 Munich D.M. 392
Lissieu Soprano 291.8 Huene 415
Oberlender 390
Oberlender Alto 439.7 Leipzig 415
Oberlender Alto Claudius 466 about
Perosa Soprano 305.1 Vienna 8540 415
Poerschmann Alto Claudius 417 Reasonable; well-used 409-10
Reich Soprano 293.9 Brussels 408 about
Rippert Alto 460.8 Stibbert-Kaltenbach 397
Rippert Bass 940. Miller 800 398
Rippert Alto Paris (private; ? = Kaltenbach) Bore not in good con 398 about
Rippert Bass Paris C.411 E.185 406
Rippert Bass Paris C.412 E.247 410 about
Rippert VF 544.7 Munich 420
Rippert Tenor in C [? 640] Moeck Ebony, ivory [397 ?]
Rippert [Alto in G] 464.4 Paris E 2163 [397]
Rippert [? Sopranino in G] 200.5 Munich 164 [397]
Rippert Alto Paris E.1515 [410; 460 if in F]
Rottenburgh, J.H. Alto 444. Brussels 2644 396
Rottenburgh, J.H. Tenor in C Kaltenbach 397
Rottenburgh, J.H. Alto 444.3 Brussels 2643A One of identical pair 399
Rottenburgh, J.H. Alto 439. Brussels 2643B 399

Rottenburgh, J.H. Alto 442.2 Brussels 1027 Best playing one 401
 Rottenburgh, J.H. Bass 883.5 The Haag GM 403
 Rottenburgh, J.H. VF 534.7 Berlin 2814 403
 Rottenburgh, J.H. Bass 890 Bruges 0.24.XXVIII 403
 Rottenburgh, J.H. Alto 504. Brussels 1036 403
 Rottenburgh, J.H. Alto 443.6 Berlin 2799 Not in tune 404
 Rouge Brussels 438 415
 Sattler Alto 430.9 Stearnes 415 ?
 Schell Tenor ? 478 Bologna 1769 Excellent 392 about
 Schell Alto Oldham 405 about
 Schell Alto 441.1 Miller 658 409
 Schell Alto Basel 1956,632 Fair 415 +
 Schell Bass Linz 159 Good 415 about
 Schell Bass Nürnberg 95 Fair/good 415 about
 Schell Tenor Innsbruck 2,85 Fair [? 392]
 Schlegel Alto Veilhan, J.C.
 Schlegel Alto Basel 427-34
 Schuchart Alto 440.4 Horniman 415 about
 Souve Bass 883.5 Stearns Coll 415 ?
 Stanesby Jr Tenor in Bb 661.4 Brünnen (Bergmann) 408
 Stanesby Jr Bass Warwick 410
 Stanesby Jr Alto 435.9 Horniman 415
 Stanesby Jr Alto 444.3 Huene 415
 Stanesby Jr Soprano in D (Sixth Flute) 263.5 Hunt-Brünnen Carved ivory 422
 Stanesby Sr Alto 450.5 Horniman 392
 Stanesby Sr Alto 456.7 Brünnen 406
 Stanesby Sr Alto 442.6 Tiboult 409
 Stanesby Sr Soprano in C 258.3 Miller 460 about
 Steenbergen Alto 444.6 Brünnen 412
 Steenbergen Soprano in C 299.5 Brünnen 415
 Steenbergen Bass 920. Darastadt 415 ?
 Terton Alto 436.2 The Hague GM 410 ?
 Terton Alto [439.6] Lendertse Center shortened c3. 415
 Terton Alto 448.1 Miller ? Not playing 415 ?
 Terton Soprano 301.5 The Hague GM [405]
 Urquhart Alto Brünnen (Oler)
 Villars, Paul Alto 457. RCM 392 exact
 Wijne Soprano in C 298.7 Brünnen 408
 Wijne Alto Hunt 415
 Wijne Alto in F 369.8 The Hague GM 494

Traverso pitches (list as of January 6, 1991)

Anon Paris C 1103 Ivory/gold 381 about
 Anon Miller 422. Excellent. 382, 396, 413.
 Anon Valenza Emb. enlarged 389-93.
 Anon Assisi 392
 Anon Bass Flute Berlin 2698 392
 Anon Paris Ivory, 7 pcs 409 - 445
 Anon England (private coll.) [c395].
 Beukers The Hague GM 418/19
 Bizey Edinburgh 121 392

Bressan 574.7 Oldham 410 ?
 Bressan Miller 1207 412
 Bressan 555.7 V & A 412 about
 Chevalier Boston Good. 410
 Denner, J. Nürnberg 257 401/425
 Denner, J. Brussels 408
 Fortier Paris 984.8.1 402
 Haka Utrecht 365 about
 Hotteterre Graz Emb. original. 394
 Hotteterre Bingham, London 400
 Hotteterre Berlin 2670 Emb. altered. [392]
 Hotteterre Leningrad 471 Emb. enlarged. [392]
 Lot, Gilles Paris 986.4.1 402
 Lot, T. Paris 1389 400
 Lot, T. (c1740-85). Miller 615 Emb. enlarged 408
 Lot, T. (c1740-85). F-flute. Miller 984 Quite good. 410
 Naust Paris E.710.C.441 368
 Naust Berlin 2667 Emb probably orig. 402 about
 Quantz Paris E D 395
 Quantz Berlin 5076 ? Emb enlarged 398
 Rippert Paris (private; M. Dorgeuil) Ivory 395
 Rippert St Moritz (CH; Musée Engadin) Emb OK 396
 Rippert Glasgow Sockets deepened [400]
 Rottenburgh, G.A. Gooik 5 7 corps de rechange 388 - 427
 Rottenburgh, G.A. Gooik 6 9 corps de rechange 388 - 427
 Rottenburgh, G.A. Gooik 3 2 corps de rechange 413 - 427
 Rottenburgh, G.A. 551. Brussels 2682 432
 Rottenburgh, G.A. 543. Brussels 3570 435
 Rottenburgh, J.H. 532. Brussels 2679 388
 Rottenburgh, J.H. Liège (ex van Zuylen) 3 corps de rechange 395 - 415
 Rottenburgh, J.H. Brussels 2001 338
 Rottenburgh, J.H. Piccolo 265 Berlin 2654 415
 Rottenburgh, J.H. 561 Brussels 1077 418
 Rottenburgh, J.H. 526. Brussels 2683 Head by G.A. Rott. 418
 Rottenburgh, J.H. 535. Brussels 2680 440
 Rottenburgh, J.H. 526. Brussels 2681 446
 Scherer Cambridge (Shackleton) 392
 Scherer Brussels #3 best at 410 410/394/370
 Scherer Huene 415 - 420
 Schuchart 576.8 Oxford (ivory) 392 ?
 Schuchart 546.8 Preston, S. 418
 Stanesby Jr 557.6 Boeke, A. 415
 Stanesby Jr 558 Brügger [(ivory) ?] 415 (minus ?)
 Stanesby Jr 562 Horniman (wood and ivory) 415 (minus ?)
 Stanesby Jr 561 Horniman (ivory) 423
 Wijne The Hague GM 410
 Wijne, Robert (1698-1774) (Private collection, Holland) Other center joints 405
 Wijne, Robert (1698-1774) The Hague GM Bkwood 405-410

Wood bending process in 18th century England

Many comms. have dealt in past years with the question of wood bending techniques (1). Various authors refer to the scarce indications given in this respect by Frank Hubbard, who in turn regrets in his work "that there are few hints of the process of imparting the curve to a bentside"(2) in early written documents. After having mentioned the "lead trough for soaking bentsides" found in Blanchet's workshop together with a "machine for bending wood" belonging to Malade, he quotes two technological sources from the second half of the 18th century. Both sources describe a simple soaking process apparently in cold water. This technique was certainly in use, but was there no other possibility ?

An English document from the first quarter of the 18th century shows us a process used in the shipbuilding technology of that time. Though no mention is made that this "hot sand" technique was also used in other crafts, it is worth publishing it here.

I'll give fully in reprint form the "account of the manner of bending Planks" published by Robert Cay in the Philosophical Transactions of the Royal Society in London, in 1722.

Among the different interesting things found there, we learn that the method consisting of "burning the Planks over an open Fire" ("dry heat") to enable their bending, was also practised at that time. According to Cay, the results obtained by this latter technique are not so good as when using the "hot sand process".

Another interesting point in this report is the last paragraph where a historical "rule of thumb" is given in a mathematical form that can guide the "Carpenters" during their work (and ourselves if we decide to try this early method...). As regards the time needed by a plank of a given thickness to attain the right softness "to make it fit for bending", many observations made by the ancient English craftsmen could lead to the conclusion that the time of exposure varies in relation to the square of the thicknesses of the planks to be treated, e.g. if a plank of 5 inches in thickness requires 5 hours, a plank of 10 inches would require 20 hours in the hot sand. We may assume that the absolute time data change according to the species of wood treated.

1.see Comm.34 - 62 - 290 - 308 - 356 - 509 - 540 - 572 - 592 - 682

2. Frank Hubbard, "Three Centuries...", p.211.

The text and the accompanying figures in their original forms:

(53) Numb. 371.

**PHILOSOPHICAL
TRANSACTIONS.**

For the Months of *April and May*, 1722.

V. *An Account of the manner of bending Planks in His Majesty's Yards at Deptford, &c. by a Sand-heat, invented by Captain Cumberland.*
By Robert Cay, Esq;

THe place, where the Planks lie to be softened in the Stove, is between two Brick-Walls; of such a length, height and distance from each other, as suffice to admit the largest, or to hold a good number of the smaller Sort: the bottom is of thick Iron Plates, supported by strong Bars; under the middle of which, are two Fire-places, whose Flews carry the Flame towards the Ends.

The Planks are laid in Sand; the lowest about six or eight Inches above the Iron-Plates, they are well cover'd with the Sand, and Boards laid over all, to keep in the Heat. The Sand is moistned with warm Water, (for which purpose they have a Cauldron adjoining to the Stove) and if the Timber be large, and intended to be very much bent, so that it must lie long in the Stove, they water the Sand again, once in 8 or 10 Hours. When 'tis judged to be soft enough, the Sand is remov'd; and the Workmen carry away their respective Planks, to the several Places, where they are to be us'd: and having first nail'd a thin Board upon the out-side, to preserve the Plank from Bruises, they fix one part in its proper place, and bring to the others, by any power they can most conveniently apply. This Work seems to be perform'd with wonderful Ease; notwithstanding some we saw were so knotty, that the Builders assur'd us, they cou'd not have brought them to that Curvature by the former Methods. Those we saw put in between others, very exactly fitted the Spaces they had been cut for; and the Workmen told us, they had made no Allowance either for the swelling, or shrinking of the Wood.

This Method excels that of burning the Planks over an open Fire in several respects: particularly, that no part of the Wood is destroy'd, but remains of the same Dimensions; at least very nearly; a Plank of the breadth of 16 inches being said not to alter above $\frac{1}{4}$ part of an Inch. The Edges of the Plank are preserv'd; and consequently the Work must be much firmer, and the Calking last longer. The extraordinary softness of the Wood, while 'tis warm, makes it easily bend to any Figure necessary in Ship-building, which it holds very well, if they have occasion to take it off again after it is cold: whereas the Plank bent by burning, would start when loosened; and could only be fixed to the Timbers by such a force, as was able to overcome the Resistance occasion'd by the Spring of the Plank. It likewise adapts it self very readily to the Surface of the Timbers, if they happen to be uneven.

They shew'd us the Gun Deck-Clamps in a Ship of the Second Rate; which are very large Planks, bent and twisted in so peculiar a manner, that they never could by any other Method, bend them into that Form, but used to cut them into Shape. The whole Operation is perform'd with much less trouble to the Carpenters, as well as at less Expence; and they hope the Wood will be more durable; as tis evident, from the deep Tincture the Sand receives, that a considerable quantity of Sap comes out of the Oak, while its in the Stove: and a large Plank was observ'd by the Workmen or Officers of the Yard, to weigh some Pounds less, when it was taken out.

A Plank five Inches thick requires five or six Hours to make it fit for bending; and the Time requisite for others, seems to be in a Duplicate Propotion to their thickness.

Explanation of the Figures.

Fig. 1. Represents a Plank, in the Buttocks of a Second Rate Ship, whose length from *A*, to *C*. is three Feet, and thickness (*AF*) 4½ inches, the end *C*, of this Plank was bent 12 or 13 Inches from the straight Line *AB*

Fig. 2. and *3.* are Sections of the Stove.

A A. the Fire-places.

B. B. the Air-holes.

C. C. the Flews under the Iron bottom.

D. D. the two Chimneys.

E. the place for the Planks and Sand.

F. F. the two Brick-walls.

G. G. two inclin'd planes, for the Men to stand on, &c. when they put in, or take out Planks, or water the Sand.

h. h. The bottom of the Stove, made of Iron.

i. i. The Grates to lay the Fewel on.

V. An Account of the manner of joining Planks in
the Ship's Yards at Deptford, &c. by a
Saw-iron, invented by Captain Cumberland.
By Robert Cay, Esq.

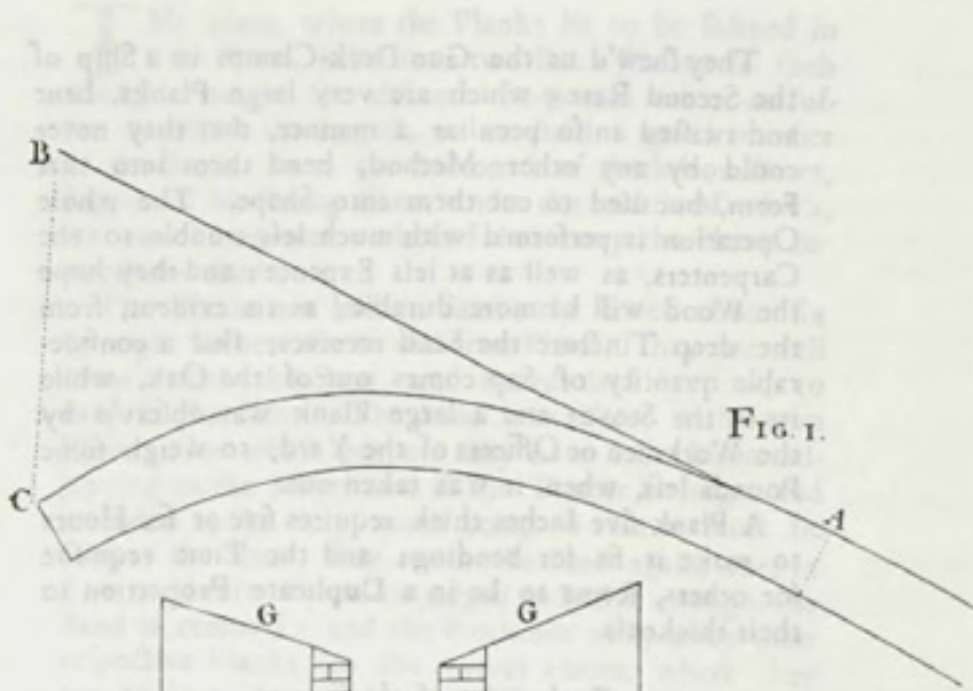


FIG. II.

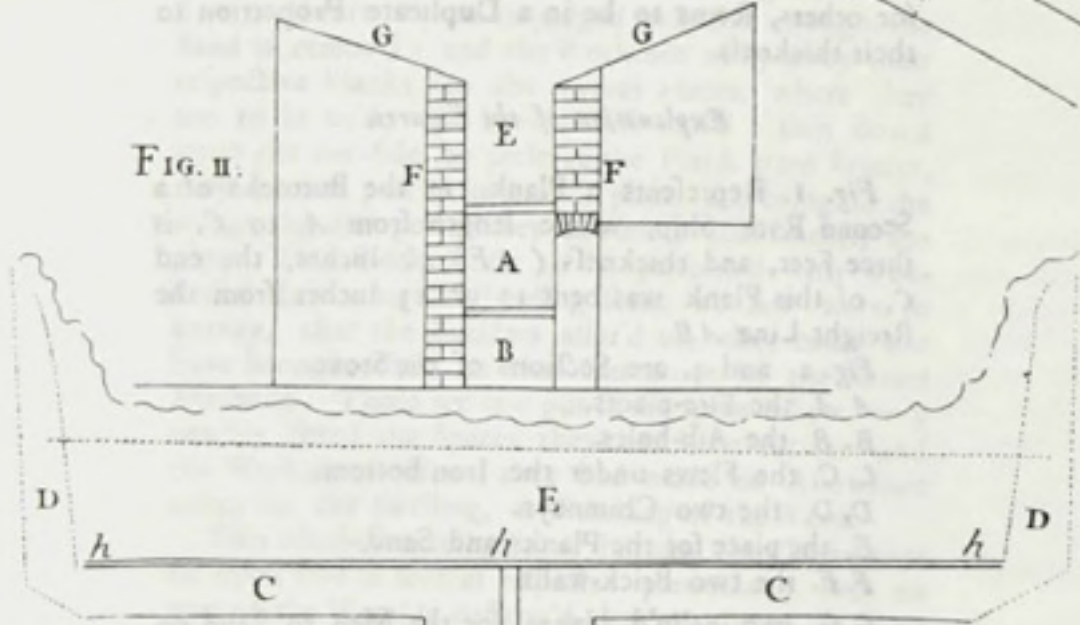
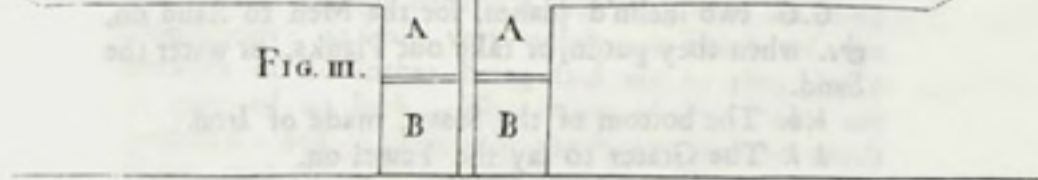


FIG. III.



A Seventeenth-Century French Harpsichord?

Readily identifiable or nameable harpsichords, like nicknamed symphonies, often have an unfair claim on our attention. If in addition to anonymity an instrument has no clearly defined origin or links with particular repertoire, its intrinsic worth may go unappreciated.

The harpsichord I am going to describe suffers both these disabilities, even if at first glance it seems to be of a familiar type. I was asked to restore this instrument while it was in the collection of Alan Rubin. It is now in the Württembergisches Landesmuseum, Stuttgart. The first known owner, in the latter part of the nineteenth century, was Eugene de Briqueville. It was restored by the firm of Pleyel Wolff in 1905, and is discussed along with French seventeenth-century harpsichords in Hubbard's *Three Centuries of Harpsichord Making* (pages 101ff).

The harpsichord is in every respect for its period a large instrument. Indeed, it is slightly longer than most eighteenth-century French doubles (see Table I). It has two manuals, two 8' and 4' (4' on the upper manual, doglegged), and a compass of GG to c'' (without GG#). It is principally of walnut with the bottom spine and bracing probably of fir and with most smaller components of beech. The soundboard likewise is probably fir, and only one other wood occurs in the instrument, a stained fruit wood in imitation of ebony as the natural key covers and as laminations in the "double" skunktail sharps between layers of bone. The lock, hinges, hooks and original tuning hammer, which hangs in a staple at the bass end of the keywell, are of engraved steel.

The stand of eight twist-turned legs is also of walnut with portions of stained softwood in the least visible places. And as on the body of the instrument, all mouldings are stained black.

Inside the lid is a fine oil painting after one by Albani, now in the Louvre, depicting Diana and her handmaidens disarming Love. On the inside of the flap is a genre scene in a grisaille cartouche depicting feasting and merrymaking. The painting is not as old as the instrument; it has been laid on an already finished surface. The original painting by Albani arrived in Paris in the 1680s and was probably not accessible for copying prior to this date.

Construction of the harpsichord began with the baseboard, which shows several construction lines including the line of the bridge. The basic structure is four mortised and tenoned open rectangular frames standing in grooves in the baseboard perpendicular to the spine. (Plate I) These are placed almost equidistantly along the sound box, the widest one forming the header, and beyond this are two large wrestplank support blocks standing on the bottom and extending forward into the keywell to support the upper manual keyblocks. These blocks are grooved to receive the upper key panel like a drawer, and have a section which rises into the gap to form a spacer. The wrestplank is walnut and quite thin (3.3 cm). The remainder of the structure consists of knees at the bentside/cheek and bentside/tail corners, which strengthen the plain mitred joints below the soundboard, while above these joints have three dovetailed keys apiece. The tail/spine corner has the common strengthening of slices of hardwood in saw kerfs. The soundboard is diagonally laid (approximately 12° to spine), constructed of seven pieces mostly on the quarter with annual rings ranging from five to sixteen to the centimetre. Thickness varies from 2.6 to 3.9 mm, following a general increase from treble to bass. (Plate II)

The bridges are of black stained beech with the single pinning in the quirk of an ogee moulding. The bridges were located during gluing

between wooden pegs, remnants of which still protrude below the soundboard. In addition, the ends of the bridges were fixed with small nails from below.

The keyboard and registers are best described with reference to the work done by Pleyel, the undoing of which formed the bulk of my restoration. Pleyel had attempted to strengthen the case to receive heavier strings and had modified the string layout and action to make the instrument resemble more familiar eighteenth-century French harpsichords or their ideas about them. In addition, there were the usual modifications made in restorations of that period: leathered jacks, leaded keys, piano cloths and felts, etc.

Removing the soundboard revealed an extra bracing system installed by Pleyel, consisting of two heavy longitudinal timbers just below the soundboard level and running between the tail and header and between treble bentside and the header. To make room for the latter an original diagonal brace, which ran between the treble hitch-rail and bottom, was removed. This has been reconstructed from remaining impressions and scribe lines, and Pleyel's braces as well as two small steel gap-spacers were removed.

The side draft of the strings had been reduced, but it proved possible to restore the original angle from the holes in the soundboard and bentside liner. Originally, after the fashion of Italian harpsichords, the same shallow moulding ran all around the soundboard, forming the hitch-rail at the bentside, and also, in this case, more of the same moulding framed the inside edge of the case above the soundboard. Pleyel's eighteenth-century style hitch-rail was removed and the original system restored.

Pleyel's diagonal piano-style bars were removed from the soundboard. Unfortunately many of these had passed through the 4' hitch-rail, which had also been planed flush with the tops of the bars. The gaps left by the halving joints were filled, and the hitch-rail was restored to its conjectured original height with a layer of new wood. Therefore its strength and rigidity are only slightly impaired as the grain of the wood is unbroken on the upper and lower edges. (Plate III) The positions and widths of the three old bars were still clearly visible, but of course their heights and tapering must be guesswork. The 4' hitch-rail, I think, provides a guide to the style and mass of the missing bars, being itself much more like a curved soundbar than the later form of hitch-rail.

The three box-type registers, a comb of beech closed with a veneer of fir, had been badly weakened in two places where Pleyel's gap-spacers had passed through them. (Plate IV) Plate V is a photograph taken during repair of these sections and shows the undercutting inside the register.

The jacks in the instrument were a mixture of new and old work, but none original. To accommodate them the slots in the registers had been enlarged in many cases, and to allow the tongues of these eighteenth-century style jacks to work clearance slots had been added to the originally plain rectangular slots of the registers. I made new jacks of walnut. Probably in the original conception, the jacks working in these plain mortises had the flyback of the tongue limited by the register edge.

The keys and key frames had been much modified by Pleyel, but all that had been done was obvious and in most cases not difficult to reverse. The keylevers themselves, of beech, were extremely distorted, but by various compromises, at the balance and the tails of the keys, could at least be rendered playable, if not perfectly regular. On the lower manual Pleyel had enlarged the mortises at the balance and driven piano-size balance-pins into the original rail. On the upper manual both balance-pins and guide-pins were missing. The old very forward balance-rail had

been abandoned by Pleyel, who had put a new rail under the keys farther back to give the same ratio of leverage as the lower manual, and again piano pins were used. At the tails of the keys the old thin wire pins between the keys had been replaced with thick ones running in mortises cut in the keys. Fortunately the back-touch survived with the holes for the old pins. The original upper manual balance-pin holes survived in the keylevers, and from these it was possible to reconstruct the balance-rail and sets of balance-pins for both manuals. Under the assorted felts and cloth on the keytails were traces of leather, and in the restoration I have used soft doeskin for the keytails on both manuals.

On first examining the instrument I was inclined to disbelieve the placing of the octave register on the upper keyboard, despite the unlikelihood of an early twentieth-century restorer putting it there if it were not there already. However, during restoration the rightness of such a disposition became clear, and the final result in terms of timbre and musical use remove any doubt. In conception the upper manual and its strings seem like an *ottavina*, superimposed on a two unison register harpsichord. Simple evolutionary ideas of the origin of the second manual, outside the tradition of transposing harpsichords, would perhaps lead us to expect this. As can be seen from the soundboard layout, the barring scheme of the unisons, three bars parallel to the bridge, seem to have had inserted into their simple and logical design the octave bridge and hitch-rail, which cuts through the main soundbar. (Plate VI) The 4' hitch-rail is exceptionally light and seems a rather tentative intrusion. A further confirmation of this separate conception of the upper manual comes from the mechanical proportions and guiding systems of the two keyboards, which are quite dissimilar.

None of this is conclusive in placing the octave on the upper manual, but as soon as the instrument was restrung, the clinching evidence for this disposition appeared. The 4' strings, running as usual under the longer 8' strings, leave the nut well to the right of them, giving ample clearance for the rising 4' jacks placed in the front register. But then they cross under the 8' strings until at the bridge the 4' bridge-pins are either vertically under or to the left of the 8' strings, making it difficult or impossible (depending on different parts of the compass) for a jack to pluck the 4' string in either the rear or middle register. In the final result the timbre of the 4' is most unlike any other octave sound on a northern two-manual harpsichord, having a definite and strong solo sound benefitting from the very compact layout of bridge and hitch-rail on their limited and rather rigid area of soundboard, plus the nasal component of the front plucking point. It also has the peculiarity when alternated with the lower manual that the strongest element of contrast felt is not one of pitch, but of timbre. This makes it more usable as an almost conventional, if rather naive, second manual than might be expected.

I noticed one detail during restoration which may point to an even more "primitive" two-manual arrangement. The tails of the upper manual keys have been unevenly and separately trimmed to length after the key panel was cut up. Though the builder could have made a mistake that necessitated this shortening of the keys, to judge from the workmanship of the rest of the instrument, this seems unlikely. This may mean that the dog-leg disposition is not original, and that the octave stop was a separate instrument which could not be added to the unisons, but was only a solo and sympathetic choir of strings. (Experiment shows that the 4' is quite tolerable undamped.)

There is evidence of another modification which was made almost certainly during the building of the instrument. A scribe line runs along the side of the 8' nut nearest the player, and in the treble the nut

follows the line but deviates considerably in the tenor, almost returning to it in the bass. I am sure this is an original construction line. (The builder's style involves a great many scribe lines.) The nut seems never to have been moved from its original position, indicating that a modification from the original design must have been made in the workshop. This is supported by signs of a similar departure from original marking out at the bass end of the 8' bridge. On the inside of the bottom boards there is a scribe line which follows the line of the 8' bridge as it is at present, except in the bass where the line is straight but the bridge curves slightly. There are also unused peg holes in the soundboard for a bridge following this straight line. This modification would have had little effect on the scaling, but resulted in slightly shortening the plucking point in the tenor.

There seem to have been several alterations to the arrangements for changing registers during the life of the instrument. There are three old levers, though to judge from their workmanship, they are probably not contemporary with the instrument. One is on the lefthand side and operates the front 8'; of the two on the righthand side the upper one operates the back 8' and the lower one the 4'. The screws and, in the case of the raised lever, the little bridge on which it pivots seem to date from even later, probably the nineteenth century. There are marks on the side of the case and cutouts in one of the lever covers which show that instead of the little bridge, the upper lever was previously pivoted on a small wooden block.

The levers and their covers are reminiscent of other seventeenth-century examples, but in addition to their workmanship there are extra indications that they are an early modification, especially as the moulding on the front edge of the wrestplank has been crudely trimmed to admit the covers. I feel it is quite likely that with the sliding Italian-style jack-rail and the 4' probably not playing from the lower manual, there were originally no aids to changing registration.

A glance at the photograph of the instrument will show why Frank Hubbard discussed this harpsichord along with the surviving seventeenth-century French harpsichords. However, on the basis of my more intimate acquaintance acquired during restoration, I do not believe this instrument belongs originally in their company. Starting with the most obvious feature that evokes the seventeenth-century French harpsichord, twist-turned legs, these are in fact a decorative cliché of the later seventeenth and early eighteenth century occurring under instruments and furniture from many different countries. The nameboard, cut down between two ogee mouldings, and the stop-lever covers, typical of those found on instruments by Vaudry, Des Ruisseaux and others, are I believe French work done in the 1680s, sometime after the instrument was built. Many other more integral and internal features evoke "Germanic" characteristics. On the spectrum of the international style of the seventeenth century, untouched by the school of Antwerp, this harpsichord shows many of the slightly assimilated Italianate concepts which we associate with German harpsichords and forms a tradition continuing into the instruments of Dresden, Hamburg and Berlin of the eighteenth century. These features include box registers and by implication a form of jack, a sliding jack-rail, decorative panels on the keywell ends reminiscent of Italian inner cases, mouldings framing the inside casework, bent and moulded bridges, open and jointed frames, a wrestplank fixing dependent on blocks not sides, the bass end of the bridge not hooked or mitred but straight and an acutely pointed tail. Details of the decoration also point away from France. Amongst these are the absence of painting on the soundboard and the form of the sharps and rather barbarous fronts of the naturals.

Dating the instrument remains difficult. On one hand the compass

seems advanced and developed with its almost chromatic descent to GG. Though perhaps that only seems the case in the context of French instruments. On the other hand, the probable original disposition seems old-fashioned enough to place its construction nearer mid-seventeenth century. In which case the French style pre-Pleyel modifications described above could be explained by their having taken place in France at the same time that the painting was added to the lid. Any more certain conclusions about the date and origin of the harpsichord can probably only be arrived at by the discovery of other similar instruments, or perhaps from a more exhaustive study of the forms of the mouldings and other furniture details.

Musically and in workmanship this instrument is one of the most impressive I have encountered. In sonority, as in physical size, it is on a large scale. While exhibiting some of the dry articulation of the French instruments, there is a far greater generosity of sound with the fullest exploitation of energy from the soundboard. In all the repertoire for which it is fitted by compass, its sombre grandeur works eloquently, overriding pedantic ideas of what is historically and geographically appropriate. Its intrinsic quality should certainly soon earn it a nickname.

Acknowledgements

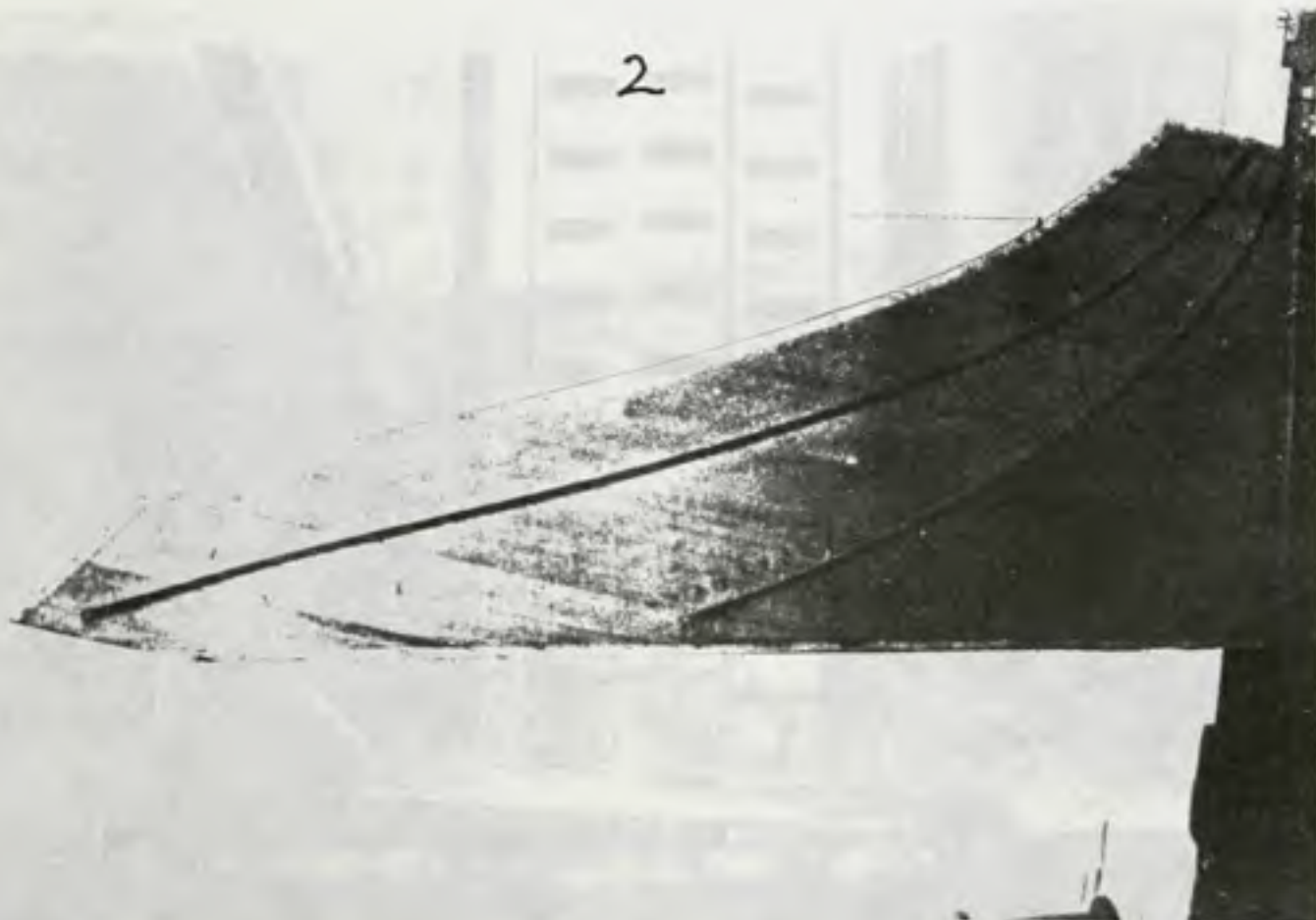
I would like to thank Alan Rubin, William Jurgensen, Derek Adlam, Rainer Schütze and Ann and Peter MacTaggart for their help and insights.

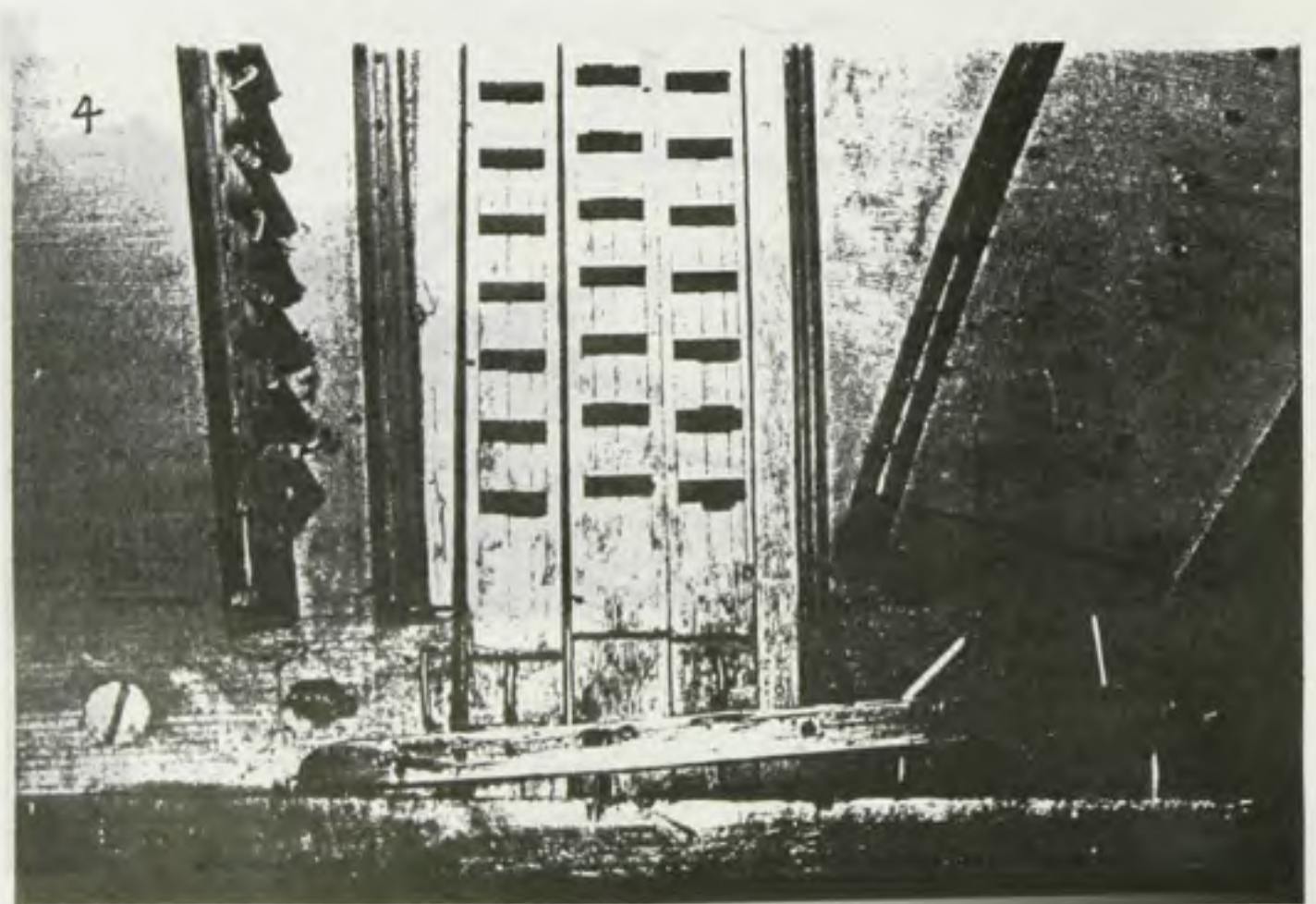
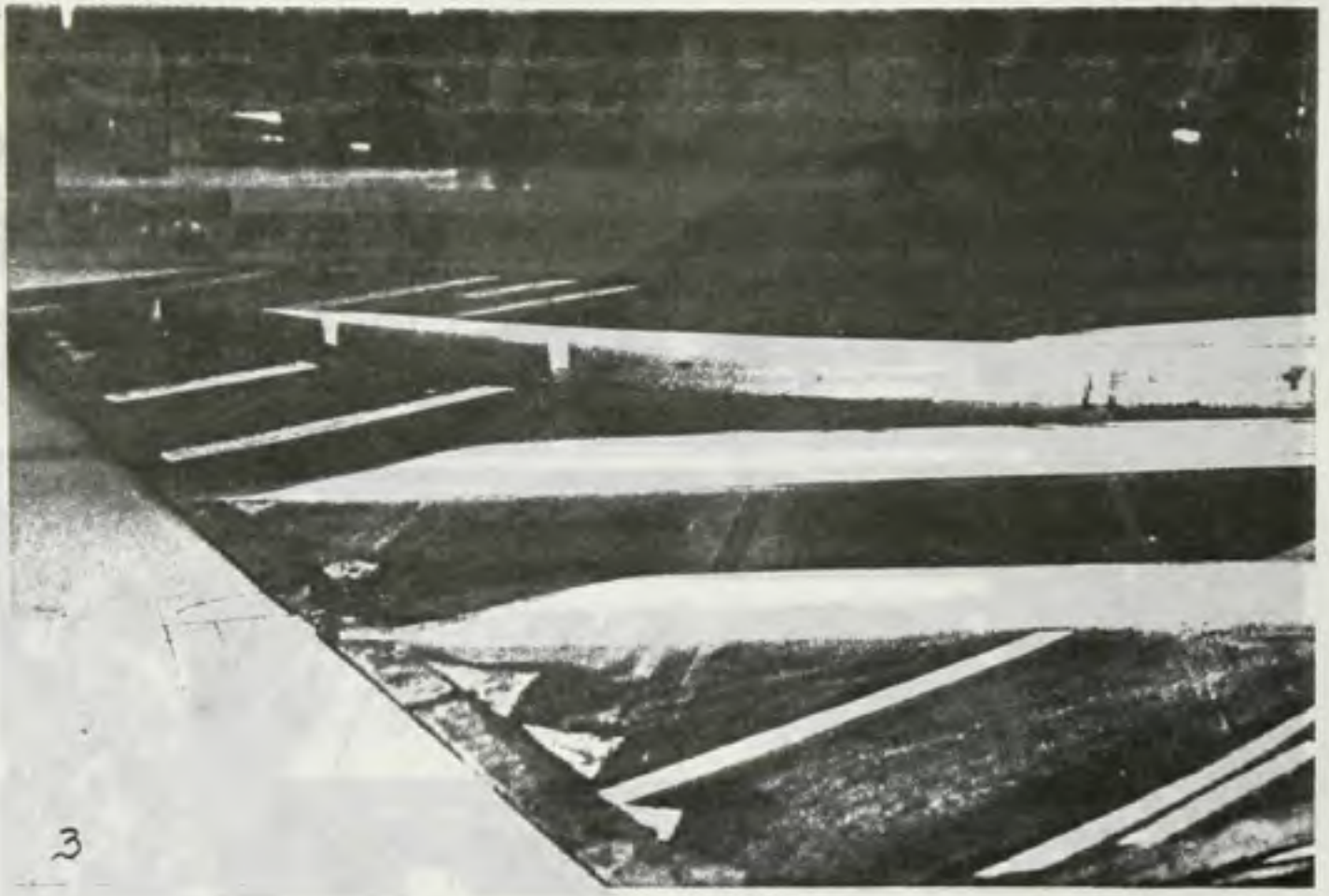
Table 1. Some Dimensions (cm)

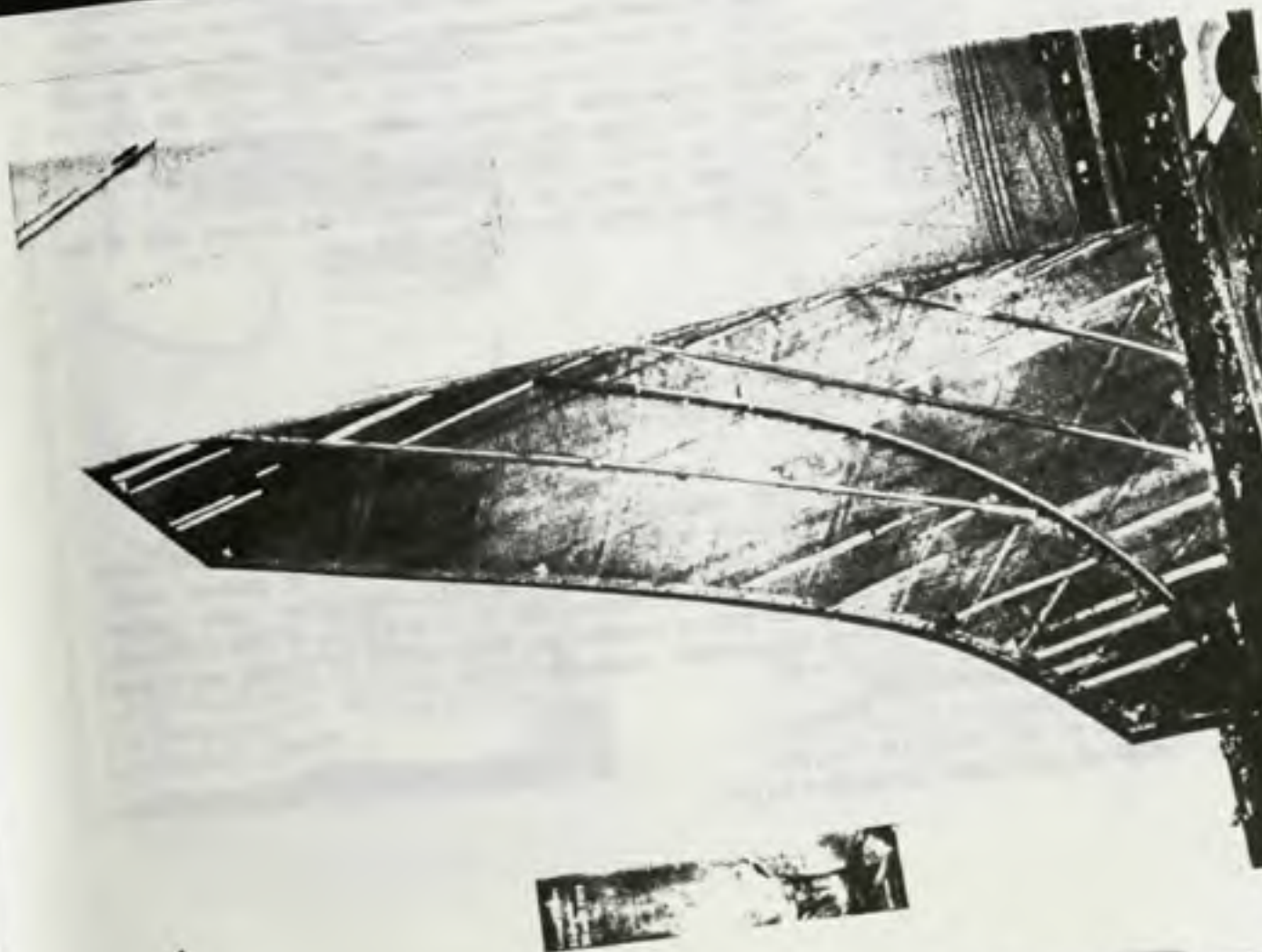
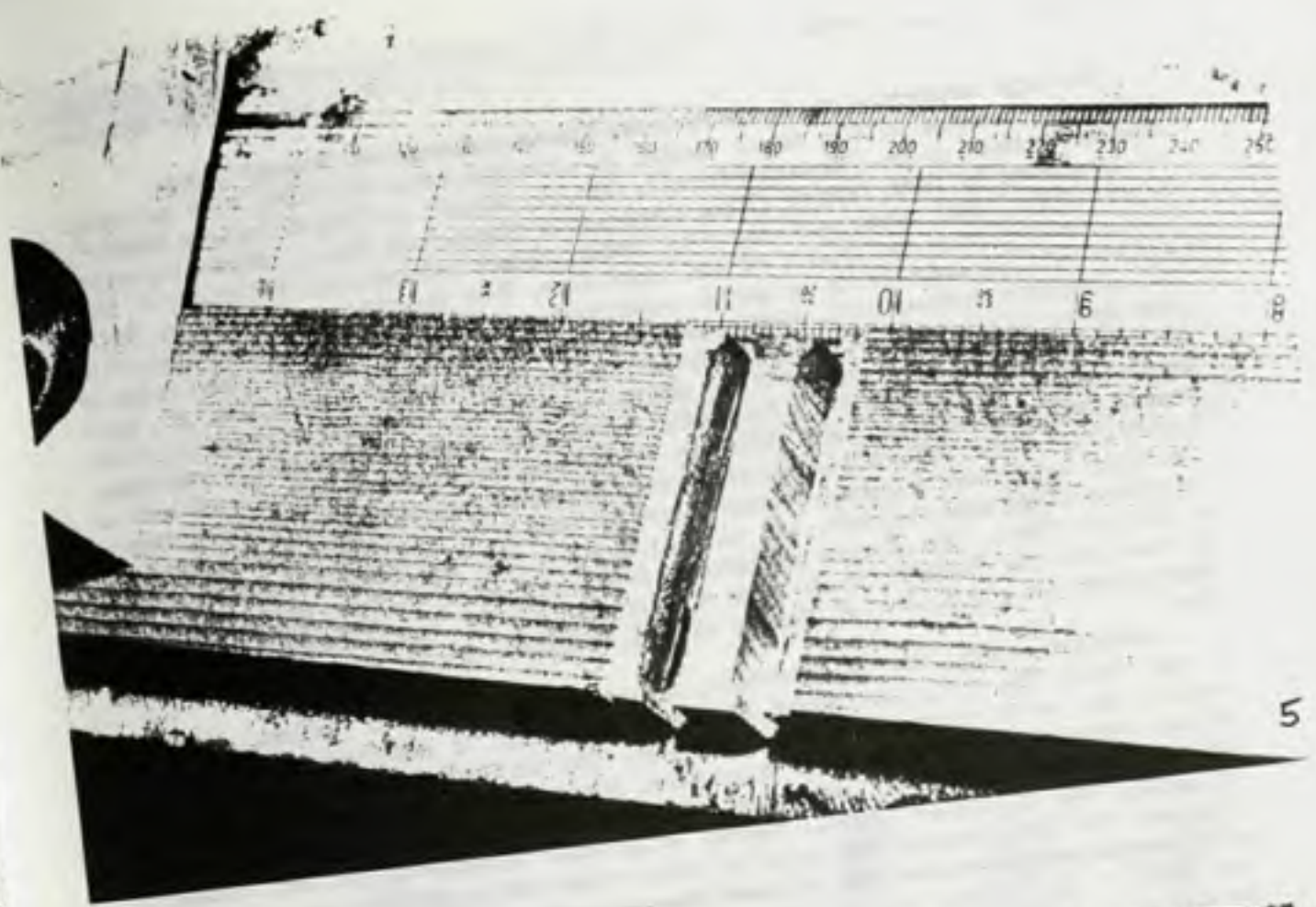
Overall size	
length	249.5
width	83.1
depth (less lid)	26.5
Thickness of casework	
cheek, bentside and tail	0.7-0.8
spine	1.5
bottom	1.6
Keyboard	
octave span	15.6
length of natural key heads	3.3



2







The large harpsichord now in the Württembergisches Landesmuseum, Stuttgart, and previously belonging to Alan Rubin, London, is certainly worth revisiting, time and again. Alternately known as the "so-called-french", "the big walnut", or "das süddeutsche Cembalo", and considered by Frank Hubbard (Three Centuries of Harpsichord Making, Harvard University Press, 1967, P.100) along with the 17th century french instruments, the origin of this harpsichord has been the subject of much conjecture. Both its restorer, Christopher Nobbs, London, and I consider it to be german or at least germanic. Indeed, my first unqualified and unrequested comment to Mr. Nobbs while then visiting his shop was was 'that smells of south-german or alsacian organbuilder against the wind'. In a very fine article, Mr. Nobbs has stated some of his reasons (The English Harpsichord Magazine). Although my first impression was very intuitive, I later realized that the similarities with Friedrich Ring, organbuilder in Strassbourg and immediate predecessor to Andreas Silbermann as well as with Heinrich Silbermann could not be overlooked. The discussion was renewed by the statement that there is supposed (supposed because I have not seen it or recieved first-hand knowledge from those making said statement, but, then who an I?) to be a parallel and signed instrument in southern France. The present whereabouts doesn't say anything about the origin as can be seen with the "Walnut", which spent most of its life in France. Except for Mr. Nobbs' observations (op cit.), all of this is wintery ambiguity. I must throw more wood on the fire.

Instrument makers, like all craftsmen, were real people (more so than now) living in a real world. For them, the concept of divine proportion, of numerical necessity was a reality, part of a system larger than themselves. That the keyboard octave has 7 + 5 keys or the overtone row is built up of consecutive fractions (1:1, 1:2, 2:3, 3:4, 4:5, etc) was not a matter of chance or physics but of divine necessity. Indeed, they had no method of working with irrational (unreal) numbers except when expressed in rational numbers as fractions. For their designs, they relied on number series such as the overtone row or primes or Fibonacci numbers because they believed these mirrored the natural order or harmony of the world. A good example of this is their use of the Golden Section which, as everyone knows, is an irrational number. It can, of course, be arrived at graphically but there is another method. The ratio of two consecutive Fibonacci numbers approaches, the farther removed it is from 1 the more exact, the Golden Section: 2:3 = .667; 3:5 = .600; 5:8 = .625; 8:13 = .615; 13:21 = .619; 21:34 = .618; 34:55 = .618; 55:89 = .618!

With this in mind, I will attempt to arrive at the proportion and measure used in the "Walnut" as one possibility of determining where it might have been made.

First, some proportions:

length:width = 3:1

height with lid:width = 1:3

height:width at tail-bentside joint = 1:1

1/2 width at 2/3 of length

distance frontedge to bellyrail:width = Golden Section

" " " wrestplank:width = 1:3

inside height:length = 1:13

: width of wrestplank:width = 1:4

If by no means all, these are enough examples to show that the design was arrived at using proportions. As absolute numbers, these have nothing to do with units of measure which, in any case, adhered to the arbitrary unit given in their locality. Especially with organbuilders, I have found it consistent that the octave span is 12 x 1/2" or 6". In this case, that would be 156.5:6 = 26.08mm and give a hypothetical line (1/12") of 2.17mm and a foot of 313mm. Does this fit the given measurements reasonably well?

length 2500:26.08 = 95.859" = 8'

width 837:26.08 = 32.094"

height 275:26.08 = 10.544"

length of tail 390:26.08 = 14.954"

width of wrestplank 209:26.08 = 8.014"

thickness of wrostplank $33:26.08 = 1.265 = 1 \frac{1}{4}$ "
 keyhead lengths $1 \frac{1}{4}$ " & $1 \frac{1}{3}$ " ($1''3'''$ & $1''4'''$)

scaling taken as the mean of both strings:

$$c^2 - (187+179:2):26.08 = 7.017$$

$$c^2 - (354+340:2):26.08 = 13.305$$

$$c^1 - (660+632:2):26.08 = 24.770$$

$$c^0 - (1255+1220:2):28.08 = 47.450$$

It is very common in german instruments, especially clavichords, with a scaling for steel strings to double the length less one unit for each octave. Here, we have 7", 13", 25", 48" or exactly this system although, of course, $(2 \times 25) - 1$ is not 48 but 49, close enough, considering how far down this note is along the compass of this admittedly very long instrument. That hypothetical foot fits this scaling and the other measurements so well that it is reason for me to believe that it is correct. This 313mm foot is the RHINE FOOT, also used in Dijon and probably in most of what at one time was Burgundy. In the seventeenth century this was not french.





Figura della pianta del Cimbalo con suoi Ordigni e Sin da Senare.



Tastatura quale si leva e si mette, con suoi Capi tasti.

- A. Tastatura...
- B. Bancone...
- C. Registro...
- D. Corda di Cedo: soprano
- E. Corda di Gese: soprano
- F. Corda di Effaite: soprano
- G. Corda di Cef: Centralo
- H. Corda di Geseur: tenore, e centralo
- I. Corda di Effaite: tenore, e centralo
- L. Corda di cesalf: Tenore
- M. Corda di Geseur: del Oua va del basso, e tenore
- N. Corda di Effaite del 2° del basso, e tenore
- O. Corda del 3° di cesalf: tenore e tenore
- P. Corda di Geseur: basso
- Q. Corda di Effaite: basso
- R. Corda di cesalf: basso

FoMRHI Comm 1043

IS LOOKING SEEDING ?

William Jurgenson

In the following, I would like to look at a small italian harpsichord, unsigned and undated but presumably built about 1600 in Venice. I will preface this voyage with a translation of the catalogue page and a consideration of the restoration minutes.

Inv.No. G 7,817
 Harpsichord, C/E-f³, 8'+6"
 without signature, early 16th century
 length 1823mm
 width 816mm
 height 196mm
 length of tail 283mm
 " " cheek 402mm
 angle of tail 34°

Bottom of spruce, comprised of 4 boards approx.15mm thick, between the sides and with a front crosspiece 34mm wide glued with a butt-joint. Walls of cypress 4-5mm thick, butt-jointed, not mitred. Bellyrail of spruce 17mm thick with two "mouseholes" 182x48mm. 9 knees of lime, 4 on the bentside, 3 on the spine and in both tail corners. 4 struts of spruce. The inside height is 118mm.

Wrestplank of walnut, in the bass 164mm, in the treble 130mm wide and 38mm thick. Wrestrpins 4x45 resp. 4.5x50 resp. 4.8x52mm in two rows parallel to the nut. Hitchpins in the soundboard in front of the molding. soundboard of spruce (pitchpockets) quartersawn, parallel to the spine and without a rose. Cutoffbar 33x13mm near bridge, secured at the ends with linen and in the middle with parchment. No ribs. Bridge of beech, nut of walnut, both 13 high and 9 wide in the bass and 11 high and 9 wide in the treble. The gauge nos. in ink on the wrestplank. Scaling on a separate sheet.

One manual, C/E-f³, 50 notes. Keyframe of spruce with balancerrail and rack of walnut. Keys of spruce numbered $\frac{1}{2}$, 2-50 in ink. Ratio of naturals C/E 135:170, f³ 125:156, guided by blades of beech. Keydip governed by frontrail and jackrail. Keyboard widths 684, 488 and 163mm. Heads covered with boxscored with two lines, beveled on the sides and with box arcades. sharps of pear with ebony (?) tops.

keyhead length 37mm
 sharp length 73mm
 " height 11mm
 " lower width 12.5mm
 " upper " 11mm

The "D" keys are wider than "G" and "A". The naturals have italian solfeggio syllables written in ink.

Excepting 11 pieces, all jacks are original, of pear with beech tongues, one lead weight, quills, one damper and springs (probably not original) of steel wire. Original hor-slides of pear, glued up of blocks between two veneers, the one marked "S", the back one with "P". They are marked together with a cabinetmakers mark and "S" has a mark corresponding to one on the wrestplank. All "C"s are marked on the adjacent edges and the plucking direction is marked at C: "P" ←, "S" →

Moldings of cypress around the soundboard, wrestplank and gap as well as upper and lower edges of case, inside and out. Frontboard removable. Jackrail of cypress with moldings on upper edges, the jackrail blocks ending in a scroll at both ends. Keycheeks of blackened walnut.

The instrument had a pull-down pedal, C/E-c°. The outer case is green and yellow resp. gold chinoiserie in Louis seize style and also has the hole for the pull-downs.

I. Initial condition:

The strings of phosphor-bronze and the obviously wrong stop-levers are to be immediately removed. The registers are labeled "P" = Primo, plucking to the left and "S" = Secundo, plucking to the right. In the following, I will refer to the longer as "P" and the shorter as "S". The wrestpin "P'f" is missing, "P'e" and "S'b" are split. The wrestpins 'S'c,F,D,G&E are not old, those of 'P'c,F,G&E are of type No.1, those of 'P'd,A,A#,B,c°&c#° are of type No.2 and the remainder is of type No.3. All of them now have holes. The wrestplank holes of the smaller types are not, except for 'P'd, filled so that I must assume them to be the oldest: perhaps our master was using up his stocks. More probably, at least type No.3 are eighteenth century replacements. "P" register is at present in front, plucking to the left: the jacks are in no order:

"S" register: P50 new, S15, S43 new, S4, S6, S5, S7, S2, S9, S10, ?S13, S14, S7, S16, S17, S18, S19, S20, S21, S22, S23, P24, P47 newer, S26, S27, S29, S37, S30 newer, P32, S32, P36, S34, P35, S36, P40, S39, S38, S40, S47 newer, S48, S49 new, S1.
 "P" register: S3 new, P5, P6, P7, P1, P8, P2, P4, P12, P11, P13, P15, S10, P17, P16, P19, P18, P20, P21, P22, P23, P26, S24, P25, P27, P28, P29, P31, P30, S31, P34, P33, S33, S35, P38, S28?, P42 newer, P39, P9, P41, P43, P44, P37, P46, P14, S49, P48, P49 new, S50 new.

The jacks of pear with beech tongues (photo 5) are even now quilled, the springs are of piano wire but, judging by their receptacle, they were probably brass leaf, whalebone or quill. The flag dampers are now of red cashmere, unfortunately glued. The box keyplates are laquered, the keyframe is held down with 4 woodscrews from underneath, the bumper cloths have been replaced by modern felt. The jackpads and that of the jackrail are of reddish baize. The liner is broken away from the bentside between c¹ and c¹ (photo 6). Apart from that, the soundboard itself is loose at a¹ and on the bellyrail to the left of the crack (photo 7). Because of this, the soundboard has moved forward, jamming the slides. Photo 3 shows how the soundboard has moved from under the molding and also the same can be seen at the end of the bridge. This constitutes the actual reason for the renewed "restoration" after about only ten years. The lavish use of PVA is not my doing.

II. What was done:

In order to glue, I widened the openings with wedges as far as possible, cleaning them first dry and then with warm water. It was necessary to remove part of the molding and the hitchpins in this area (photo 6). First, the liner was glued to the bentside, then the soundboard to the liner and the bellyrail. The bridge was reglued and the crack shimmed. Because the wrestplank was also loose, I removed the moldings here and cleaned the surfaces. The pinlock was reglued to the cheek, the moldings reinstated and the hitchpins put back.

In the process of cleaning, I ascertained that, at least, the soundboard had been sized. The filler on the soundboard and case is apparently original: at one place, I carefully removed part of it; the wood beneath was like new, not darkened. This filler is a gesso, retouched with a watery tempera. With this, all visible nailholes, inside and out, those, now without nails (X-ray), that positioned the cutoff and all the places that tore out while planing are filled.

After everything was cleaned, it was obvious that the slides had been in the wrong order: "P" should have been at the back and "S" in front. The slides are marked with a cabinetmakers mark and with an index on the edge of "S" matching a mark on the wrestplank molding. The "C"s are all marked on the adjacent edges of both slides and the plucking directions are marked at C (photo 8). The jacks were put in the right order and, as far as necessary, repaired: some had to have worn damage replaced. Nos. "P"2,5,9&45, "S"2,15&37 recieved new tongues. For "S"25 made a new jack. Those jacks whose springs were missing (eg. "S"28) as well as my new "S"25 recieved new ones of quill which works very well. I removed the cashmere dampers. Because they were glued, I had to repair many forks. I shimmed the jacks with paper and/or cardboard to fit their slots so as to make reasonable voicing possible.

Before restringing, I had first to remove the split wrestpins. I heated them with a propane torch to break them loose. The necessary replacements were then made. The gauge Nos. are written in ink on the wrestplank (photos 9-11) so that it was "only necessary to define them.

7

Based on several lists (Thomas & Rhodes, Organ Yearbook 1979, pl26 and private lists of Denzil Wright, M. Rose and myself), I restrung as on the table. The scale allows a tuning at 440 cps. with no problems. It is interesting to note that, for the first 10 notes, every note is marked. This makes it obvious that the short-octave notes C,D&E were not thicker although we "moderns" automatically do this.

After taking the keys from the frame, I discovered that the felts were "glued" with UHU, a butyl acetate adhesive. This is certainly not the finest method. And difficult to remove. The front- and balancerails, being warped, were sewn and wedged to straighten them. The lacquer was easily removed with acetone without damaging the calligraphy. Several keys had traces of other calligraphies: these were tone letters instead of the solfeggio syllables now present. Layers of black wool cloth (there were black fibers in the glue rests under the UHU) were sewn together and glued to the frame to establish a keydip of approx. 7mm. After removing the baize jackpads, I could see that white leather of the kind used by organ-builders had once been glued: this is what I then used. Also, an inked line for the plucking-point of "P" came to light. Judging by the traces in the keywell, the keyframe once rested on four wooden blocks in the corners. Using the most "virgin" jacks, I made these to establish the correct height. Since the instrument has no subframe or rails, the keyframe is suspended above the bottom in this manner. The screws were redundant. After removing the baize from the jackrail it was obvious that the original cloth had been nailed. A new pad was sewn from the same black cloth and nailed on. The keydip of approx. 7mm is correct: the jackrailblocks are scribed with both the under edge of the jackrail and the cloth (photo 4). Since most of the sharps drop behind the frontrail, it is clear that the jackrail governs keydip. The mutilated block in the bass was repaired. The eyes for the pedal pull-downs were made of 1.2mm iron wire and replaced in the foremost of the 3 rows of holes since it made the most sense: the keys do fall very little just in front of the balancerail. The measured action weights are as follows:

key c' alone 5gr.
with "P" jack 10gr.
with both jacks 15gr.

The instrument was requilled and dampers of the same black wool cloth inserted.

III. Two remaining points:

At the bass end of the nut there are many cut marks (photo 12), a medium size screwhole with concentric scratches and a nailhole in front of the nut. The front surface of the nut has also been chiseled vertical to the wrestplank. What could have been here? The only attachment to be found only in the bass is the arpichordum. Although very speculative, I have reconstructed one. A historical screw fitting the hole quite nicely holds a cam to adjust the movement and a staple in the nailhole holds the batten in place. The hooks are made from historic 1.8mm iron wire. They buzz "P" from C-c^o.

The other point concerns the carved consoles (photo 16). The case walls run full-length under the moldings, they were cut away on the finished case for the consoles. I would venture that they were added, perhaps in the late 17th or early 18th cent. to augment the instrument. Its' outer case in Louis seize style is a case in point.

OOOOOO

Now I would like to proceed considering the instrument and how it was made - or at least how I think it was made. I find this instrument particularly interesting because it is almost entirely original, because of its' makers working style and because it is a straight-forward simple tool - it is not ornate or unusual. And it is a fine musical instrument.

First, then, a look at working methods. On the bottom there are scribed lines for the plucking point of "P", the bellyrail and a line roughly between the balance pins but parallel to the front edge. The bridge is marked out with lead on the bottom. The nut and both rows of wrestpins are scored on the wrestplank surface. These lines are parallel: they must have been made with a dividers or fixed gauge because the mistake in the treble effects all of them. The "U"s are marked on the surface and on the gap edge of the wrestplank with lead (photos 11,12&13): these are the key centers. These lines run under the nut and the line for c' determines the "P" c' wrestpin.

Because the drill depthgauge left its marks not only on the surface of the wrestplank but also on the molding for the first holes (photo 13), it is obvious that the holes were drilled after the case was finished.

To further understand, we must attempt to find our builders' measure. Assuming, for the moment, that an octave equals 6", then one division would equal 1/2". The measure of the keyboard is 488mm and of the wrestplank is 487mm, practically identical. Dividing this by 36, we get a spacing of 13.53mm. That would give an inch of 27.06mm: I round this off to 27mm. How does this fit? The instrument is 30" wide: $816:30 = 27.2$ mm. The distance from the bottom to the soundboard surface is $4.5" - 121:27 = 4.48$. The distance from the front edge to the end of the bridge is 60", from the front edge to the soundboard on the spine is 12", the cutofflar is exactly 30" long, the longer c' string is 399mm, almost 270 or 10" long. In that case, c' should be 540 or 20" long but it is only 517. However, there are other bridgepinholes in this area, grouped to give "P#a#b#c'&c#" and "S'b#c'": these holes have not been plugged. Their sequence shows that first the longer strings were marked out and then the shorter, marking the close pairs of pins with a dividers. The most important thing about these "wrong" holes is that c' would have been 538mm long, our theoretical measure. Otherwise, there are no "wrong" holes anywhere in the bridge. For me, it is apparent that our master worked to this measure, otherwise he would not have marked out the bridge to this length. To begin, he drew the plan on the bottom, quite normal, and then made the box complete with soundboard, both bridges unpinned and all the moldings. He then drilled the wrestpins, probably marking them out with a dividers from c' but somewhat inaccurately. In the bass there is virtually no side draft (which is OK) and in the treble the draft is so that some of the strings bear against neighboring wrestpins: the addition of a minimal inaccuracy would move the bass pins farther to the left and the treble pins to the right. He then marked off the correct length for c' and began again, in both directions, to mark off. The c' line is his "middle" of the instrument. Whether a cabinetmaker a piece of furniture, an organbuilder an organcase or a luthier a violin, all of them "live" from a "middle" or symmetry axis: this reduces exactly these additive errors. In any case, he saw immediately that, although the strings need not necessarily be parallel to the case, they would be too far to the left or too unevenly spaced to fit the gap. Therefore, he moved c' far enough to the right, it still runs to the left; to make a reasonable gapspace. This, of course, deformed the scaling but our master apparently knew or felt that geometry and layout were more important than religious adherence to the scaling. In as much as the strings are in no way parallel but with vacillating spacing, narrower and wider, it seems reasonable to assume that he marked off the long bridge with a dividers, judging the spacing and adjusting accordingly. He must have marked off the nut with a masterjack because the spacing in the gap is amazingly even. That doesn't answer the question why the bridge is not where it should be mathematically. Because the instrument was not opened, I could not determine whether the bridge corresponds to the marking on the bottom which also doesn't show on the X-rays.

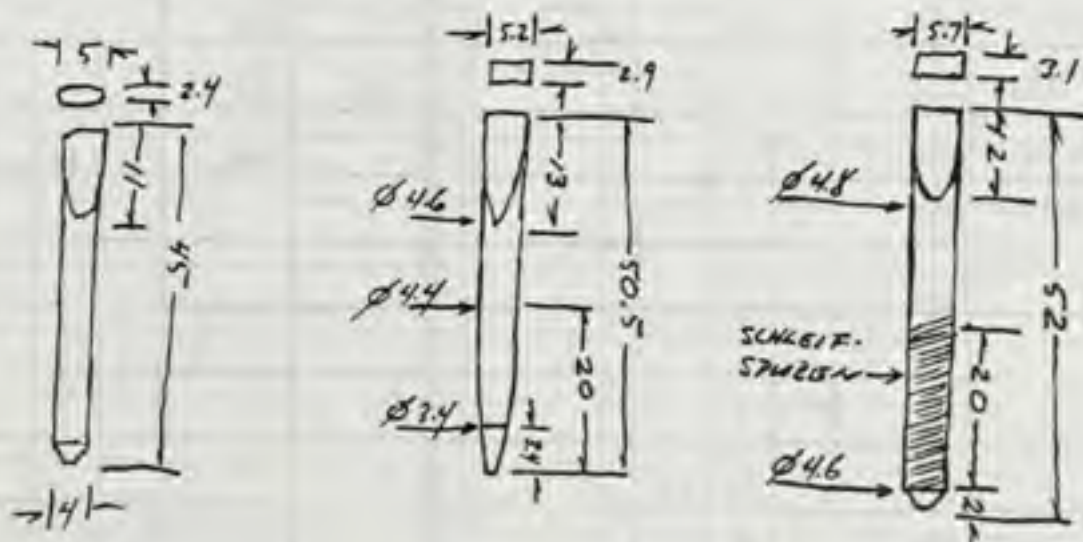
How to arrive at a plan. One possibility is to mark off the centerlines of, say, the "C" and "F" keys along the length of the bottom, adding to this the keywell borders which are defined by the keyboard, as well as the pluckingpoint and a line for the nut (these are actually present on our instrument). From this the string lengths can be measured for the scribed notes giving points along a curve defining the bridge and from this the bent-side curve, at an appropriate distance from the bridge is drawn. This is nothing but a simple graph or coordinate system - it is the method I use. We can consider this to be working from the inside out. But the key centers are missing on the bottom of our instrument although they are present on the wrestplank.

There is also the possibility of working the other way around. It is well known that, for instance, luthiers made their instruments according to so-called divine proportions: Fibonacci numbers, Golden Section, primes. I will try to apply the Fibonacci row 1,2,3,5,8,13,21,34,55... to our instrument. It is 2 1/2" wide which equals 5 octaves; let this be our Fibonacci No. 5, then 1 would be 6" or one unit (unit measure). The length would have to be one of the next numbers, perhaps the sum of the next two: $5+8=13$. $13 \times 6" = 78"$ but the length is only $67 \frac{1}{2}"$. Try again. $67 \frac{1}{2}":6" \approx 11$, a prime and incidentally the sum of the first four numbers of the row: $1+2+3+5=11$. At the point on the line of the spine 78" from the front is the intersection of the straight continuation of the long bridge, so that number does have some relevance. It is very common in the 15th. and early 16th. centuries for the cheek to be 1/2 of the width and here, also: $15":30":2$. The width of the tail is about 6" or 1 unit. What about the curve? It is equally common for the width 1/2 at 1/2 of the length, but in this case it is not

However, at unit 5 of the length it is about 1/2 of the width and at unit 8 it is 8" wide. We have used the numbers from 1 to 13, if we divide 13 by 21 we get .619, very close to the Golden Section .618 (the same is true if we divide 21 by 34, 34 by 55, 55 by 89...). At the minor of the length, the instrument is 1/4 of the length wide and here is the first knee on the spine. The center knee on the bentside is at 1/2 of the length, all knees are roughly equally spaced at about 13". The front edge of the soundboard is 12" or 2 units from the front, the end of the nut about 6" or 1 unit from the front. The treble end of the nut is about 9" or 1 1/2 units and the end of the bridge is quite close to 12" from the front. The ends of the bridge are about 3" from the bentside and if our master had kept this distance constant along the length, the scale of c' would have been correct. For my taste, there are just too many parallels here for it all to be coincidence and I am quite ready to accept his working from the outside in and, as can be seen, following his "divine" numbers, he could have arrived at a just scale without even considering the string lengths. For some reason we will never know, he deviated from this plan in actually gluing the bridge on: had he planed away too much with the compass plane (the instrument is somewhat narrower than its' theoretical width) or was, perhaps, the soundboard wood just too stiff?

What I am trying to get at is the fundamental difference between his method and ours: inside-out vs. outside-in or, more basic, reductionistic vs. wholistic. At the risk of sounding trite, this is the problem of our time. We have been, as have been all generations since Newton and Descartes, taught to see parts, smallest units, to assemble reality out of them, to believe that the whole is only the sum of its' parts. We are unable to see the whole, to comprehend it otherwise than as the interaction of its' parts. Today, modern physics is making it clear that the cannot be described by the properties of its parts. We cannot revert, go back in time, become naive in the way our master was, but he had one intellectual advantage over us. He envisaged his musical instrument as an entity, adhering to a larger system, following a pattern larger than the instrument itself, defining its' own structure and not being defined by its' parts - a metasystem which also defined him and his world. Outside-in. As long as we are unable to see the wholeness - reality -, we will never understand how they did what they did and, much more important, we will never be able to make new instruments which will equal theirs', musically. It is not a question of age or aged woods or of trade secrets lost to the world or of alchemy, it is a question of direction, conception, will, intentionality, love.

June, 1983
December, 1989
Wii. Jurgenson



Art No.1

Art No.2

Art No.3

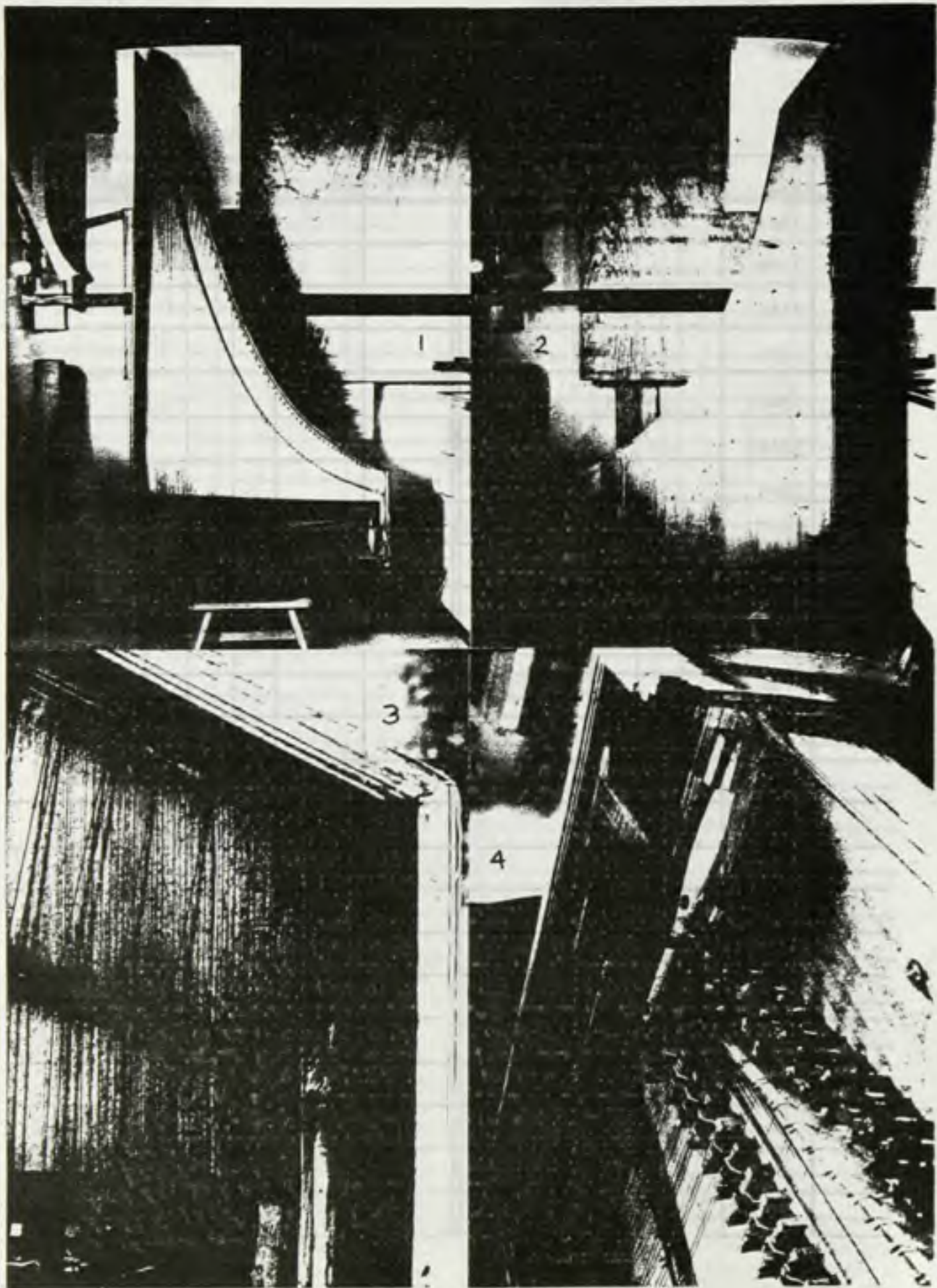
C/E-f3 8' + 8'
 alle Saiten aus Messing

INSTR: ITAL. CEMBALO

INV. NR: G-7.817

PITCH	L.	DIA:			COMMENTS	PITCH	L.	DIA.			COMMENTS
		von "p"	von "p" vorher	jetzt				von "p"	von "p" vorher	jetzt	
f3	99		40	.27	.225						
e	107					f1	385				
dis	113					e	409				
d	120					dis	432				
cis	127					d	459				
c3	135		51			cis	487		.27		6
h2	142					c1	517	106	.33		
b	151					h	546				
a	160					b	574				
gis	169					a	609				
g	180					gis	640				
fis	191			.225	8	g	676		.30	.33	5
f	203			.25		fis	715		.32	.36	
e	215					f	752				
dis	227					e	800				
d	240					dis	847				
cis	254					d	892				
c2	269		80			cis	940		.36		4
h1	284					c	986	131	.32	.40	3
b	299					h1					
a	313					b					
gis	329					a					
z	344		.27	.25	7	gis					
fis	363		30	.27		z					

Drahtnummer auf Stimmstock





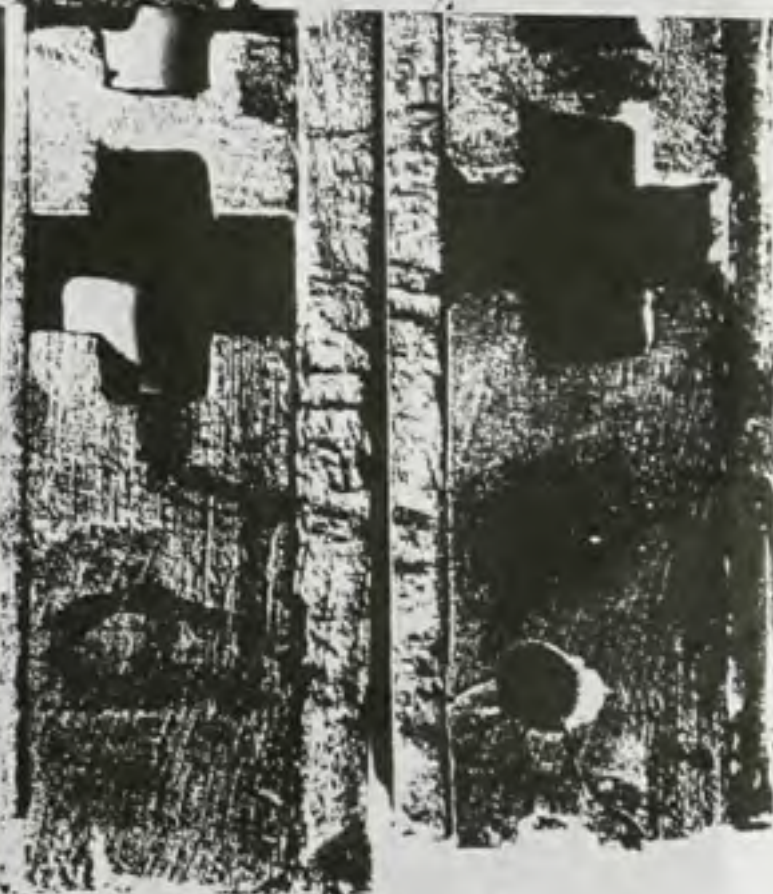
5



6



7



8

