

FELLOWSHIP OF MAKERS AND RESTORERS OF HISTORICAL INSTRUMENTS

BULLETIN AND COMMUNICATIONS. JANUARY 1978

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A happy and prosperous new year to all FOMRHI members, especially to those who have sent in their renewals on time.

LOST MEMBERS: Two copies of Bull/Comm 9 (apologies that the number was omitted from the title page) have been returned marked 'Gone away'. Can anyone give me addresses for: Trevor Downing, lately of Newcastle, and Malcolm Prior, lately of Headley Down?

MEMBERSHIP LIST: Enough members have not yet renewed that, as last year, this issue includes a further supplement and the main list for 1978 will come with the next issue. Since a good many of the new members have not renewed yet, as well as the \* to denote a change of address, another sign (#) denotes 1977 only - it did not seem right to leave them out, especially as I hope that they will renew their subscriptions when reminded.

It was suggested during the Seminar that more detail should be provided, especially a distinction by periods. If this affects you, would you please let me know whether your instruments are Renaissance or Baroque or the relevant century or whatever you think significant.

Don't worry if the present supplement does not include the additions to instruments that you've sent me; these have been noted but to save space in this issue I'm only including the changes of address etc.

HONORARY SECRETARY: According to Rule 9a (Bull/Comm.6, January 1977) The Secretary serves for three years and is eligible for re-election on retirement. The ballot for this will go out in April, since my three years is up in September and it seems sensible to allow for a hand-over period if anyone else is elected. Therefore it is now that I should ask for any other nominations. There is no formality required (ie you can volunteer rather than needing to be nominated); however, if you are nominating anyone else, please do get their consent in writing so as not to waste time by nominating someone unwilling to serve. There is a fair amount of work involved; very few days go by without letters arriving that have to be answered. I shall be standing for re-election, incidentally.

There are no other officers, the position of editor being unofficial and done by Djilda Abbott simply because she is willing to do all the work involved.

FINANCIAL REPORT: The accounts have not yet been audited, but you might like to know that we seem to have ended up the year with just over £100 in hand (some of which is owed to NRI for the circulation of the initial issue), plus a stock of Bull/Comms.1-4 and 6-9 for sale as back numbers, plus all the renewals for 78 which are carried forward into this year, plus a £30 profit from the Seminar which will be used to subsidise subscriptions for people in countries which forbid the export of money. Due to the generosity of various members we already have members in East Germany, Czechoslovakia and the USSR, some of them personal friends paid for by members elsewhere, some of them paid for through donations to FOMRHI; we welcome more of these and we also welcome nominations to receive such subscriptions in any area which forbids the export of currency, provided that you are certain that they will appreciate and use our issues and if possible that they will show them to, and share them with, colleagues.

16th CENTURY SEMINAR: This was a great success; a large attendance included a number of non-members, several of whom have joined, and members from Australia, Canada, Belgium, Holland, the USA and Britain.

There were no formal papers (this was in deliberate keeping with FoMRHI's normal policy of informality; I was told that it could not have happened elsewhere, but see below) and I think and hope that everyone who wanted to was able to join in the wide-ranging discussions. There is a report in this issue.

I should be very reluctant to believe that only Eph, Djilda and I could organise FoMRHI occasions, though so far it is only we three who have done so as far as I know; I should also be sorry if it were true that only in England can such informal events take place. So, who will be willing to organise FoMRHI events elsewhere? You can either do it yourselves by using the List of Members and Supplements, writing or telephoning directly to those in your area, or you can send me a notice to be circulated with our issues. Costs are your responsibility, as they were mine on this occasion. If you make a profit, you can either use it for other FoMRHI events in your area or, better, use it as I'm using those from this occasion - remember to build-in the cost of the leaflets, if you use that method, which were £16 for us. We paid £60 for the use of the Early Music Centre and, to play safe on numbers actually attending, I charged £3 per person, which isn't much for three days.

SEASONING TIMBER: We have had a number of requests for a Communication on this. John Rawson agreed, reluctantly, to write one which you will find herewith; reluctantly because he said that he's no expert but that he was willing to write what he did in the hope that others will respond with a note of what they do. He hopes also that others will follow up his note on key-weighting. Such short notes on a single process don't take that long to write, and they are of great help to your colleagues and, judging by past experience, the response from others is a help to the original author.

SCHOOL VIOLS, etc.: I sent our last issue to Music in Education, marking my remarks on pp.5 & 6 in the Bulletin. I have had a letter from Paul Griffiths (Editor, Music in Education, Macmillan Journals Ltd, 4 Little Essex Street, London WC2R 3LF) saying: "...I would be very pleased to hear of makers who are willing and able to supply instruments for school use: we might publish a listing of them in a future issue. I would also be glad to hear from teachers, like Bryan Tolley [I sent him Bryan's address], with a special interest in this field." Over to you, now; if you are interested in this area, get in touch with him.

THEW, ARNOTT & CO.: I included a note about them and a copy of their list of oils etc. in the last Bulletin. One member who ordered material received it by return of post and is very satisfied with the quality and the price.

KARL ZEEH: On the other hand, this firm whose purfling was recommended in Bull.8 have not replied to requests from a member. Feedback of your experiences with firms mentioned in the Bulletin is always useful.

NEW FELLOWS: Mary Remnant and Donald Warnock have been elected.

YEAR/PLACE SETS: Further to Bill Elliott's suggestion of the need for these in the last Bulletin, Paul Kemmer comments: At least for Baroque & Classical instruments I don't think it would be worth the effort. I would guess that most of the places mentioned used a 'hodgepodge' too, with the exception that they wouldn't have used instruments made in the future (obviously). [I'm not convinced that he's right about this; the hodgepodge, I mean, with the obvious exceptions such as Nürnberg trumpets in most of Europe; I think, with Bill, that there were local styles in most instruments and that we do need to think of sets] I'd say that Amati violins could have been found in any country, for instance. What might help more would be just to encourage museums and draftsmen to come

up with plans of musically important instruments, and start a fashion among instrument makers to provide pamphlets giving facts about date of manufacture and uses of the original.

MUSEUMS: And, talking of museums, I've had a letter from one of our members saying that a colleague of his had approached the Horniman with the request to examine their recorders and received the usual brush-off and could I help. I've written to the Curator, and we'll see whether this has any effect, but in the meanwhile if anyone has any data on the recorders there, could they let me know? I think better to keep this anonymous at the moment, but I'll pass on any measurements or plans that I'm sent.

PLANS - STANESBY FLUTE: Plans of my Stanesby Junior ivory transverse flute are now available from Djilda for 10p. for the plan plus 10p. to cover postage in UK/Europe and 25p. for postage overseas. I should warn you that Andreas Glatt, who measured it, thought that it had been cut down (it blows at c.440 Hz, which is a semi-tone higher than most Stanesbys). On the other hand, Bill Elliott who prepared the plan is convinced that it was made originally to this pitch; on the first hand, however, Bob Marvin looked at it last night and suspects that it was cut down and then re-reamed. Still, if you want a plan of a one key flute originally by a good maker that plays at modern pitch, write to Djilda. Anyone who wants to compare their results with the original is welcome to come down here (so's anybody else as always; there are plenty of other instruments here).

PLANS - LUTE & GAMBA: Jörn Steinberg (please note that his district number is wrong in the first Supplement - it should be Hamburg 52 and not 53) should have available in April a plan embodying his ideas of lute construction in the first half of the 16th century, showing the probable original barring, bridge and neck block of the ex-Halfpenny Hans Frei lute in Warwick and the Laux Maler, Nürnberg MI 54, and an outline and side elevation of the Tieffenbrücker(?) viola da gamba in the Gemeentemuseum at The Hague.

MEASUREMENTS - BARYTON & HURDY-GURDY: Melanie Spriggs has measured the Sainprae Baryton (cat.2/7) and a hurdy-gurdy (unspecified and exterior only) at the Victoria & Albert Museum and has deposited copies of the measurements there to be available to anyone interested. She intends to draw a plan of the baryton.

PLANES: I have been sent a note of three Masterpieces of the Plane Maker's Art. Since the 5" thumb plane is priced at £192 and the 8" shoulder plane at £274, they need to be masterpieces. If you're interested, write to Henley Optical Company, 4 Hart Street, Henley-on-Thames, Oxfordshire; delivery is 8 weeks (hand-built to order in a limited edition of 1501).

STRINGS, etc: Donna Curry says that she is USA distributor for Pyramid strings and also supplies better gut than any source known of to her. \* She also provides stringing help, service and advice and builder help and information. If interested in gut strings, see also the report of the 16th century seminar.

L'ENCYCLOPÉDIE: Further to my review (Comm.72) Alan Crumpler points out another mistranslation that I should have spotted. Plate 10 of the organ material, figs.59 & 60 show a casting board and roller for the metal pipes. These are described as something quite different in the English translation and a couple of footnotes accuse the French text, which is quite correct, a) of being incorrect and b) of saying something that it doesn't say!

\*We at NRI could say the same for our gut, but we haven't checked Donna's. I very much doubt whether Donna has checked our gut.

G.A.M.: I have now been sent a decent copy of the list of publications of GAM and this will be found below. In addition, Dominique Adam has offered to send details of any of their publications to anyone who wants them and has sent details of the contents of the issues on Lute, Temperament and Transverse Flute:

Lute: its origins, the tablatures, the different lutes, the baroque lute, how to play, the end of the lute, some studies on the instrument - how to make one, studies on the strings - bridge - soundboard - rose - the bars, all of this being quite general.

Temperament: I) comparison between the different temperaments; II) decimal temperament.

Flute: 1) general physical studies; 2) in reality: the pipes with a flute type; 3) holes problems; 4) the transverse flute.

Nos.9, 15, 18 are out of print but should be available again either by now or very shortly; 84, 86 and 89-92 may not yet be published but if not will be available very shortly.

REQUESTS: A number of makers have sent requests for information with their subscriptions and requests for Communications on various subjects. If you can help, please do so. Many of the requests are of sufficiently general interest that I hope you will send a copy of your reply to me for the next issue - the ideal would be top copy to me for reprinting and the carbon to the enquirer so that they don't have to wait till the next issue for an answer.

Geoff Kime asks for Communications on building techniques in general (see also under cittern & lute below).

Peg-making - Kenneth Marshall asks for a Communication on this.

Timbers - Geoff Ralph asks for identifications of timbers used in extant instruments.

Varnishes & Stains - he also asks for identification of these.

Jörn Steinberg asks if anyone can produce 16th century recipes for varnishes for lute and viola da gamba.

Bibliographies - Rick Baines says: "performers such as myself who are not professional musicologists, would like help with bibliographies and references for further study wherever possible. It would also be useful if duplicated lecture notes were available." I can't help on this last point - my own lectures are either given without notes or so rough that they be no help to anyone else; can anyone else help him? Regarding the bibliographies and references, this is up to authors of Communications. One advantage of writing for FoMRHI is that one is not compelled to check references and compile footnotes, which is often the most time-consuming part of writing any article. Possibly we should bear in mind that some of our members need this help; what do others think? One thing that I suggested to him in reply, and that he welcomed as an idea, is that some members might be willing to write descriptive evaluations of the standard source books (eg Mersenne, Praetorius, etc); these should include a discussion of the accuracy of the available translations. If anyone would tackle any of these, or any parts of any of these, please let me know so that I can compile a list and so avoid duplication.

James Kimbel asks for bibliographies for various instruments or for families of instruments. Surely some of you have compiled such bibliographies which you could send us, or would be willing to do so.

Lists of Suppliers - Geoff Kime asks for lists of good basic material suppliers, compiled from members' recommendations. We are always anxious for your recommendations and my own feeling is that it is then a matter of looking through the bulletin, rather than of compiling an index to bulletins, but again this is up to you; all the information that has been sent to us is printed and if anyone thinks that it would be useful if it were indexed periodically, then go ahead and index it. Meanwhile, please send us more recommendations.

Timpani - Ed Bowles writes: "Wanted: Information and photos of 19th century timpani with so-called mechanical (as opposed to simple T-handles) tuning mechanisms either outside the shell or inside the drum. Interested especially in pedal tuning devices and rotary-tuned timpani." I've sent him all that I've got; can anyone else help, and can they keep an eye round the dark corners of museums or opera houses and theatres for old-fashioned timpani lurking there? In particular he is looking for the Cramer model (last heard of in Darmstadt in the 2nd quarter of the last century), the Hudler mechanism used by the Vienna Musikverein c.1831, the Puschmann model used in Chemnitz form c.1850, and the Pittrich model patented in 1881 and manufactured by Queisser of Dresden and details of which orchestras purchased these and when; there is nothing about either Pittrich or Queisser in the Dresden City Archives (perhaps not surprising when one remembers what we did to Dresden).

Virginals/Spinnet - Sean Rawnsley asks whether anyone can produce information on the 1581 Antonius Baffo in the Rushworth & Dreaper collection in Liverpool; there seems to be a discrepancy between the descriptions in Russell's and Hubbard's books.

Harpsichords - Sender Fontwit has three requests: 1) He has trouble getting clean edges on the gold-leaf bands decorating the outside of the cases and would appreciate advice on this; masking tape leaves a ragged edge when peeled off. 2) Does anyone use crow or raven for plectra? He has been using crow for the past year and would like to hear from others who have done so on how they find it. 3) He is looking for a source of German silver spruce or Swiss pine for soundboards.

Ron Hachez would like to hear from anyone on the decorative techniques used on early guitars, harpsichords, etc such as inlay, painting, paste inlay, etc.

Regals - Roger Spalding seeks information on construction of regals; how the keys were hinged, sizes of reed etc.

Cittern - Kenneth Marshall asks for a Communication on cittern building.

Guitar - Both Mel Sartain and Ron Hachez seek information on roses for guitars, especially five-tiered parchment roses. Ron also seeks information on decoration - see second para under Harpsichord above.

Vihuela - Anthony Both asks if there is a book specifically on the construction and/or history of the vihuela and, if so, if someone would be kind enough to give him the bibliographic information.

Lute - Kenneth Marshall asks for more practical information on lute-building and more details of rose designs, including access to photographs from other members for the latter.

Ron Hachez asks for probable early construction techniques for lute backs and other string instruments. Has anyone done any work on the actual technique of manufacture?

X Violin - Andrew Fairfax would be interested to read about, and get in touch with people interested in, the early/Baroque violin; would anyone write a Communication on the construction of such instruments and/or produce a list of unmodernised examples. He says that a fair amount is known about the construction used by Stradivarius (ie block sizes, neck fitting, linings) but much less so about the earlier makers such as Gasparo da Salò and the Amatis. Has anyone had the chance to study the interior construction of these earlier makers? I would suggest also asking whether anyone details of the inside of the Ventura Lınarol in Vienna.

Balkan Strings - Enzo Puzovio asks if anyone could write a Communication on the string instruments of the Balkans?

Woodwinds - Rick Baines asks for advice and information on voicing recorders, on making reeds and reamers (presumably in addition to articles in earlier FoMRHI issues on the latter; there is another coming from Bill Elliott when he gets round to sending me the drawings) and on sources of tools (on which also we have already included some recommendations but we're always anxious for more).

Pauline Dürichen asks whether anyone has studied or written about the question regarding left vs. right handedness in early flute and recorder playing and asks how it really became common practice to put the right hand below the left on the recorder, especially when one considers that it never developed a key mechanism to make this necessary. I have referred her to the index of my Mediaeval & Renaissance book and to Jack Schuman's article in GSJ 24 and to the Galpin Society's left-handed Martin frères clarinet (Edinburgh Exhibition Catalogue, 1968, no.149, and to Jimmy Barton, though violinists are not strictly relevant to her enquiry. I would also be interested personally in any replies.

Chris Page says that Lewis Jones is planning some very early reed instruments and is casting around for a good varied stock of cane and elder; replies to Chris, please, at Jesus College, Oxford.

Enzo Puzovio asks if anyone can recommend a fingering for a Moroccan shawm; it's a bit cold at the moment for taking it up on the moors to blow, and the hotel in which he lives disapproves of too much experimenting on the premises!

FINALLY: I hope I haven't left anyone out; if so, let me know by 31st March, which is the deadline for Communications and notes for the next issue.

Djilda and I are very grateful to the many of you who expressed your appreciation of what we are doing. We will do our best to keep it up, but never forget what I've often said before: what we're not sent we can't print - ultimately the quality of our Bulletins and Communications depends on you.

Jeremy Montagu  
7 Pickwick Road  
Dulwich Village  
London SE21 7JN

P.S.: I did forget several things that I meant to put in and since I got this far several other queries, bits of news and so on, have arrived in the post with new members or renewals. So turn over the page and carry on reading.

Further to COMM.90: An apology for stupidity on my part (and ignorance). I said that there was no indication that the string catalogue did not include the plucked instruments, confusing Streichinstrumente, as it is titled, which means bowed instruments, with Saiteninstrumente, which means string instruments. Because the German for string instruments as far as the orchestra is concerned is Streichinstrumente (they are all bowed, so why not?), I'd always thought they meant the same and had never looked it up in a dictionary. My thanks to Paul Hailperin for sorting me out, and my apologies to you and especially to Berlin.

VIOLONE: Theron McClure has sent me the latest issue of this. It consists of a brief study (5 pages) of the iconography of 170 viols (without any illustrations, like ours his is a xerox process). Available from him for 60p. or £1, post free.

COMPUTERS: Both Caryl and Stratton McAllister (see Suppl. to Members List in this issue) work for IBM on computers, and they offer help (and the use of computers) to anyone who can put up a project that interests them; they cover most wind and string instruments between them.

HARPSICORDS: L.A.Kirk asks for more harpsichord information please.

BOWS: Doug Eaton wants to try making his own viol bow and asks if anyone can recommend any publications which describe the process of hairing or re-hairing bows. I hesitate to recommend Heron-Allen (Violin Making as it was and is, Reeves) because I don't know whether what he says applies to viol bows as well as violin.\* If someone would write us a note on this, others might find it useful also.

BRYAN TOLLEY: I meant to point out that parts of his Comms. herewith were written by his school girls. He has got half a dozen of them making their own instruments, Jane Burkinshaw, Janet Allison, Sally Crowson, Susanne Roscow, Angela Makey and Debbie Castedine, and says nowadays it's not just him who reads the bulletin but half of school as well. The more people who read each issue, the happier we are; pass them round to anyone interested; if they want to join we're happy to have them as members, but see that they read us anyway!

MY TRAVELS: I get around a bit, lecturing to music clubs and so on, with up to 150 instruments for an evening. I've had the pleasure of meeting some of you, who've heard about one in your area, so I thought I'd say where I'll be in the near future in the hope of meeting more of you. I've thought of it too late for Southampton and Oldham this month, but I'll be in Leeds (Trinity & All Saints Coll. of Edn., Horseforth) on Feb.8th; Edinburgh for the International Folk Music Council UK Conference April 6th-9th (anybody interested get in touch with Peter Cooke at the School of Scottish Studies in Edinburgh); Wisbech (The Grammar School) on April 12th; Wembley & Finchley Liberal Synagogues on April 13th & 15th respectively; and Whitley Bay Library, Tyneside on May 9th. It will be a pleasure to meet any of you in those areas.

I'll leave this open this time in case anything else comes in before I send it off. It has.

IRISH HARPS: Can anyone help Tom Savage find a copy of R.B.Armstrong's Irish & Highland Harps?

DELFIN: George Sandberg has Delrin, 2m<sup>2</sup>, 0.5mm thick; a sheet 100x200mm weighs 15gr, costs 0.50DM, postage Europe 0.50 DM, GB & abroad 0.70 DM; his bank account number is Hamburg 24903-200 - anybody interested write to him. These are non-profit prices (for larger quantities double postage as you double quantity of Delrin).

RAUL PÉREZ: I misspelled his name in the List of Members - it should be Raul Orlando Pérez - my apologies.

## BULLETIN SUPPLEMENT

**LATHE:** Bill Laing, noting the difficulty several wind instrument makers appear to have in making reamer blanks, has offered the use of his South Bend engineers lathe, at his workshop in sunny? Folkstone (his description, not mine). The lathe specs. are:

- Taper cutting, full length of bed
- Length between centres - 53.5 cm
- Centre height - 12.5 cm
- Speed range - 60 - 1200 rpm.
- Screw cutting - 4 - 224 tpi.
- Automatic feed on taper, long and cross cut
- Compound slide for short tapers
- Taper settings in degrees or ins. per foot.

He also offers sleeping bag space. His address is in the list in this issue.

**TITEBOND GLUE:** made by Franklin Glue Company, USA. An aliphatic resin glue, used like white glue, working time 5 min., clamping time 25 min., can be undone with heat and moisture like animal glue. It gets harder and more brittle than usual white glues and doesn't seem to share their tendency to creep under tension. One maker I know swears by it for glueing on lute bridges. Two won't use anything else for purfling (poor fit doesn't show). Most people find it easy to work with. It is now obtainable in U.K. from M.A. Jackson, 6 Maltings Mews, West Street, Hertford, Herts at £1 per 8 (U.S.) fl. oz. bottle plus 25p post and packing. We paid about half this price in USA, so transatlantic travellers, put some in your luggage for the folks over here. It might be worth ordering direct from the Franklin Glue Company, Columbus, Ohio 43207, USA.

**BOWS:** Further to Jeremy's note on the previous page: I found Heron-Allen's section on hairing useful when learning to do this job, also the section in Alberto Bachmann, An Encyclopedia of the Violin. A point of difference if you're making the fixed-frog sort of viol bow. For well-articulated single-line music you need (according to Ganassi) a tight bow - a really tight bow works beautifully. This requires extra firm wedges fixing the hair, especially the one at the back of the frog where the pull of the hair is in a direction straight out away from the stick. Modern-tradition wedges are cut tapering (see Heron-Allen fig. 66) and work, so I understand, by pushing them in till the top surface jams across the hole. I make wedges straight-sided (up and down in the same fig) and they work by pivoting about point P as the hair pulls, so that the corner diagonally opposite jams.

## ON SIMPLE INSTRUMENTS

There is a fashion of creatively designing modern cookups inspired by early instruments, which pass off as early instruments good enough for kids to learn on or the poor to play. Many design features of these are not any simpler than authentic ones, and they usually are the invention of someone who prefers the: "How can I make this work?" approach to: "How might they have made it work?". Most of the simplification involves eliminating original design features considered superfluous to function. Some reputable makers support and even contribute to this flouting authenticity in their simple or "student" instruments. Perhaps they want to keep clear the distinction between these and their "real" ones.

In designing an instrument to be made by amateur builders the designer needs to make certain assumptions about: 1. the builders' knowledge and concern about authentic features, 2. their level of craft skill, 3. the specialized resources available to them (materials, tools skilled help) and 4. their impatience at getting the

## PUBLICATIONS DISTRIBUEES PAR LE DROICT CHEMIN DE MUSIQUE

- 1 -Le problèmes des gammes: VAN ESBROCK (université de Gand)
- 2 -La composition de la musique à la machine à calculer: P. BARBAUD
- 3 -Le problème du diapason: E. LEIPP (Faculté des Sciences Paris)
- 4 -Appareillages et méthodes en acoustique musicale: E. LEIPP
- 5 -Théorie informationnelle de la musique: A. MOLES
- 6 -La musique des oiseaux: M. CASTELLENGO (Faculté des sciences Paris)
- 7 -Confidences d'un ancien preneur de son: M. PHILIPPOT
- 8 -La notation des musiques extraeuropéennes à l'aide d'un sonagramme:  
M. CASTELLENGO
- 9 -Les musiques expérimentales : A. MOLES
- 10-Les champs de liberté des instruments de musique: E. LEIPP
- 11-Influence de l'acoustique des salles sur l'évolution du style musical  
F.WINCKEL (Université technique Berlin )
- 12-la Vièle, le monocorde vietnamien, la cithare à 16 cordes : TRAN VAN  
KHE
- 13-L'acoustique des théâtres antiques: F. CANAC
- 14-La situation de l'acoustique musicale aux U.S.A. :J. RISSET
- 15-L'orgue hydraulique antique: M. PERROT
- 16-Le violon de Savart: E. LEIPP
- 17-Les instruments à percussion: M. TOURTE
- 18-Les cloches: M. CASTELLENGO
- 19-Expériences de corrélation entre musique et parole: M. CHAILLEY
- 20-Le problème du bruit: E. LEIPP
- 21-La vina et la musique de l'Inde du Sud.
- 22-Information sémantique et parole: E.LEIPP
- 23-Le Galoubet: M. CASTELLENGO
- 24-Le Sarod: E.LEIPP
- 25-La guibarde: E.LEIPP
- 26-Les haut-parleurs : J.S. LIENARD (Faculté des Sciences Paris)
- 27-Le pouvoir directionnel des instruments de musique: J. MEYER
- 28-La fabrication des disques: P.GILOTAUX
- 29-Reflexions sur les problèmes du rythmes dans les musiques orientales  
:E.LEIPP
- 30-Le piano: Colloque de 4 conférences sur le thème du piano
- 31-L'art vocal en Inde: M. PURI, TRAN VAN KHE, CASTELLENGO
- 32-Mécanique et acoustique de l'appareil phonatoire: E. LEIPP
- 33-Tour d'horizon sur les musiques expérimentales : CHIARUCCI-REIBEL
- 34-La machine parlante de Kempelen: J.S. LIENARD
- 35-La flûte traversière: M. CASTELLENGO
- 36-Le diapason: E.LEIPP
- 37-L'intelligibilité de la parole
- 38-La régale: E. LEIPP et A. ISOIR
- 39-La musique du théâtre No Japonais: M. CASTELLENGO et A. TAMBA
- 40-Le nouveau diapason électronique à l'opéra : E.LEIPP et M. CASTELLENGO
- 41 Le cor d'orchestre: E.LEIPP et M. THEVET
- 42-Paramètres sensibles d'un tuyau d'orgue à bouche: M. CASTELLENGO
- 43 Le problème de la reconnaissance automatique de la parole: T. TARNOCKI  
et E. LEIPP
- 44 Quelques instruments traditionnels de Chine: TRAN VAN KHE et CHENG  
HUEI CHENG
- 45 L'ordinateur comme instrument de musique: J.C. RISSET
- 46-L'Orthophonie : MME BOREL MAISONNY
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## BULLETIN SUPPLEMENT (continued)

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FELLOWSHIP of MAKERS and RES1977 List of Members - 3rd Supplement, as at 6th January 1978.

- \* in left-hand margin denotes a change of address from the main list or from one of the two previous supplements.
- # in left-hand margin means joined in the last quarter of 1977 but not yet subscribed for 1978 and thus not certainly wishing to remain a member.
- P.J.J. Peart, Gremelsbrugge, 8 Ubach over Worms, Holland; tel: 045-352324 (harpsichord; M,P).
- Rick Paines, 1 Langley Road, Prestwich, Manchester M25 5NF; tel: 061-773 1546 (woodwind, M; recorder crumhorn, P).
- \* Johnny Baps, oude Luikerbaan 50, B-3500 Hasselt, Belgium.
- # Karl E. Baumann, 4 Sussex Place, London W2 2TP; tel: 01-723 9853 (lute, oprharion; C,P).
- Philippe Bolton, 2 avenue du Béguinage, 59910 Bondues, France; tel: (20) 78-32-71 (recorder, flutes; M).
- \* Brian Carlick, Stable Workshop, Dower House, Rousham, nr. Steeple Aston, Oxford; tel: Steeple Aston 47052.
- \*\* Chris Challen, 26 (not 21) Clifford Road, New Barnet etc.
- Milton Cherin, 12 West 96th St., New York, NY 10025, USA (guitar, lute, mandolin; M,P).
- \* Alan Clark, 71 Canberra Crescent, Blythe Bridge, Stoke-on-Trent, Staffordshire ST3 7RA; tel: Blythe Bridge 6933.
- Peter Collins, The Coach House, Standon, Ware, Hertfordshire; tel: Ware 821109 (keyboards; M,R,P).
- \* Alan Crumpler, tel: 051-489 5028.
- # Claire Darbois, 4 place du marché aux Poissons, 67000 Strasbourg, France (harpsichord; M).
- Margaret Downie, 2872 University Avenue, Apt. G, Morgantown, West Virginia 26505, USA; tel: (304) 599-0134 (bowed str, kybd, crumhorn; C,P,res).
- \* Jens Egeberg, Aalekistevej 46 st.th., DK-2720 Vanløse, Denmark.
- # Mark Ellis, 6 Brailsford Road, Dunkirk, Nottingham NG7 2JN; tel: Nottingham 73800 (violins, viols, lute; M,P).
- # James T. Gaspar, 1131 17th Street, Santa Monica, California 90403, USA.
- Mark Gaydos, The Early Music Shop, 28 Sunbridge Road, Bradford, West Yorkshire, BD1 2AE; tel: Bradford 20014 (recorders; M).
- Ian Gould, 0 Copes Drive, Tamworth, Staffordshire B79 8HH; tel: Tamworth 62645 (woodwind, organ; M,P,res).
- Paul Gretton, Hespertal 17, D-4300 Essen 16, West Germany; tel: (0201) 401734 (cornett, serpent, ren wind, perc; M,P,W,res).
- \* Yvonne Hamilton, 'Creake's Noyse', 135 Parkland Drive, Elton, Cheshire; tel: 09282 4406.
- Gordon Harris, 4 Baronsmere Road, London N2 9QB; tel: 01-444 7432 (violins, viols; M,R,C).
- \* Tim Hobrough, (moving to London from Canada, but I've no address yet)
- # Martyn Hodgson, 1 Broomfield Road, Headingley, Leeds 6; tel: Leeds 751137 (lute, theorbo, guitar; M,R,P,T).
- \* Akira Ishii, 354 Saitama-ken, Fujimi-shi Mizuko 3293-5, Japan.
- Gildas Jaffrennou, "Ker Alba", Côte de Vincin, 56610 Arradon, France (harp; M).
- David J. Johnson, 111 Pickwick Lane, Oak Ridge, Tennessee 37830, USA (harpsichord, clavichord; M).
- \* Cary Karp, Kyrkogaardsg. 19, S-75235 Uppsala, Sweden; tel: 018-104937.
- William R. Laing, 164 Canterbury Road, Folkestone, Kent; tel: Folkestone 56639 or 58944 (violins, bows; M).
- Duane Lakin-Thomas, 1596 Linwood Street, Apt. B, San Diego, California 92103, USA; tel: (714) 296-2052 (psaltery, curtal; res; ww, P).
- Peter John Lang, 744A Fulham Road, London SW6 5SF.
- \* Dave Law, 100 Amersham Road, Terriers, High Wycombe, Buckinghamshire HP13 5AB; tel: 0494-445284.

- John Lindberg, 211 Hitt Street, #101, Columbia, Missouri 65201, USA;  
tel:(314) 449-1475 (woodwind, bowed strings; P).
- Robert Longstaff, 30 Lansdown Close, St.Johns, Woking, Surrey; tel:  
Woking 65398.
- Cajsa Lund, Gildegaard, S-270 12 Rydsgård, Sweden; tel: 0411-71327  
(prehistoric instrs; C,W,res).
- Stratton & Caryl McAllister, IBM PSIC, Avenue Louise, Box 25, B-1050  
Brussels, Belgium; tel: Brussels 5388330 until 28th February,  
then: IBM PSIC, via IV Novembre 103, I-00187 Roma, Italy;  
tel: Rome 06-5790 (winds & strings, C,P; computers).
- # Thomas McGeary, Division of Musicology, School of Music, University of  
Illinois, Urbana, Illinois 61801, USA (keyboards; M,R,hist).
- Philip MacLeod-Coupe, "Keepersmead", Rattlesden, Bury St.Edmunds, Suffolk  
IP30 ORD; tel: Rattlesden 537 (lute;M).
- Francesca McManus, 71 Priory Road, Kew Gardens, Richmond, Surrey TW9 3DH;  
tel: 01-940 7086.
- John Marriage, 155 High Street, Cottenham, Cambridge CB4 4RX; tel: Cot-  
tenham 50888 (keyboards; M).
- \* Kenneth Marshall, tel: Errol 393.
- \* Laurence Marshall (not Lawrence); add PO Code: M16 7GP.
- # Guy Maxwell, "Well Yard", Beyton, nr.Bury St.Edmunds, Suffolk (claviend;
- # Robert W.Meadow, 679 Chili Ave., Rochester, NY 14611; tel:(716) 235-06  
(lute; M).
- \* Irmela Judith Meier, 4 Weaverhouse, Pedley Street, London E1 5ES.
- Theodorus Miller, R.R.1., Port Washington, British Columbia, Canada V0  
2T0; tel:(604) 629-3794 (all instrs, esp.hpschd, M; hpschd,  
Grant Moore, 109 North Street, Ypsilanti, Michigan 48197, USA; tel:(313)  
485-3244 (oboe; M,P).
- \* Okechukwu Ndubuisi, St.Michael's Vicarage, St.Leonard's Road, Poplar,  
London E.14; tel: 01-987 1795.
- New York Public Library, Fifth Avenue & 42nd Street, New York, NY 10018
- Mark Nobel, Flat 12/ 60 Princess Street, Kew, Victoria 3101, Austral.  
(all instrs, esp. organ; M).
- \* Andrew Parkinson, 41 Albion Road, London, N.16.
- \* Andrew Parrott, 24 Avondale Park Gardens, London W11 4PR; tel:01-727  
R.J.Peckham, 7 Kirklee Circus, Glasgow G12 0TW; tel: 041-334 7830  
(lute, guitar; M).
- \* Raúl Orlando Pérez (not Paul O.Perez).
- # Michael Plant, 55 Tom Lane, Sheffield S10 3PA (viols, med.strings; M).
- E.G.Preston, The Warden's House, Hungerford Court, Bath College of Hi-  
Education, Newton Park, Bath BA2 9BH.
- Geoff Ralph, 4 Weaver House, Pedley Street, London E1 5ES (harp; M, res)
- Felix Raudonikas, 11 Liniija 58 apt.23, Leningrad 199178, USSR; tel:  
218-6363 (flutes, recorders; M,R).
- Sean Rawnsley, Redpits, Wood Dalling, Norwich NR11 6AQ (Ital.hpschd  
& virginals; M)
- \* David Rolfe, P.O.Box 99, Armidale, New South Wales 2350, Australia.
- John L.Rollins, 1249 St.Paul St., Bellingham, Washington 98225, USA;  
tel: (206) 734-5032.
- James Scott, 1648 Oak View Avenue, Kensington, California 94707, USA;  
tel: (415) 526-5815 (recorder; M).
- Nicholas Shackleton, 1 Claremont, Hills Road, Cambridge CB2 1PA; tel:  
Cambridge 311938 or 58381 extn.255 (clarinet; C,R,P).
- Karel Smagge, Kerkstraat 10, Tholen, Holland; tel: 01660-2154 (hpschd,  
positive, shawm, windcaps, recorder; P).
- \* Jörn Steinberg, D-2000 Hamburg 52, Blomkamp 130c, West Germany.
- \* Peter Syrus, 18 Brooklands Avenue, Withington, Manchester M20 8JE; tel:  
061-434 1782.
- Desmond Taylor, 15 Knockbracken Crescent, Carryduff, Belfast, Northern  
Ireland BT8 8DB; tel: Carryduff 812821 (lute; M,P).

- # Jean Claude Trichard, Section de Musicologie, 8 rue René Descartes, 86022 Poitiers, France (lute; M).
- # Dan Vaillancourt, 73 rue d'Auteuil, Québec 8, Province de Québec, Canada G1R 5C3 (guitar, vihuela; M,P).
- Howard Vogel, Studio 4, 24 Horatio Street, New York, NY 10014, USA; tel: (212) 242-4087 (rec, ob, bsn,P,R; lute, guitar, vln, M,R).
- Jacqueline Wiltshire, 100 Severalls Avenue, Chesham, Buckinghamshire (harp).
- Harry C. Woodhouse, "Cornish Musical Crafts", Trenoweth, Porthpean, St. Austell, Cornwall PL26 6AU; tel: St. Austell 3608 (woodwinds, barrel organs & pianos; M,R).
- # George Woolston, Puistolantie Raitti 5A, Helsinki 00750, Finland (rebec, fidel; M).

General Facilities: Computer: S & C McAllister

Organological Index:

All Instruments: Theodorus Miller (M) Cajsa Lund - prehist. (C,W,res)  
Mark Nobel (M)

Percussion: Paul Gretton (M,P,res)

String Instruments, General: S. & C. McAllister (C,P) Michael Plant (M)

Psaltery: Duane Lakin-Thomas (res)

Keyboards: Peter Collins (M,R,P) John Marriage (M)

Piano: Harry Woodhouse - barrel pfte (M,R)

Harpsichord etc: P.J.J. Baart - h (M,P) Thomas McGeary - h,v (M,R,hist)  
Claire Darbois - h (M) Theodorus Miller - h (M,P)  
Margaret Downie - h (C,P) Sean Rawnsley -h,v (M)  
David Johnson - h (M) Karel Smagge - h (P)

Clavichord: David Johnson (M) Thomas McGeary (M,R,hist) Guy Maxwell (M)

Lute: Karl Baumann (C,P) Martyn Hodgson (M,R,P,T) R.J. Peckham (M)  
Milton Cherin (M,P) Philip MacLeod-Coupe (M) Desmond Taylor (M,P)  
Mark Ellis (M,P) Robert Meadow (M) Jean Claude Trichard (M)  
Howard Vogel (M,R)

Guitar: Milton Cherin (M,P) Harold Snyder (M)  
Martyn Hodgson (M,R,P,T) Dan Vaillancourt (M,P)  
R.J. Peckham (M) Howard Vogel (M,R)

Cittern etc: Karl Baumann - o (C,P) Dan Vaillancourt (M,P) Alan Crumpler - g (M)

Mandolin: Milton Cherin (M,P)

Bowed Strings General: Margaret Downie (C,P,res) John Lindberg (P)

Bows: William Laing (M)

Rebec: Margaret Downie (C,P) George Woolston (M)

Fiddle: Alan Crumpler (M) George Woolston (M)

Violin family: Mark Ellis (M,P) William Laing (M)  
Gordon Harris (M,R,C) Howard Vogel (M,R)

Viola da Gamba: Margaret Downie (C,P) Gordon Harris (M,R,C)  
Mark Ellis (M,P) Michael Plant (M)

Harp: Gildas Jaffrennou (M) Geoff Ralph (M,res) Jacqueline Wiltshire

Wind General: Paul Gretton (M,P) Stratton McAllister (C,P)

Woodwind General: Rick Baines (M,P) Duane Lakin-Thomas (P)  
 Ian Gould (M,P,res) John Lindberg (P)  
 Harry Woodhouse (M,R)

Transverse Flute: Philippe Bolton (M) Felix Raudonikas (M,R)

Recorder: Rick Baines (P) Felix Raudonikas (M,R)  
 Philippe Bolton (M) James Scott (M)  
 Mark Gaydos (M) Karel Smagge (P)  
 Theodorus Miller (P) Howard Vogel (P,R)

Gemshorn: Ian Gould (M,P)

Organ: Margaret Downie (C,P) Mark Nobel (M)  
 Ian Gould (M,P,res) Karel Smagge;pos (P)  
 Harry Woodhouse; barrel (M,R)

Reeds General: Karel Smagge (P)

Crumhorn: Rick Baines (P) Margaret Downie (C,P)

Clarinet: Nicholas Shackleton (C,R,P)

Bassoon: Howard Vogel (P,R) Curtal: Duane Lakin-Thomas (P)

Oboe: Grant Moore (M,P) Howard Vogel (P,R)

Shawm: Karel Smagge (P)

Brass General: Paul Gretton (W, res)

Cornett: Paul Gretton - c,spt (P,W,res)

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Geographical Index:

Australia: Mark Nobel, Victoria

Belgium: Stratton & Caryl McAllister (till 28th Feb)

Canada: Theodorus Miller, B.C. Dan Vaillancourt, Québec

Finland: George Woolston

France: Philippe Bolton, Claire Darbois, Gildas Jaffrennou, Jean-Claude Trichard

West Germany: Paul Gretton

Italy: S. & C. McAllister(after 1st March)

Netherlands: P.J.J.Baart, Karel Smagge

Sweden: Cajsa Lund

U.K.: E.G.Preston, Avon Nicholas Shackleton, Cambs Peter Collins, Herts  
 Jacqueline Wiltshire, Bucks William Laing, Kent

Harry Woodhouse, Cornwall  
 London: Irmela Meier, E1 Gordon Harris, N2 Karl Baumann, W2  
 Geoff Ralph, E1 Andrew Parkinson, N16 Andrew Parrott, W11  
 Okechukwu Ndubuisi, E14 Peter John Lang, SW6

Manchester: Rick Baines, M25

Sean Rawnsley, Norf. Philip MacLeod-Coupe, Suff. Francesca McManus, Sur  
 Mark Ellis, Notts Guy Maxwell, --- Michael Plant, S.Yorks  
 Ian Gould, Staffs Robert Longstaff, Sur. Mark Gaydos, W.Yorks  
 Martyn Hodgson, ---

Scotland: R.J.Peckham, Glasgow

Northern Ireland: Desmond Taylor, Belfast

<u>U.S.A:</u> James Gaspar, Calif	Milton Cherin, NY
Duane Lakin-Thomas,---	Robert Meadow,---
James Scott, ----	N.Y. Public Library ---
Thomas McGearry, Ill.	Howard Vogel, ---
Grant Moore, Mich.	David Johnson, Tenn.
John Lindberg, Miss.	John Rollins, Wash.
	Margaret Downie, W.Virg.

U.S.S.R: Felix Raudonikas, Leningrad

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Please check your entries here and in the other supplements and the main list, and let me have any corrections and additions before the end of March for the next main list.

There are still a lot of UK Post Office Codes missing.

## Report on the 16th Century Seminar

Jeremy Montagu

On the first day, which was devoted to general topics such as authenticity in construction of instruments, tunings, playing style and embellishments, many opinions were heard, many problems were aired, but as might be expected, few conclusions were reached. It was generally agreed that iconography was a dangerous tool and should be used with care even when no other was available. It was also agreed that even though scaling up or down an instrument was almost impossible to do accurately, there was often no alternative when sets were required of instruments of which only one size survived. Several makers had found that customers desired greater authenticity, rather than any convenience accruing from modern devices or materials, and that authentic materials often had advantages in stability and reliability over modern materials. Others, and on other occasions the same ones, had found that they were sometimes compelled by the customers to abandon authenticity to a greater or lesser degree, and this was especially true in matters of pitch.

On tuning standards there was a general agreement that a higher pitch than the modern was the most likely for the 16th century, probably something around a semitone above A-440 (c.460), which had the advantage to the customer working with some later instruments at 415 that these could be used if players transposed a tone. The problems of temperament involved long discussion and it was agreed that both players and makers should be far more conscious of this and of the types of music suited to Pythagorean, Harmonic or Meantone temperaments. Familiarity with hexachords and long and patient practice with a monochord were both suggested as essentials in preparing for performances of much early music. It was suggested also that the availability of inexpensive but accurate monochords would be of great assistance to performers.

The use of embellishment was also problematic. Did Palestrina, for example, permit Dalla Casa to embellish in his performances, or was embellishment a way for the soloist to show off and assert his independence when away from an ensemble? It was suggested that embellishment was something that composers expected but disliked.

Tempo was also discussed. A description of a heart-beat being normally at the rate of 4 minims per beat in a medical treatise of 1480-90<sup>3</sup> suggested that music might have been performed at considerably faster speeds than we expect today and that speeds were sufficiently rigid for this example to be useful to doctors. While Luis Milan specified that tempo rubato should be used, he seemed to be the first to do so and it was thus possible that this was not done before his time.<sup>4</sup>

Another problem was accent and whether it followed the mensura or the words and the extent to which, if the latter, it continued to follow the words in instrumental performance of originally vocal music. There was also discussion of the extent to which accent was possible on the instruments of the period and the means by which this could be done.

The second day was devoted to discussion of string instruments, and a number of the wind players and makers took the opportunity to spend the day playing and comparing instruments.

X Eph Segerman began by talking about strings and string materials, pointing out that strings of the same material, irrespective of their mass, broke at the same pitch<sup>5</sup> rather than at the same tension, so that

there is a fixed range of pitch between top and bottom strings. According to Jerome of Moravia the range was  $1\frac{1}{2}$ -2 octaves for five string fiddles and to the Arab theorists and Tinctoris  $1\frac{1}{2}$  octaves on the lute. In about 1500 there were several 2 octave instruments and between these times there had been an increase in the professionalisation of string making. According to Bachmann, mediæval string players made their own strings; professional string makers may have had the equipment and the techniques for putting in a higher twist and thus extending the range, for the higher the twist the more the elasticity. He had experimented successfully in twisting nylon, using a hook in the chuck of a twist-drill, and then annealing the string in front of an electric fan-heater, and with gut by twisting it, half-drying it and twisting it again, the limit with both materials being the kinking point.

One of the problems with strings was uniformity and Munich strings were more uniform and gave more. The increase of range c.1500 with the addition of a seventh course may have been possible due to the availability of these strings. Munich remained a source for the best strings throughout the 16th century, and was followed by Bologna. Munich strings seem to have been hard to get and were certainly expensive, a set of strings costing as much as a fifth of the cost of a viol. The strings were probably polished for uniformity, especially<sup>9</sup> the high minikins (English for Munichens). The lower strings, catlines, were probably laid like a three-core rope<sup>10</sup> - Mersenne suggests getting strings from a rope-maker - and NRI are experimenting with these.

Bill Hunt, who had very kindly come for this purpose, then demonstrated the different responses of covered strings and high-twist gut basses on viols by Ian Harwood, John Pringle and Martin Edmunds, showing that the gut strings was difficult to set going in fast passages and that it lacked the resonance and harmonic presence of covered strings. The possibility of the early use of covered strings was raised, since thread covered with metal wire was in use for embroidery and it was agreed that further research into this possibility was necessary. It was agreed also that production of catlines was urgently needed.

Martin Edmunds described his research in Vienna and at Beare's on the Brussels instruments and showed some of the viols that he had made as a result. The fact that three makers were producing viols of a similar pattern in Venice in the 1560s indicated that a type had been established in the previous generation, perhaps around 1530. He commented that he had found Fulton's varnish recipe in *The Strad*, December 1974, to be useful. There was some discussion of the advantages of and reasons for the hook and screw-eye tail-piece fastening and the hollow fingerboard characteristic of these Venetian instruments. This was the earliest pattern of viol that anyone was known to be working on, along with the figure-eight pattern which Ian Harwood had shown; nobody as yet was copying the pattern of the Gasparo da Salò in the Ashmolean Museum, nor the early Spanish instruments with flat bridges which Ian Woodfield had described, and thus there was as yet no type of viol suitable for early 16th century music.<sup>11</sup>

John Pringle demonstrated that high-twist gut was unsuitable for the bottom string of the viola also, and Eph Segerman pointed out that it was the introduction of catlines that had made possible the violin family as we know it, allowing the treble to come into use between the small soprano, which became the violino piccolo, and the tenor.

There was considerable debate as to the polarity of horse-hair and the question of whether bows should be haired with hairs all running the same way and whether this would aid in the alternation of strong

and weak strokes, and whether there was any evidence for the use of braided hair such as is sometimes found on non-European bows.

Eph showed their small 16th century guitar, which he said was mostly played with a strumming technique, like a tenor ukulele. Various people commented on the thickness of the neck, which he said was normal at that period, being held in the fork between thumb and hand so that the thumb could be used to stop the bass course.

Bill Laing and Eph described the use of the Hutchings ring-mode technique for tuning violin bellies, which led to considerable discussion of its usefulness in early instrument building, the problem being that while this technique increased the resonance of the belly and the quality of the sound in modern terms, was this desirable or not if one were making a copy of an early instrument when there was no way of discovering what sort of vibration pattern were present in the belly of the original instrument without taking it apart, a process upon which a museum might frown! It was pointed out that 300 years might have altered the response, anyway, and that what we were trying to do was to recreate the sound that the instrument had made while it was new. Ian Harwood led the objections to the use of such mechanical techniques and the dangers of it leading to mistrust of a maker's own faculties and to the introduction of factory methods. It was suggested that there was a definite place for good, cheap instruments, the production of which could be assisted in this way and which would not impair the work of the expert artist, and that less expert makers might find its assistance in ensuring uniformity of quality to be beneficial. It was therefore suggested that anyone who had the opportunity to study a belly of an original instrument detached from its body should note the patterns formed at different frequencies for the benefit of anyone who found this technique useful.

It was generally agreed that the FoMRHI Members List would be more useful if it indicated the periods in which makers worked and whether they produced baroque or renaissance models, etc.

There was debate on whether FoMRHI could do anything to help offset the adverse effects of the new quarter-page minimum size for advertisements in *Early Music*, perhaps by taking a full page and selling it off to members for a joint advertisement. It was decided that representations should first be made to the editor, pointing out the difficulties that this made for the small makers, who felt that *Early Music* was still the best place in which to advertise but who could not afford the greatly increased cost of a quarter page over a sixth or an eighth of a page.<sup>12</sup>

On the third day the emphasis was on wind instruments, which allowed the string makers and players to compare instruments and to experiment with different playing techniques and instruments.

The day began with a long discussion of the rôle of the recorder in which Bob Marvin, by a series of questions, tried without great success to establish some parameters.

The afternoon continued with rather more practical discussion of other types of woodwind. Eric Moulder described and discussed the work he had done on crumhorns and schryari. The reeds and the resulting ease of blowing and of cross-fingering were discussed in detail, as was the size of the cap and thus the length of the staple, for most illustrations show a shorter cap than is found on surviving instruments. The relationship between cap volume and playing characteristics was as yet unknown, as was the effect of voicing the reed to respond to diffe-

rent wind pressures. It was pointed out that the oriental double-reed/cylindrical-bore instruments such as the Japanese hichiriki seemed to be blown at a very high pressure but that double-reed/conical-bore instruments and single-reed/cylindrical-bore instruments seemed to be voiced at very low pressure so that shawm players, for instance, in many areas were capable of playing for hours on end without effort. There was a feeling that both our shawms and our capped reeds were voiced for far too high a pressure and that further study and experiment with reeds and different pressures were needed. It was unlikely that the original players submitted to the strains that were built into our instruments.

The origin of the crumhorn and the possibility of an ancestral horn-pipe were debated, raising the possibility of the original use of a single-beating reed as on surviving folk horn-pipes and on bagpipes with cylindrical-bore chanters, many of which had horn bells. How and why did a double reed ever become allied to the cylindrical bore of the crumhorn?

The presence of the holes round the pirouette of the rackett had a considerable effect on the tone. Irene de Jong mentioned the use of a V-shaped reed, supposed to be a copy of an original rackett reed, which had produced a very loud sound.

Gemshorns were briefly discussed but the lack of surviving evidence led to little conclusion being reached save that a consort of gemshorns sounded well together.

Rick Baines said that he had made two cross-flutes from beech and there was some discussion as to why this wood was not used historically or at present, for many of its characteristics, and its easy availability, suggested its suitability. There was also discussion of why the traverso, as distinct from the military fife of varying sizes, seemed to have been little used in the Renaissance, and of the differences between the two related instruments.

There was general agreement that modern shawms were far too quiet to fit the descriptions and the uses of the period. It was suggested that this might be due to lipping the reed, rather than pouching it in the mouth, and perhaps to confusion by modern makers between the shawm, which was used outdoors, and the pommer, which was used in churches etc. Eric Moulder suggested that what was required was brightness and the presence of jangling overtones, both of which were lacking on modern instruments but were present on many surviving folk shawms. He described a picture of a fan-shaped reed and asked if anyone had tried one. Irene de Jong said that one that she had tried had been very loud but with no control of pitch, but that this might well be worth investigating further. Rick Baines said that he had had success with Pakistani bagpipe chanter reeds on small sizes of shawm.

There was some discussion of the douçaine, and Eric Moulder said that he had tried a Scottish bagpipe drone reed in a bass cornamuse with successful results. I described the Hungarian conical gourd shawms with a single-beating reed made from a quill (Sárosi, Ungarns, p.84) which are said not to overblow (GSJ 21 p.9) and would thus fit Tinctoris's description as imperfect. It was suggested that the douçaine might have fitted in the gap between the single-beating reed bagpipe chanter and double-reed with windcap on a cylindrical bore.

The discussions then concluded, allowing more playing time at the end of a very successful seminar. It was very noticeable that there was no atmosphere of the expert teaching the inexperienced, but that the more a participant knew, the more he or she had benefited from the discussions. Finally, credit and appreciation should be expressed to Bob Marvin, whose idea the seminar had

1. On wind instruments that play with other wind instruments. Pitch standards relating to strings were not really discussed (I had no more to add to what we have written in Com. 38 and 79).
2. Though someone said this, the surviving information we have only indicates that they disliked excesses of embellishment.
3. Bob Marvin who introduced the information of the 15th century minim-heartbeat relationship did not claim that this was a typical 16th century tempo. In fact he induced much discussion on the question of why the duration of a minim increased so rapidly with time before the 16th century and so slowly afterwards.
4. I for one never took seriously the speculation that rubato was invented by Milan. He never claimed that the practice was new though the detail with which he specified such aspects of instrumental performance practises was quite novel.
5. At the same string length.
6. Actually it was John Duncalf, the lute maker in our establishment
7. The word "give" is from Gombosi's translation of the book of Capirola's music, and we interpret it as a statement of greater elasticity.
8. This story is given more fully elsewhere in this issue.
9. If I said this I didn't mean it this way. The Munich strings were more uniform and were probably polished, but the high "miniken" strings (which were the best and the most expensive all through the 17th century as well) required very careful selection of the intestines for uniformity to make them up and a minimum of polishing to give maximum strength. I suspect that the usual thicker strings used in the 16th century were not as uniform as those from Munich because they were either not polished or not polished as competently.
10. Two strands are also possible.
11. In response to Bob Marvin's question of what were the characteristics of the earlier 16th century viols, I ventured to speculate that the 1560's might have seen the transition from the earlier bent-and-barred soundboard to the later carved soundboard. The earlier type is exemplified by the Francesco Linarol viol in Vienna and the original soundboard of the Hainrich Ebert viol currently at Beare's (both observed by Martin Edmunds) and the Tieffenbrucker viol at the Hague (observed by Bob Hadaway). The bent-and-barred soundboard construction is in principle identical to that of the vihuela (which the viol derived from in the 15th century), ie:- the soundboard is planed flat to even thickness and then two transverse bars are glued to it, one each above and below the soundhole(s). In the vihuela and many early 16th century viols the soundhole is a circular rose on the centre line of the soundboard, while in the other viols the soundholes are f or c holes symmetrically placed on each side of the centre line. Some of the viol soundboards were probably left flat as on the vihuela (e.g. "Portrait of a Musician" by Zacchio di Antonio de Vezzano in the Louvre, Paris) but most were bent to an arch and glued to arched cross-bars.
12. None at the conference actually remembered the relevant page sizes. Actually the 1/12th page at £10 was the smallest size and is now discontinued. The smallest size now is 1/6th page at £22.50.

## SOME THOUGHTS ON GUT STRING HISTORY BEFORE 1600

The second tuning of Jerome's is the only instance we are aware of where a two-octave open-string range was used before late in the 15th century when many instruments (e.g. lute, viola da mano, lyra da braccio) adopted it. We have associated this range with putting maximum twist into the gut using standard medieval gut-making technology. The realisation that the amount of twist correlated with the quality of bass tone and thus the range could have been known by some in Jerome's time and only became widespread in the late 15th century. We suspect that an overall improvement in the consistency of higher string quality in the 15th century was associated with the transfer of gut-string making from the responsibility of the musician himself (as discussed by Bachmann<sup>2</sup>) to a craft in its own right (Dorfmueller<sup>3</sup> traces professional string making in Munich back to 1431).

But, as to be expected, the situation could not have been this simple. When Vitale<sup>4</sup> successfully immortalised the works of his dead master Vincenzo Capirola in his manuscript book written around 1517, he recorded Capirola's secret of putting strings on the lute, having the thick end of the treble strings at the nut and of the basses at the bridge. Capirola played on these strings with a conical taper on a 6-course lute with an open-string range of two octaves. His system counteracts the sharpening effect of stretching the fat strings of the lowest two courses during fretting by a flattening due to increased average weight per unit length on the remaining length of vibrating string. Vitali also mentioned the superior strings from Munich which 'give' more (we interpret this as meaning that they were more elastic) and which did not have thicker and thinner ends (i.e. they were uniform).

It then seems that in c. 1500 the ordinary gut that a master lutanist would use covered 2 octaves open-string range, and that there was more uniform and elastic gut from Munich that perhaps more affluent or well-connected musicians could get. The situation in Jerome's time might have been similar at a step lower in quality and a 4th lower in open-string range.

There is some evidence of an open-string range of two octaves and a 4th being occasionally used around 1500 (i.e. the Bologna Fragment<sup>5</sup>, the Pesaro MS<sup>6</sup> and Bermudo's<sup>7</sup> report on the practices of Luis de Guzman who died in 1528<sup>8</sup>) and perhaps this was associated with the superior strings from Munich.

Starting around 1570 this range of over 30 semitones seems to have become available again as the lute and later the viola bastarda and lyra viol exploited it. We have associated this range at this time with Venice Catline bass strings. The question remains as to whether Venice Catline were really new in the second half of the 16th century (as association with the rope-like twisted metal strings developed then might imply) or whether they were essentially the same as the more elastic bass strings from Munich mentioned by Vitali which only became generally available after 1570. If the latter were the case, we must consider what might have been happening to these strings in the interim.

Lawrence Wright<sup>9</sup> has noticed that in the financial records of the French court 4 viols were bought for Henry II in 1543 for 180 Livre tournois at the same time that a set of strings for one viol was bought for 9 Livre tournois.

A set of 5 plain gut strings costing 1/5 the price of an average viol fit for a king is indeed expensive. These could be the strings from Munich that Capriola knew about but perhaps couldn't afford.

Though ambiguity in which octave is being played is a useful consequence of octave bass pairs, these were exploited in this way much more on the cittern and guitar than on the lute. The main reason for octave pairing in the basses of lutes remains that of brightening up the sound of thick gut strings which have lost most of their harmonics. More elastic basses retain more harmonics and this leads us to associate Dowland's use of Venice Catline basses with his tuning them in unisons<sup>10</sup>.

If we now consider the mid-16th century Spanish vihuela it is clear that it was unique amongst <sup>gut strings</sup> plucked instruments of the time in having unison basses as well as having its highest course doubled. These are indications of very high quality strings of the type Vitale described as made in Munich. At this time, gold from the New World made the Spanish aristocracy particularly affluent. The economy of the country was not healthy though, and it is possible that there may be a relation between the subsequent decline of the vihuela and the massive bankruptcy of the Spanish Crown in 1557. The South German merchants were the worst affected of all and their role in the Spanish economy was quickly taken over by the Genoese<sup>11</sup>. It is quite possible that the exit of the South German merchants was accompanied by a stop in the supply of vihuela strings from Munich. (To illustrate the chaos in trade at the time, Sancta Maria's book was licensed for publication in 1557 but printing was postponed for 8 years because of lack of paper). The guess here is that there was a sharp decline in serious vihuela playing after 1557 which picked up again somewhat in the 1570's when a new supply of highly elastic bass strings appeared. In the interim, no books specifically for vihuela had been published, and Daza's valliant effort in 1576 to bring back the good old days couldn't overcome the effects of the gap (perhaps vihuelas were being tuned and played like guitars), so the decline of the vihuela continued.

In Le Roy's lute method probably printed in 1571 (now lost but the English translation of 1574<sup>12</sup> survives) it is mentioned that a few Italian lutanists were playing on lutes with a 7th course a fourth lower than the 6th. By 1582 this practice was so widespread that Barbetta<sup>13</sup> included music for such a 7-course lute in his book published by Jobin, and announced this fact proudly in the title.

Though Dowland mentioned that the best treble strings came from Munich (called Minikins), he wrote that the Venice Catlines were made in Bologna. Seventeenth century records indicate that Venice Catlines were much cheaper than Minnikins.

It seems likely that some time around 1570 the string makers of Bologna learned how to reproduce the very true and elastic bass strings made in Munich and soon were making them in quantity at relatively low cost.

We doubt whether the history of strings in the 16th century will ever get much more definitive than speculations such as these, but this does not reduce its fascination.

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FoMRHI Comm. 95

### A CORRECTION TO COMM 50 ON JEROME OF MORAVIA'S SECOND FIDDLE TUNING

When we say something stupid in a paper and almost a year goes by and no-one mentions it, it makes us wonder whether our stuff is either so poorly written or so uninteresting that no-one reads it in detail, or whether our readers are either just as stupid as we are, or too disgustingly polite to mention it.

Anyway, on the second line from the bottom of the 5th paragraph on p. 34, it is obvious that the range  $d - d''$  is 2 octaves and not 3 as stated. Thus the argument in the 3rd paragraph of p. 35 that the G string was not used for the melody in Jerome's second tuning is nonsense. The bridge-notching system in the last paragraph of p. 34 could still apply to this tuning if, whenever the G string was used for the melody, the g string next to it was also played. This postulated practice of playing an octave pair together parallels that on the bass course of a medieval lute and the bourdon pair of a 7-string *lyra da braccio*.

FoMRHI Comm. no. 96

## A Hypothesis on the Symphony

Jeremy Montagu

While engaged on a study of the instruments of Beverley Minster, an idea came to me on which I would value the opinions of fellow members. As in a number of other representations, the symphony is a small rectangular instrument with the crank at the tuning peg end. This can, I think, be easily explained in that if the wheel is to be held firmly upright the axle must be securely bedded and if, as seems probable, the rectangular instruments are completely hollowed out inside as resonance chambers, the only way of doing this is by running the axle from end to end of the instrument; once one is doing this, it becomes immaterial from the maker's point of view which end of the axle carries the crank. If, as is possible, the symphony players were also familiar with the portative organ, the only other portable keyboard instrument of the period, there is nothing surprising about them preferring to crank with the left hand, instead of pushing the bellows, and playing with the right. This arrangement is thus not particularly a problem.

Where a problem does arise is the position of the keys. These run right along the body, with some of them on the wrong side of the wheel. There are far too many representations of instruments with such keys for them all to be wrong (two examples easily to my hand are Cantigas, Escorial J.b.2, f.154v and Luttrell Psalter, BL Add.42130, f.176 (plates 16 and V in my World of Medieval & Renaissance Musical Instruments respectively). A possibility is that the key-bars were cranked, as on the gebunden clavichord, but if one assumes, as one does, that the keys of the symphony were pushed inwards so that the tangents press the strings from the side, such an arrangement is mechanically disadvantageous, to put it mildly, whereas the clavichord arrangement of the key-bars pivoting so that tangents rise to touch the strings works alright.

Now what has occurred to me is that how do we know that the key-bars of the symphony pushed in? Those of the later hurdy-gurdy do, but those of the earlier organistrum turned so that, indeed, wooden blades did rise up and stop the strings. Might an arrangement similar to that of the clavichord been possible on the symphony? And would it have worked successfully? I can't see why not, but I would value anybody's opinion, and it would be especially interesting if anyone would like to try building such a machine.

If I am right, two things follow from this. One is that this is how the Luttrell Psalter player could use his instrument with the keys on the upper side of the instrument, which is impossible without a spring arrangement if he is pushing the keys in (and if so, I was wrong in saying on p.30 of my book that the artist got it wrong, and Eph was right to pull me up for doing so in Comm.44c).

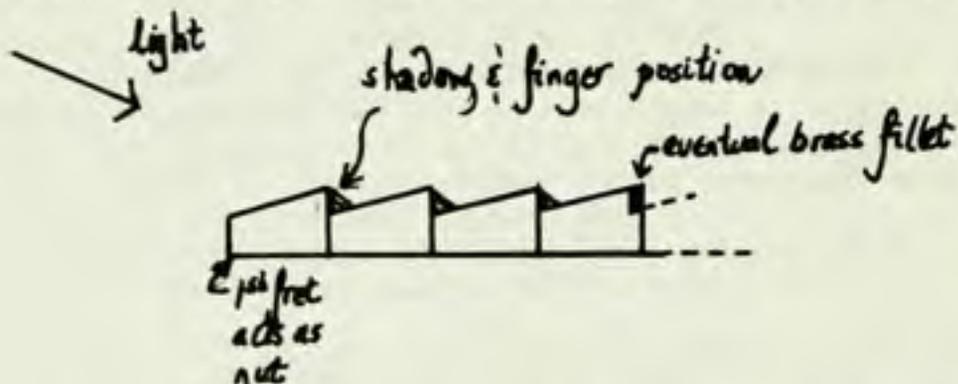
The other is, was this how the clavichord started? Did a symphonist move the keys without cranking and find that he produced a sound? Certainly some of the early clavichords that Ed Bowles illustrates in his checklist in Edwin Ripin's Keyboard Instruments (Edinburgh UP & Dover) are very little bigger than a symphony and are only than 50 years or so later than Beverley.

I would be grateful for comments as quickly as possible, because I have been writing an article on this, and if enough of you say it's impossible, I'd better cut it out before it's printed! Hence this hasty Comm.

While great attention has been paid to the cittern or cetra in the Gubbio intarsia (Winternitz, *Musical Instruments and their Symbolism in Western Art*, plate 53), it appears to be the only representation that clearly shows a space between each fret. The fret blocks appear as well to be severely rectangular with the surface quite flat.

Other representations, however, are not as explicit. *Musica and Mercury* in the reliefs by Agostino di Duccio in the Tempio Malatestiano, Rimini (Winternitz pl. 4 & 5), hold citterns in which the spaces between the frets now appear to be shadows falling over each succeeding fret from the preceding and slightly higher ones. A cittern in which the spacing can also be taken as shadows is shown in the intarsia by Fra Giovanni da Verona in the choir stalls in Monte Oliveto, Maggiore, Siena (Winternitz pl. 13c). Here the frets seem to be of a thinner material and they are set so that the grain runs at right angles to the strings.

I would suggest, therefore, that the fret blocks were not rectangular and that there were no spaces between them. Rather they were  in section and a series of them fitted together on the neck produced the shadows one sees, shadows that fall in the very position that the fingers take up on the frets.



In order to minimize the wear at the point of contact with the strings, the top of each block was given a minimum angle. If a very hard wood was used and string tension was not too high, then the frets should have lasted for some time. Over a long period no doubt worn frets would have become a problem and I can see then inserting a fillet of brass at the points of contact, thus leading to the usual practice of later cittern fingerboard construction with brass frets and a slight scalloping between them.

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FoMRHI Comm. 98

## LEAD IN HARPSICHORD KEYBOARDS

John Rawson

Lead weights are frequently used in keyboards to get the touch and balance right. Several problems however arise.

There are weak acids in wood, which over long periods corrode lead, and this causes swelling of the weights. If the keys are small in relation to the weights complete fracture of the key will result. I have seen this in an instrument made since the First World War.

Corrosion of lead is a problem well known to museum conservationists who have discovered the problems of keeping lead objects in wooden cabinets.

Old instruments did not use the modern method of setting round weights into holes in the keys. If cutting away of the wood was insufficient to get balance then slabs of lead were nailed to the underside of the keys. This method may appear crude to us but it causes no trouble.

The round weights in modern piano keyboards seem fairly harmless. The keys are very thick compared with the size of the weights, and the weights are located so near the back end of the key that if splitting of the wood occurs it does not affect the action.

In harpsichords etc. the thinner keyboards need smaller weights than the commercially available ones and so one is tempted to make ones own. Melting lead however is a dangerous process, in particular because of the fumes given off, which are a cumulative brain poison.

There are several alternatives available, although at a much higher price:

a. For corrosion resistance I suppose one could use pure Tin. Very expensive and hard to get. Specific gravity only 7.29 compared to lead at 11.34. Melts at  $232^{\circ}\text{C}$  compared to lead at  $327^{\circ}\text{C}$ .

b. Cerrobend, made for bending metal tubes, from Mining and Chemical Co Alperton, Middlesex 01-902-1191. Specific gravity 9.4, melts at  $70^{\circ}\text{C}$ .

c. Woods Metal from metal dealers such as Smiths, St. John's Sq. London EC1. Specific gravity 9.7, melts at  $65^{\circ}\text{C}$ . Price around £12 per Kilo.

The last two are very easy to use. You heat them in a tin in a saucepan of hot water and pour them straight into holes in the wood. They expand a little on cooling so they do not fall out. Both seem to be highly corrosion resistant over short periods.

It is not clear however how they would react to corrosion over long periods. Enquiries to the manufacturers and to friendly metallurgists have produced nothing. Can anyone help?

FoMRHI Comm. 99.

## SEASONING YOUR OWN TIMBER

John Rawson

It has been suggested that an interchange of information on this subject would be useful to many people - and so to start the ball rolling I have agreed to write down what I have picked up in the hope that other people will be able to add to it. I write from the point of view of a keyboard instrument maker needing timber for casework and stands, not soundboard timber which is obviously in a different class altogether.

1. Drying from Wet to 'Dry'

When timber is first cut down it is completely saturated. This water needs to

be removed without causing damage to the structure of the wood, which will shrink considerably in the process.

The methods adopted in the commercial yards are based on experience and have solid reasons to recommend them. Most people must be familiar with the system of sawing the tree into planks and stacking them with battens between, often in the open but also often under cover. So here are some hints on avoiding pitfalls:-

- a. Usually a tree should be planked very soon after felling or you get bad staining (except Oak). Felling should always be done in the winter "when the sap is down". The work is too hard for hot weather, and trees converted in the summer dry too fast and the wood splits.
- b. Planks should be between about 1" and 3" thick. Thinner and they may be of little use particularly if they warp - thicker and they take too long to dry (rule of thumb - one year per inch of thickness).
- c. Stack with strips between immediately after cutting - if you delay a day or it all goes mouldy.
- d. Stack on bearers clear of the ground - bearers must line up or you put a bend in each plank.
- e. Location of the stack should take account of wind direction and ventilation generally - sheltered places, like sheds open on only one side, slow down drying.
- f. Thickness of stacking strips controls ventilation.  $\frac{1}{4}$ " strips make drying very slow,  $\frac{3}{4}$ " or 1" quite fast (but beware of using different thicknesses - don't mix them up by mistake).
- g. Be careful about choosing wood for the sticks, the wrong one can stain the planks. Ideally use the same wood as the stacks.
- h. Make sure you have enough (hundreds) of sticks before you get the timber.
- i. Stack very carefully. It must be stable. If it falls over, and if it does not hurt anyone by doing so, you have an awful lot of hard work (for two people) putting it up again (and if you don't it all goes mouldy). If you have to go high, because of lack of space, build two stacks side by side, put heavy timbers across, and then go on up.
- j. Painting the ends of the planks with Bituminous paint (Synthaprufe, R. I. W. etc sold for waterproofing concrete floors) reduces splitting caused by too fast drying from the ends of the wood cells.
- k. A Protimeter (Protimeter Ltd., Meter House, Fieldhouse Lane, Marlow, Bucks. 06284-72722) gives a useful objective opinion, though only of surface dampness, until one gets more experienced.
- l. Keep a lookout for woodworm and other pests, rot, fungus and Fire. You have to keep an eye on the stacks.

That is roughly how you do it, but you also need to know what to do - i.e. how fast to dry it and for how long. Here all the different timbers need different treatment. Some are easy, some difficult, some will take fast drying, some need slow. For instance Black Italian Poplar seems to dry fast, easily and without warping much. Walnut, which is not all that different in weight, dries quite fast, but is very prone to splitting, going mouldy and growing spectacular fungus (this must partly account

for its high price when dry). Pear warps badly. Oak needs very careful drying or it can 'collapse' and warp badly enough to be unuseable. Sycamore has to be planked the same day that it is felled and slood on end to drain or it stains. Very few timbers can be dried in the log without major splits (radial and tangential shrinkage are usually different) but Laburnam can, hence 'Oysterwood' parquetry. Holly is so waxy it does not seem to need much drying and if destined for harpsichord jack tongues it will dry very quickly anyway. The very hard woods such as box and ebony should not be overlooked, Ebony arrives in this country within a year of felling, and it does need conversion and drying, or it will split after use.

Further information here would be very useful - can you help?

## 2. Drying from 'Dry' to Useable

Timber stacked out of doors dries <sup>to</sup> only about 20% or 22% moisture content. Wood in furniture etc. in centrally heated rooms is at 7% or thereabout. Between the two there is quite a shrinkage and weight loss. So one really has to bring 'dry' wood into a heated (or de-humidified) store and keep it there for at least 6 months, preferably much more. If you don't you get warping and splitting in completed instruments. Ideally you would have a large heated store room containing stacks of timber arranged the same as outside. In practice people stand planks on end in their workshops or garages. The main pitfall here seems to be leaving wood leaning over so that it gets a bend in it. This can obviously be minimised with care. Needless to say one cannot bring wet wood indoors or the drying is so fast that extensive splitting usually results.

## 3. Stress Relief and Ageing.

Wood is quite capable of growing with its cells pre-stressed. No other way can a branch go on growing without sagging. However the formation of 'tension wood' and 'compression wood' is not without its snags. Compression wood in softwoods has little tensional strength and planks made of it break very easily. It is not so bad in hardwoods, but nevertheless branches of trees are not normally used by industry for this reason. One should however be aware that the butts of trees may have grown leaning over and so those with a seriously off-centre heart should be rejected. Everyone who has sawn timber knows that it often either binds on the blade or springs open when cut, showing that it still has stresses in it. Seasoning out of doors in the rain, which is slower than under cover because of the constant wetting and drying, is reputed to relieve stresses, and indeed making planks wet and dry has been recommended. Otherwise one can be careful to allow warping at every stage, in the hope that once it has happened, the stresses are less.

Generally time is a great help. The problems arise mainly when people try to take short cuts. Kiln drying is reputed to lead to instability, and too-rapid air drying leads to degradation of the wood: generally surface splitting. What we need is information on probable minimum times for drying different species, an abstract of published information, and everyone's experience of preparing timber for use in our particular work.

Do please share your experience with us.

Early Musical Instruments for School Construction

Bryan Tolley

Having managed to establish a small early music consort from the pupils at the school at which I work it soon became apparent that if the consort was to succeed then other instruments would have to be found to prevent early music becoming simply recorder music. When the idea of making instruments was suggested it was received with great enthusiasm and none of those concerned had any doubts about their own ability.

As an introduction it was decided to first try out a simple string instrument such as the psaltery. This was based upon the quadrilateral instruments often depicted in early illuminated manuscripts having only a few courses of single strings.

Construction was kept as basic as possible. No joints were attempted since the members of the consort are all girls, all under fourteen years of age, and have had no prior woodworking experience. The basic frame consists of two hardwood blocks and pine sides. These are pinned and glued together and the back added. A makers name label was glued to the base of the box beneath the position of the rose so that it could be seen. Struts were added to the underside of the soundboard after a rose had been created by means of drilling a series of holes on a geometric pattern similar to the rosettes found on shawm fontanelles. The soundboard was then glued in place. To complete the box it was veneered along its sides to cover up the ply and the crude corners. The bridges were formed and glued in place and the tuning and hitch pins were made up; these being either forged flat and drilled or notched at one end to receive the string. For these psalteries it was decided to use the same gauge wire for each string basically because of economy since a large reel of No. 1 gauge music wire was available. The tuning pegs were a drive fit into a 3mm hole and adjusted by means of a simple key made from 5/16" steel bar and a short length of brass tubing. Finally the instrument was sanded down and given a sealing coat of varnish and then several layers of beeswax. Despite the fact that ply had been used for the soundboard the instrument has a good response, a clear tone and also sustains well.

As a second project it was decided to avoid wind instruments since this would involve turning together with a great deal of accuracy and to continue with the construction of stringed instruments. A medieval fiddle was the next instrument to be tackled. A simplification of design was incorporated in the form of a full length neck to avoid having the problems of strength under string tension. The body was formed from solid pine drilled and gouged to hollow it out. The solid neck was let in at either end of the body and recessed along its length to allow the soundboard to vibrate freely. A fingerboard, soundboard, and tailpiece (à la viol) were added as were the nut and tuning pins. The addition of a small metal bridge of 1/8" wire ensured that the strings would pull down on to the bridge and nut. Details such as the rose, tuning pins and key and also the finish are the same as those for the psaltery.

The bow was from a thin beech strip steam bent with horse hair knotted and notched into one end to enable the tension to be relieved. We now have two completed fiddles which work well but

we only use them as drones due to the difficult playing techniques required.

Three other members of the consort wished to try their hands at making a hurdy-gurdy. Again for this most ambitious project the main emphasis has been on the simplification of construction; to get an instrument that looks right and sounds right but yet is relatively straight forward to produce. At present we have one completed hurdy-gurdy and two nearly playable with no major snags or problems along the way. The attached diagrams should explain the construction and the ranges of the instruments. Also the hurdy-gurdy is superficially easy to play and the girl with the completed instrument can already play several tunes including a duet with me on my hurdy-gurdy!

Despite crude construction the instruments have all turned out to be authentic looking and above all playable. Obviously better woods and lighter construction would be an advantage but the sole aim of this project has been towards getting a consort of young musicians to make, play and to be able to appreciate their own instruments.

#### A Note on the Construction of a Hurdy-Gurdy

by Janet Allison (aged 13)

Making the hurdy-gurdy wasn't easy, but when the fiddly bits came round Mr. Tolley came and helped us, and when mine was finished it was so much fun trying to play it, even more fun than if I had bought it. I think that the most difficult part was fitting the tangents and keys.

Notes on the Construction of a Medieval Fiddle

by Suzanne Koscow (aged 13)

Selecting a suitable piece of wood for the body part was first. This had to be two symmetrical pieces stuck together as the wood I was using was long and thin. When the two pieces were stuck together the shape was solid but like the shape of a guitar's body. So therefore I now had to chisel all the inside out. I set about doing this by firstly drilling out as much of the inside as I could, then I began to chisel. It was a long job where patience was relevant. One time I went a bit too wild, and as I was chiselling I knocked an end piece out of the body, but this was soon put back in place with glue.

The next thing to do was to cut a long piece of wood the length of the fiddle body plus 15cms and with a round shape on the end. This was going to be the neck. Firstly you chisel 2cms from one end of the neck about 5cms down, then right up to where 2cms from the top of the fiddle body is if you lay it on the neck. You then knock out from each end of the fiddle body in the middle a block of wood, the width and height of the neck.

You then need a piece of wood to cover the fiddle body. In this I drilled out a sound hole at the top and two shapes either side. I then stuck two struts the length of the body on the bottom of this, and then stuck the top on the fiddle body.

I then made a shape which was slanted (the fingerboard) and stuck this on the piece of the neck that was sticking out at the end. At one end of this near the round bit on the neck I stuck a piece of wood (the nut) the width of the neck and about 5cms high and in this were put five notches. Over the other side of this, on the round shape, was put a little metal bridge level with the width of the neck. And a bit further up the round shape I made five holes for metal pegs in the shape like a five on a dice.

Then I made a wooden bridge with a curved top and five notches in it.

Firstly for the tailpiece I had a piece of tailgut attached to a round piece of wood sticking out of the end of the fiddle, which was the attached to the tailpiece. The strings were attached to the tailpiece, over the wooden bridge, under the metal bridge at the other end, and then round the metal pegs at the other end. But this was useless as every time the strings were tuned, and one needed tuning real tight, the catgut would stretch and the other strings would go slack so you couldn't tune it.

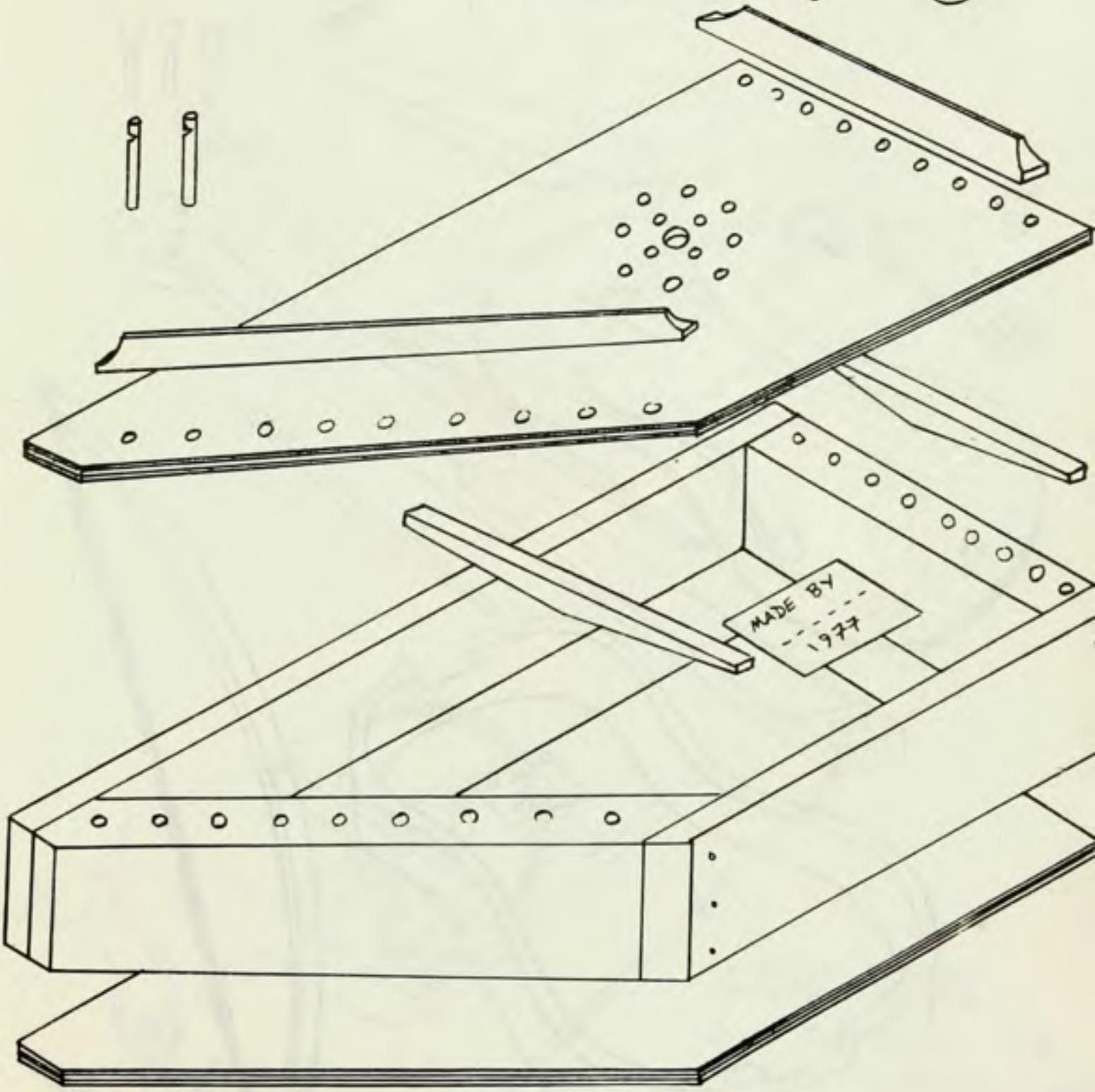
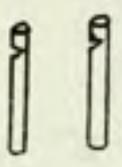
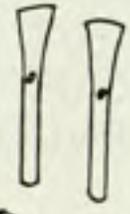
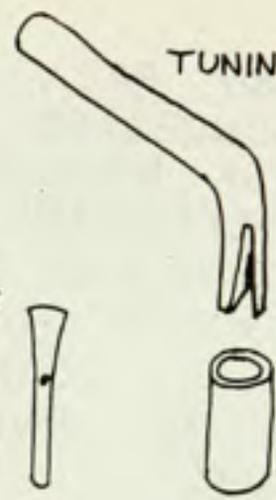
But this was substituted by a peg put sticking up on the top at the end of the fiddle, and the tailpiece was made with a hole in it to slot over this peg so it would stay firmly and the strings could be tuned.

Now all I've got to do is to learn to play it!

SOUNDBOARD & BACK  
 SIDES  
 END BLOCKS  
 STRUTS  
 BRIDGES  
 WREST & HITCH PINS  
 STRINGS  
 FINISH

1/8" PLY  
 3/8" PINE  
 BEECH  
 BEECH  
 BEECH  
 1/8" M.S. BAR  
 1 GAUGE (MUSIC)  
 VARNISH/WAX

TUNING KEY

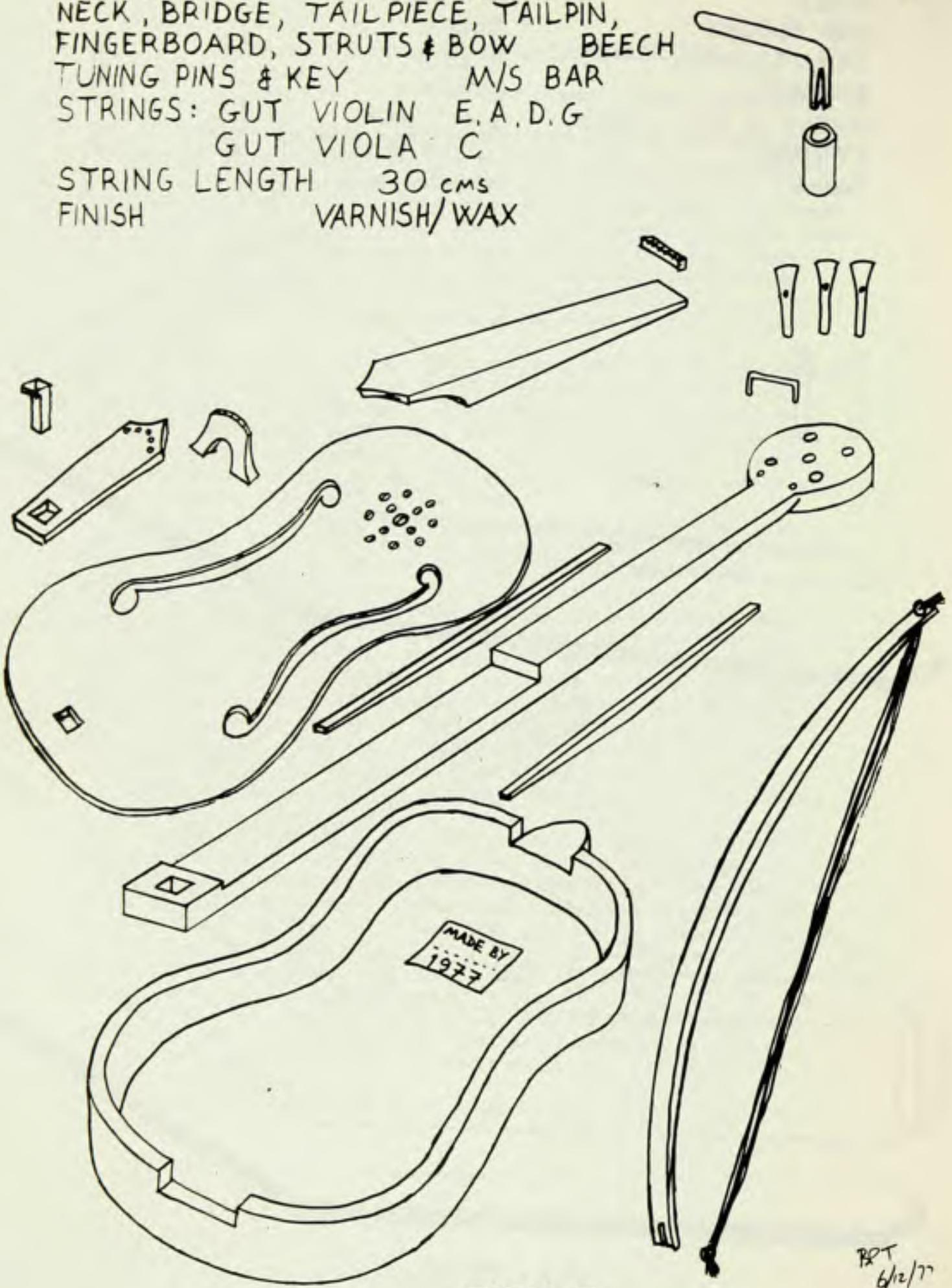


PSALTERY

(F-g DIATONIC SCALE)

BPT 6/2/77

BODY FROM SOLID PINE  
 SOUNDBOARD  $\frac{1}{8}$ " PLY  
 NECK, BRIDGE, TAILPIECE, TAILPIN,  
 FINGERBOARD, STRUTS & BOW BEECH  
 TUNING PINS & KEY M/S BAR  
 STRINGS: GUT VIOLIN E, A, D, G  
 GUT VIOLA C  
 STRING LENGTH 30 cms  
 FINISH VARNISH/WAX



FIDDLE

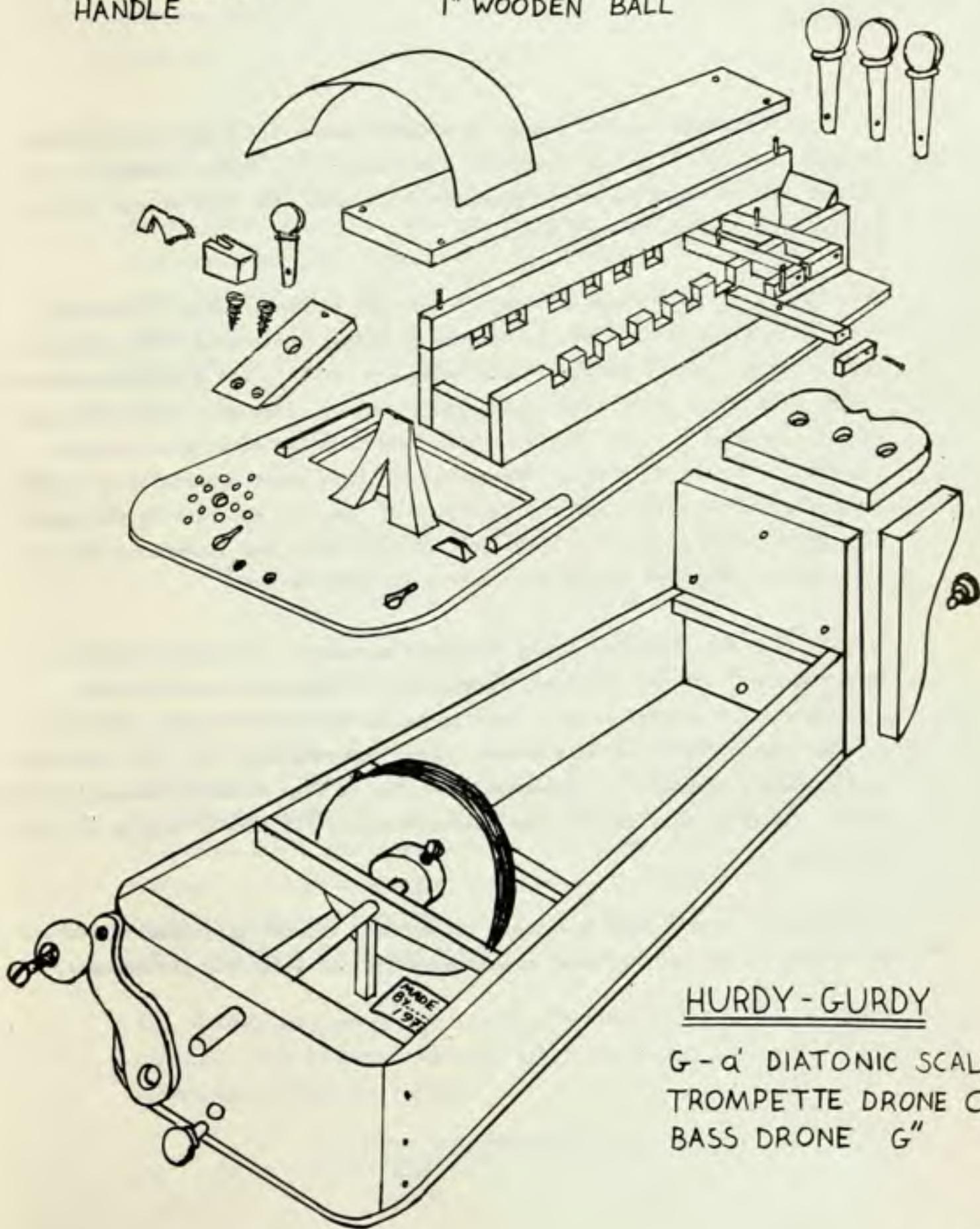
RPT  
6/12/77

REMAINING PARTS  
 WHEEL  
 WHEEL COVER  
 VIOLA TUNING PEGS  
 TANGENTS  
 CRANK & AXLE  
 HANDLE

3/8" PLY  
 BEECH  
 3 LAMS. 1/8" PLY  
 1MM PLY

1/16" BRASS ROD  
 BRASS  
 1" WOODEN BALL

STRINGS (GUT)  
 VIOLA A  
 VIOLA D  
 'CELLO D



HURDY-GURDY

G-a' DIATONIC SCALE  
 TROMPETTE DRONE C or D  
 BASS DRONE G"

BPT 7/12/77

FoMRHI Com. 101.

On Com. 76 and Woodwind Crack Repair

Cary Karp

In Com. 76 methods for the repair of cracked bamboo are suggested as being of potential use in general woodwind crack repair. I cannot comment on the suitability of the described procedures for bamboo, but they appear extremely inappropriate for use with wood.

There is as yet no generally accepted approach to the problem of woodwind crack repair and the subject is capable of triggering heated debate amongst the "experts". The idealized basic rules are never to use a non-compressible filler in a crack which could conceivably want to close at a later time, and to avoid sealing a crack with a tighter bond than the cross-grain tensile strength of the wood itself. The second of these rules especially is almost impossible to maintain, and the selection of the best approach to the repair of a given crack requires a great deal of experience and judgement; nor are the repair techniques themselves necessarily easy to apply.

Without such experience it would be highly advisable to abstain from crack repair where it is not absolutely necessary. Binding the outside of an instrument with a waxed cord, inserting balsa wood or cork shims, shellac filling (which fractures to a powder under compression), etc. all can render an instrument playable for reasonable lengths of time without running long-term risks. (Waxy or oily fillers can however cause difficulty if gluing is later attempted.)

"Patching up" cracks when necessary without any attempt at permanent fixture or closure is the only general procedure which can be safely recommended.

FoMRHI Com. 102.

## OVERSPUN STRINGS

Cary Karp

A close-wound overspun string can be described as a series of tori (a torus is a three-dimensional form generated by rotating a circle about a point which lies outside the circle and on the same plane-- a geometrically perfect doughnut) strung as a continuous row of snugly fitting beads on the string core. In this case each individual winding appears as in Fig. 1, and the diameter of a solid string of the same material as the core and equivalent to the overspun string in terms of mass per unit length is given by

$$D = \sqrt{\pi D_w \rho_w (D_c + D_w) / \rho_c + D_c^2} \quad (1)$$

where:

$D$  = diameter of solid string

$D_c$  = diameter of the overspun string core

$D_w$  = diameter of the cover wire

$\rho_c$  = density of the core material

$\rho_w$  = density of the cover material.

This relationship is commonly encountered in the literature and expressions identical to Formula 1 are found in: F. Jahnel, *Die Gitarre und Ihr Bau*, 1963; H. Fletcher, *Normal Vibrations of a Stiff Piano String*, JASA 36 (1964); D. Abbott and E. Segerman, *Strings in the 16th and 17th Centuries*, GSJ XXVII (1974). (It should be noted that due to friction effects in the covering helicoid, equivalence in mass per unit length does not necessarily imply identical vibrational characteristics.)

Fig. 1 does not, however, represent the actual configuration of a single winding. This is more correctly illustrated in Fig. 2 and the corresponding alteration to Formula 1 gives

$$D = \sqrt{\pi D_w \rho_w \sqrt{(D_c + D_w)^2 + (D_w/2)^2} / \rho_c + D_c^2} \quad (2)$$

(Formula 2 can also be used for open-wound strings with distance  $P$  between the individual windings by substituting  $P$  for  $D_w$  in the second parenthesis under the inner radical.)

Formula 1 gives a  $D_w$  which is smaller than that given by Formula 2. The numerical difference does not, however, become obvious until  $D_w$  approaches  $D_c$ , and the gain in accuracy through the use of Formula 2 may not generally appear worth the additional computational drudgery which it entails. If a calculating machine with at least the power of a programable pocket calculator is used, however, this last consideration becomes irrelevant. It can, in fact, be suggested that extensive use of Formula 1 might become prohibitively tedious without the use of such a device. (A short report entitled, "Stringing and Scaling Computation using the HP 67/97 Calculator", is available upon request from the present author c/o Musikhistoriska Museet, Slottsbacken 6, S-11130 Stockholm.)

Neither of the above formulas accounts for all the variables encountered in the manufacture of covered strings. The cover wire is plastically deformed by being wound into a tight helicoid, it is axially strained prior to being bent, and it may be dented by the core. Its in situ cross-section is thus not likely to be perfectly circular. The core is also strained in the covering process and may be dented by the cover. Abbott and Segerman's assumption that the total diameter of the covered string is equal to  $D_c + 2D_w$  is, therefore, not always valid.

In practice these factors are often compensated for by the use of a  $D_w$  somewhat larger than the calculated value. The computation of an exact  $D_w$  would be extremely complex and involve the use of variables not easily determinable in a workshop situation. Formula 1 is, nonetheless, in many cases an unnecessarily rough approximation.

Presumably an explanation for the discrepancy mentioned in Com. 82 is to be found in the preceding discussion.

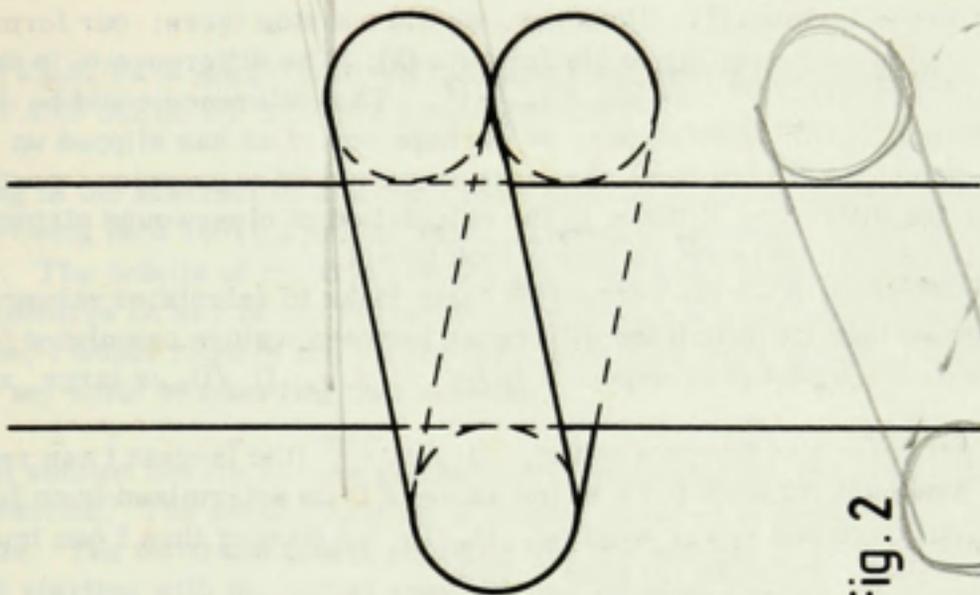


Fig. 2

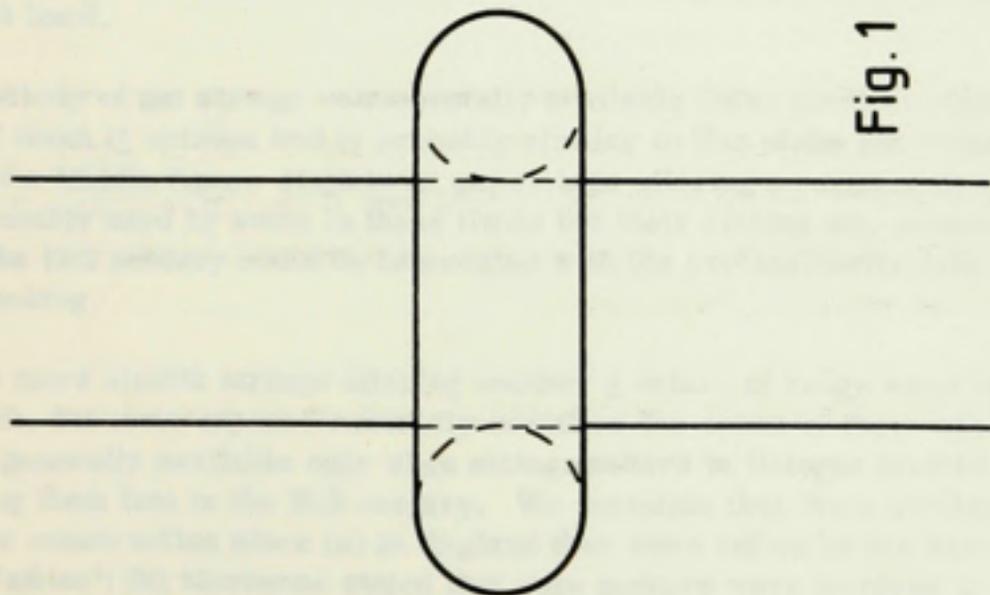
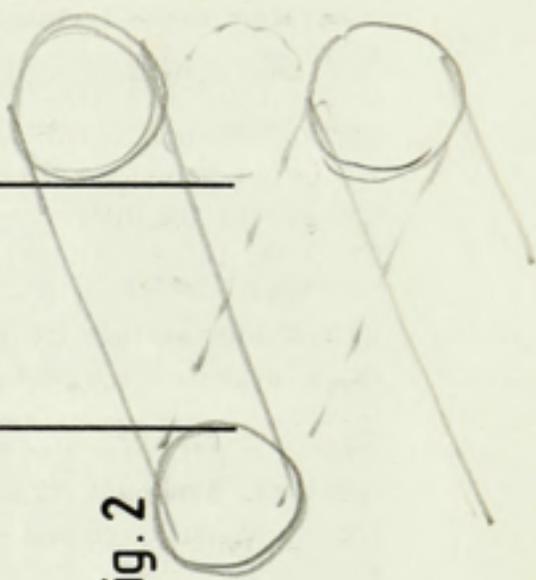


Fig. 1

Comments by D. A.

In our paper (G.S.J. 1974) formula (2) of Appendix (6) is, as Cary rightly states, equivalent to his formula (1). However, we did not stop there: our formula (3) reduces to an expression very similar to his formula (2). The difference is in the correction term: Cary's is  $(D_w/2)^2$ ; we got  $(D_w/\pi)^2$ . The difference could be due to different approximations in our calculations, or perhaps one of us has slipped up! When we wrote our paper we did not think the more complicated expression worth the extra trouble for the difference it made in the calculation of closewound strings, but since Cary has raised the issue let us take a look into it.

What difference does the correction term make to calculated values of D? Let us consider strings for which the difference between values calculated from (1) and (2) is as large as we would ever expect it to be - i.e.  $D_w/D_c$  is large, and  $\rho_w/\rho_c$  is large:

Example: gut core and silver winding,  $D_w/D_c = \frac{1}{3}$  (the largest I can remember ever making). Formula (2) adds 0.1% to the value of D as determined from formula (1).

Example: gut core and silver winding,  $D_w/D_c = \frac{1}{2}$  (larger than I can imagine ever wanting to make). Formula (2) adds 0.75%.

Example: steel core and silver winding,  $D_w/D_c = 1$ . Formula (2) adds about 2%.

In practice, the values of D we get in the wound strings we make are usually a few percent less than formula (1). We agree with Cary that the reason for this is distortion of both winding and core. The winding has to be done under tension otherwise it can work loose resulting in a buzzy string; the fact that measured overall diameters are consistently less than  $D_c + 2D_w$  is evidence of this distortion.

To summarize, distortion always makes D smaller than its calculated formula (1) value; formula (2) always makes D larger. In practice, for closewound strings we find the distortion effect outweighs the formula (2) effect.

### THE INTERACTION BETWEEN GUT STRING TECHNOLOGY AND INSTRUMENT RANGES AND SIZES UP TO THE 18th CENTURY

Following is the abstract of a paper I have offered to deliver at the AMIS meeting which is being held 14-18 April at Yale. A visit to my relatives in the USA is long overdue. The details of my trip are not yet fixed and I would welcome invitations to give lectures on any of my research areas within a week or two of that meeting. For a fee, I would require the return fare from New York plus hopefully a bit extra towards my costs of attending that meeting.

The first section covers no new ground but is essential for the development of the second section. The second section is mostly covered in more detail elsewhere in this issue. The third and fourth sections are the results of a continuation of my work starting with the initial assumptions given in Comm. 18, appropriately modified in the light of analysis of iconographic evidence. A fairly complete article on this is envisioned to appear late this year in *Early Music*.

- I The maximum open-string range of a fingerboard instrument strung with gut is determined by tensile strength on the treble end and a combination of pitch distortion, inharmonicity and absorption on the bass end. Pitch distortion and inharmonicity are functions of the ratio of elastic modulus to string stress. When the elastic modulus of the lowest strings is the same for different instruments the maximum range tends to be the same regardless of string length. Thus when the full range was used on an instrument, we generally can relate the string length with the absolute pitches of the strings.

The several increases in maximum range of instruments can be associated with the availability of new bass strings with reduced elastic modulus. Instruments not filling the new maximum range available seem to have exploited these new strings to give greater flexibility in the relationship between string length and pitch level.

- II The elasticity of gut strings commercially available today gives an open-string range of about  $1\frac{1}{2}$  octaves and is probably similar to that of the gut commonly used in the Middle Ages. High twist gut strings offering a range of 2 octaves were probably used by some in those times but their coming into general use late in the 15th century could be associated with the professionalization of string making.

By 1500 more elastic strings offering another  $\frac{1}{2}$  octave of range were being made in Munich, but their expense seriously curtailed the extent of their use. They became generally available only when string makers in Bologna started producing them late in the 16th century. We postulate that these strings had a rope-like construction since (a) in England they were called by the name of a rope, 'Catline'; (b) Mersenne stated that rope makers were involved in their supply, and (c) this construction offers the required elasticity. Gut overspun with metal first became available in the second half of the 17th century and their use has been spreading slowly since.

- III It seems that when the viol first developed from the plucked viola (vihuela) in the 15th century, its string length was about  $\frac{1}{2}$  meter. When scaling instruments into families became fashionable, string lengths  $\frac{2}{3}$ ,  $1\frac{1}{2}$  and 2 times this appeared (the smallest was usually played da braccio). A set appropriate to play the available music usually used either the smaller or larger three of these 4 string lengths. Such a set included 4 instruments, treble, alto (also called contralto or countertenor), tenor and bass. The alto used the same tuning as the tenor and sometimes could be somewhat shorter in string length.

With the availability of Catline strings, the viol string lengths dropped by 20% to ease fingering, with the smallest string-length falling into disuse and the distinction between tenor and alto disappearing. The largest original size was retained as a contrabass (violone). Another drop of 10% around 1700 in response to overspun strings brought the consort viols to their modern sizes.

- IV The violin family was a continuous development from the 16th century family of viole da braccio which evolved directly from the medieval 3-stringed fiddle. The ubiquitous member of the family in the 16th century had a string length of 35-40 cm, the same as the smallest of the viols. This size was usually the tenor in the set. The treble had a string length  $\frac{2}{3}$  of this. Occasionally these two instruments played the bass and tenor role respectively to the treble of a tiny instrument with  $\frac{2}{3}$  the string length of the usual treble. The usual bass had  $\frac{3}{2}$  the string length of the tenor in Italy and twice (or  $\frac{9}{4}$ ) that in France. Contrabasses with string length 4 times that of the treble and tenor were also used.

In the second half of the 16th century a smallish alto of the usual set commenced a successful solo career as the 'violino'. By the 17th century, with the help of Catline strings, the family adapted itself to the violino as the new treble, with the tenor, small bass (Italian) and large bass (French) dropping a third or fourth in pitch. The new set used either of the basses and occasionally the original treble (renamed 'violino piccolo') and contrabass. The smaller bass then had an octave relationship to the violino but in the 17th century it was used much less than the larger one and later was called 'violoncello piccolo'. With the availability of overspun strings the large bass was able to take over the musical function of the violone and so it acquired the name 'violoncello'. With these strings insuring projection in the bass the 'cellos and tenors (now called violas or violettas) tended towards smaller sizes.

FoMRHI Comm.104.

A DESCRIPTION OF THE EARLY "IRISH HARP"

The earliest harps consisted of two main parts; the soundbox (or resonating chamber) and the arm (where the strings are fastened and tuned). Around the 8th. or 9th. centuries a third part, the fore-pillar, was added, creating the "triangular frame harp".

The addition of the fore-pillar made the harp stronger and more stable, and the Irish took this a step further, creating a bulkier, sturdy instrument that quickly achieved a prominent place in the musical life of Europe, and continued to be popular until the end of the 18th. Century.

In recent times the harp has generally been regarded from the outside rather than the inside. This view tends to define the ancient Irish harp as (in order of importance):

- 0) any harp less than 5 feet tall,
- 1) a harp with decoration in Celtic style,
- 2) one which has the general shape of an old harp,
- 3) a wire-strung harp,
- 4) a harp built in the same manner as the surviving old Irish harps.

Actually these criteria are listed in exactly the reverse of their proper order.

I have the advantage of writing from the point of view of an instrument builder, rather than that of the musicologist or historian. The result is that what follows is a functional rather than visual description.

\* \* \* \* \*

### The Soundbox

The soundbox is hewn from a block of hardwood. Tradition holds that willow was the accepted material for harps, but the two instruments in the National Museum of Antiquities of Scotland are of hornbeam. ~~I'll discuss the question of wood later on.~~

The shape of the soundbox is determined largely by the wood from which it is taken. Sawn timber will easily yield a soundbox of constant depth and tapering width, similar to the soundboxes on the smaller harps, but timbers massive enough for the soundboxes of the larger harps are virtually unobtainable.

The larger harps have soundboxes which are deeper at the treble end than at the bass, as well as being wider at the bass end than at the treble. This double-tapered shape comes quite naturally from a half-round section of a log. The depth of the shoulder is determined by its width, and the width of the bass end is determined by the desired depth at the lower corners (~~see diagram~~).

This block is hollowed out from the back, so that the soundboard, sides, and ends of the soundbox are integral. The back is closed by a board, pegged into a mortice cut to receive it. The bass end is usually cut back on either side of the pillar (creating the soundboard extension block) which reduces the weight and shortens the instrument, making it easier to hold with the knees. On the larger harps the soundboard extension block is not necessary, as these rest on the floor when in use.

The soundboard is pierced with four or six soundholes. Many of the old harps also have large holes cut in the back, but these are invariably rather crudely made, and I think that they were probably cut through relatively recently, either in an effort to improve the tone of the instruments by making them look more like pedal-harps, or to make stringing easier for someone who didn't know how to change strings properly. This sort of misguided mutilation has been very common with old instruments.

There is usually an outer stringband, formed by recessing the soundboard faces, which strengthens the soundboard. It also serves a decorative function, as it would be easier to leave a thickening rib along the centre-line on the inside surface. Strength is only gained from extra wood along the centre, so the faces of the soundboard are thinner to give greater flexibility.

The strings are tied to toggles which hold them in place and distribute the strain of the strings over a greater area than would otherwise be the case. The toggles are kept in place by the string pegs. The strings are prevented from cutting into the soundboard by the feet of the strings, which are of metal.

Except on the Kildare harp, there is no bracing inside the soundbox, and although by their very nature the strings are trying to rip the soundboard apart, the wood is strong enough to resist the strain. But should the soundboard sustain a sharp blow it is likely to crack. This is possibly the explanation of why so few harps have survived of all the thousands which must have been made over the years. Many of the surviving harps have metal bands across the soundboard which are quite ugly, but would keep a damaged harp playable for some time. The soundboard is the one weak area of the instrument, and this is true of all harps. Fortunately, once the instrument has had its wood stretched and stressed by the tension of the strings it will produce an admirable tone with an amazing number of cracks in the soundboard.

#### The Arm

The arm is also known as the neck, comb, or harmonic curve. It is carved in various ways, the important thing being to reduce its weight without weakening it or destroying the natural beauty of its form. A brass cheek-piece is fastened to each side, to give added strength. These are pierced by the tuning pins, generally of iron, and tapered slightly so they may be wedged into their holes firmly enough to resist the strain of the strings. The tuning pins have a hole or slot in the small end to receive the string. The large end is formed to fit the tuning key.

The arm of the early Irish harp is centrally mounted at the shoulder, and the strings rise at an angle to the central plan of the instrument. The old Irish harpers played with the harp on their left side with the left hand in the treble, and strung their harps on the left side of the arm. If you play with the shoulder of the instrument high enough to rest on your shoulder, and want to play with the right hand in the treble, you may find it easier to get at the shorter strings if you string them to the right side of the arm. This may mean that you would have to tune the instrument with your left hand, but would have no structural effect. With the harp resting on my breast rather than my shoulder, I've found no difficulty reaching the treble strings with either hand. There is some pictorial evidence that the harp was held in this position.

Recently people have built wire-strung harps with the arm offset to allow the strings to rise vertically along the central plan, which is a significant alteration in the geometry and structure of the instrument. It is usually done so that semitone levers might be installed. This is a device, used on some gut-strung harps, which, when brought into contact with the string, shortens the vibrating length by an amount sufficient to raise the pitch one semitone. Equipping a harp with well designed and well maintained semitone levers makes changing keys easier and permits some chromaticism, but they are not as essential as is often assumed, and will shorten the life of metal strings by work-hardening the point of contact until it becomes brittle. Until the present century wire-strung harps did not have semitone levers.

The arm may be taken from a curved branch, but on many of the original instruments the arm is sawn from a plank. As with the rest of the instrument, the available wood will play a large part in determining the exact shape, but since the shape of the arm determines the scaling of the string-lengths, it is very important.

### The Fore-pillar

The fore-pillar (or pillar) has the sole function of maintaining the distance between the arm and the soundbox. It is under considerable compression caused by the combined tension of the strings. It must also resist very strong twisting forces, because the strings are pulling down on one side of the arm and more pressure is applied to the left side than to the right. To resist these forces the pillar is quite thick - around  $2\frac{1}{2}$ " to 3" at the centre. A pillar of rectangular cross-section with these dimensions would be very heavy, and equal strength is obtained by making it thinner towards the ends and carving it to a T-shaped cross-section (T-section) in the middle.

The pillar of this harp is curved making it possible to reduce the length of the arm by having the lowest 5 or 6 tuning pins above the arm/pillar join, while leaving easy access to the bass strings for both hands. The amount of curve is not crucial. It differs in all the surviving old harps, and was probably dictated by the available wood. The pillar should ideally be carved from a curved limb of a hardwood.

### The Strings

One of the unique features of the ancient Irish harp is that it is strung in metal; brass, or brass with iron in the treble, or sometimes with silver. These strings are the major factor in determining the tone on the harp. If you decide to take the arm from a curved branch, it is not necessary to duplicate exactly the scaling (string lengths) of another harp. You can select strings that will work on your harp quite successfully, unless you make it grossly over- or under-sized. I'll discuss this further in the section on stringing and tuning.

### Assembly

On the earlier harps the arm is morticed into the soundbox and the pillar is morticed into the soundbox and the arm. This assembly is held together by the tension of the strings. It is so strong that except for a severe backwards blow upon the arm, there is little that will accidentally disassemble the harp. As I said before, sometime around the 16th. Century, when the length of the bass strings was increased, the arm/pillar join was changed so that the arm was morticed into the rear of the pillar. This may have been done simply to achieve a graceful line at the peak of the harp, which would be difficult using the older, stronger structure. Certainly, the newer type of join is strong enough, when properly made, to do the job. It is used on most other kinds of harps.

### Decoration

Most of the decoration on the old Irish harps is burnt on with a hot iron. The main exceptions are on the arm and fore-pillar, where low-relief incised decoration is often found. The ends of the T-section and the soundboard extension block are sometimes carved.

In addition to the brass fittings on the arm and soundboard, elaborate silver decorative fittings were sometimes applied. The most common was a cap to cover the exposed end of the arm, and occasionally the pillar might receive some embellishment.

This decoration is purely cosmetic, of course. The choice of design is immaterial unless you are striving for historical accuracy, in which case the only reliable guide is to copy old designs, either from a harp or some other appropriate source.

Out of the many parameters examined on the occasion of the analysis of about thirty strings found on some old musical instruments, there is one which will catch our attention : the breaking stress (B. S.) or, what's directly pertaining to the latter, the resistance to rupture per square millimeter (RRmm<sup>2</sup>) of the metal being used. Let us first specify that the concerned strings have been taken from instruments used in the XVIIth and XVIIIth centuries : harpsichords, spinets, clavichords, dulcimers. We have, of course, eliminated those which would have given doubtful results due to their corrosion condition, together with those which visibly could be considered as being posterior to the first half of the XIXth century.

The table hereunder shows the BS and RRmm<sup>2</sup> factors of the two analysed samples (table 1) :

NATURE	DIAMETER (mm)	B. S. (Kg)	RRmm <sup>2</sup> (kg /mm <sup>2</sup> )
steel and iron strings	0.54 to 0.15	19 to 1.98	85 to 110
copper alloy strings	0.74 to 0.40	19.1 to 7.6	45 to 68

TABLE 1

Both values in each column represent the measured extreme values.\* Let us add that we are conscious of the fact that, statistically speaking, both samples may seem of little weight to back up the conclusions we are going to draw. But our purpose is to call forth other more thorough researches.

\*See note 1

On the other hand, let us note that modern steel strings (spring steel used by many of us) have RRmm<sup>2</sup> of about 294 kg, that is to say, the value almost tripling that of the old strings.

Let us now start with the values shown in the last column (table 1). To make the demonstration easier, we shall consider the mean value of the analysed strings (see note 2).

Iron-steel strings	RRmm <sup>2</sup> = 94kg/mm <sup>2</sup>
Copper alloy strings	RRmm <sup>2</sup> = 61kg/mm <sup>2</sup>

TABLE 1'

The comparison of the two values reminds us of the remark made by VAN BLANKENBURG about precisely the ratio of  $5 \frac{1}{2} / 7$  existing between the lengths of copper and iron strings, for the same frequency. In other words the length of an iron string must be shortened by  $1 \frac{1}{2} / 7$ th in order to fit in there a copper string. Is that a merely arbitrary ratio ?

VAN BLANKENBURG specifies 14 duim for C'' i. e 35.5 cm. (no need to get back to the problem of the measuring units which has already been studied with full knowledge by competent people). To string the same C'' in copper alloy, the shortening should be of 7.60 cm ; C'' would then be 27.90 cm. The choice we make of tuning our instrument on the "A" 440- $\frac{3}{4}$  tone, will be explained further on in this study. Let us choose then to string our C'' , first with a steel string then with one of copper alloy, 0.200 mm in diameter. Table 2 shows the respective stresses :

C'' (cm)	iron (kg)	copper (kg)
35,5	2,90	3,18
27,9	1,81	1,90

TABLE 2

From our analyses, the B.S. of an iron string of  $\emptyset$  0.20 is 2.95 kg. The B.S. of a copper alloy string of the same diameter is 1.92 kg.

A simple comparison of the six values shows quite well that this remarkable VAN BLANKENBURG's ratio is likely taking into consideration the material resistances. That ratio is so much the more accurate as the author in question tells us moreover that Rükkers used to place his bridges in such a way as to get the strings very near to their breaking point, once they have reached their right frequency. 2.90 kg is not very far from 2.95 and 1.90 is very near to 1.92.

We would be tempted to draw some practical conclusions from the above figures. But there is no need to hasten, for we must not forget that two values in our calculations are arbitrary and namely : the tuning and the diameter of the strings.

Drawing our inspiration from the works carried out on the diameters of the strings of old harpsichors, and more precisely, from the figures (A, B and C in table 3) given by Mr. G. GRANT O'BRIEN (Organ Year Book 1974) relating to TASKIN we will suppress the unknown factor of "diameter" in our following argumentation.

The table 3 gives a summary of the string stresses for three different tunings.

Note	Length (mm)	Diameter	440 (kg)	440-1/2 tone (kg)	440-1 tone (kg)	B. S. (kg)
f'''	142	0,20 Fe	3,95	3,55	3,15	2,96
c'''	184	0,20 Fe	3,70	3,32	2,96	2,96
c''	366	0,23 Fe	4,88	4,34	3,85	3,90
c'	713	0,26 Fe	5,92	5,21	4,35	5,00
c	1207	0,33 Fe	6,80	6,10	5,38	8,05
C	1727	0,47 Cu	7,65	6,80	6,06	10,06
F1	1835	0,67 Cu	7,85	6,85	6,20	20,16
A	B	C	D	E	F	G

1. The comparison between the columns F and G shows - first, that the more we are going to the treble of an instrument, the more the stress of its strings, for the given frequencies, gets close to the breaking stress. That explains the fact that the bass strings are complete on the old instruments, which is rarely the case with the treble ones.
2. The comparison between the columns D and G shows quite well that the strings would have hardly hold in the "A" 440. Let us now make a digression to specify that, with the modern steel the problem is simple : a modern string of 0.20 mm  $\phi$  has a breaking stress of 9.40 kg. Is that not dangerous ?
3. The remark made in paragraph 1 allows the inference that the most useful information can be obtained from the highest strings. Effectively, considering the results,  $f'''$  string would not have hold at 440-1 tone ; the string  $C'''$  is at breaking point ; only the string  $C''$  would hold.

We shall abstain from giving our opinion about this problem of the pitch. It is a matter of mean values. Yet let us add that should we take as RRmm<sup>2</sup> for our old strings the highest of the values registered on the sample, (that is to say RRmm<sup>2</sup> = 110 kg/mm<sup>2</sup>) the results would be as shown in the following table (table 3').

Note	440 - 1/2 tone (kg)	440 - 3/4 tone (kg)	440 - 1 tone (kg)	B. S. (kg)
$f'''$	3, 55	3, 32	3, 15	3, 46
$c'''$	3, 32	3, 10	2, 96	3, 46
$c''$	4, 34	4, 05	3, 85	4, 45
	E'	H	F'	G'

TABLE 3'

With reference to  $f'''$  the instrument would have been at 440-3/4 tone

The value obtained for  $C'''$  and  $C''$  would bring us to think that the instrument was at 440 - 1/2 tone.

There is another way allowing, perhaps, to make clear this matter of pitch : the change of metal at level of B and c . We can see that B is strung with a brass wire of 0.33 mm in diameter, and c on the contrary, with iron of 0.33 mm in diameter. In other words, the resistance of brass wire was such as it would "hold" in B but would break in c .

What might have caused this change in metal ? Surely the purpose of sonority ! But we shall never know the exact ground. Nevertheless let us make some simple calculations again. B length is 1237 mm. What are the respective stresses (the breaking stress is the highest registered on the copper strings).

Note	Length (mm)	Diameter (mm)	440-1/2 tone (kg)	440-3/4 tone (kg)	440 - 1 tone (kg)	B. S (kg)
B	1237	0,33 Cu	6,01	5,70	5,40	5,83
c	1207	0,33 Cu	6,60	6,25	5,86	5,83

TABLE 4

So we can see that it was not possible to use brass 0.33 mm in diameter for the note c . Really, it would have been to string in "more fine" way ; as our purpose was not to solve the problem of the pitch of old harpsichords, we shall stop here talking about those theoretical datas, in order to describe one practical experiment.

Having the possibility to make such strings as those, we are interested in, with a B.S. value identical to the highest registered ones, we have noted the following :

To carry out these experiments we have used an instrument being an exact reproduction of a RUCKERS (transposing type) but which has not

been modified at the level of the bridge peaks and of the nut : having thus, the length of the strings of origin ! The original instrument has an eight foot and a four foot. As we had decided to change the 4' for an 8', we have placed that second 8' on the left of the original 8'.

There was no problem to string the original 8' (A' 440 - 3/4 tone). But we were very surprised to note that it was impossible to string the three high octaves of the second 8'. We finally decided to string this latter set with modern material. We had been very careful to maintain the exact construction of the case of the original : thickness of the ribs, dimensions of the bars ... strictly identical to the original instrument. It was that strictness which caused us the second surprise ; the modern strings of the second 8' having this dangerous (and pleasant) characteristic of not getting so easily broken, gave a too strong stress to the case, thus causing even an alarming shape of the sound board.

It was finally possible to string with our strings, and restore a normal shape of the sound board by shifting the keyboard by half a tone and placing our second 8' on the right of the original 8'. Is it not the solution indicated by VAN BLANKENBURG ?

Let us postpone this question, since the above figures and experiment could tempt us to propose conclusions the more uncertain as there is a shade over our demonstrations. In fact, are we sure that the measured parameters are the exact representation of the characteristics of the strings used at that time ? What have been the changes they have experienced during that silent period between time being and that when they still used to sing ? These points could be made clear perhaps by using quite long demonstrations based on other parameters (elongation, yield stress, hardness, coefficient of decoy ...). Let us stay where we are and hope that other researches will prove us wrong or right.

Each of us will be able to draw by himself conclusions from our researches and make all the good from them. As to us, we are chiefly thinking of the instruments which have undergone a restoration or are being restored. There is, undoubtedly, a risk in cording with material which is not identical to the strings used by the maker of the original instrument. In most cases, it seems that the ancient makers had designed their instru-

ments according to a given stress. Researches should be made - or have been already made (we would be happy to learn about the results). - to find out to what degree some instruments were under or over - sized.

We know that the B.S. of a springsteel string of 0.20 mm diameter is of 9.40 kg. If we string the C<sup>'''</sup> of our TASKIN we shall go up to g<sup>'''</sup> without breaking it. That margin is quite generous compared with the interval left by the old strings. To conclude with a last numerical data, let us just see what is the margin left by the old strings. VAN BLANKENBURG specifies that it is difficult to keep a string in unison and on the left of a given string. Concretely speaking, the stress of our c<sup>'''</sup> (∅ 0.20 mm) is 3.32 kig (column E - table 3). With an increase of 18 mm in length the stress of the same string will rise to 3.98 kg. The B.S. being of 3.46 kg.

These are only figures, indeed ! But, when added to the experiments and observations we have made on old instruments, they prompt us to a cautious attitude.

Few are those among us who have the pride and assurance of being able to call themselves the grand-son or the son of a harpsichord maker ; so let us change tradition for researches both patient and various ; the instruments are the answers ! Will we be apt to ask the questions ?

At last, we want to thank all those whose great kindness was equal to capabilities, and who gave us a helpful hand in these researches.

Rémy GUG

Strasbourg, July 1976

NOTES : 1. The tensile tests have been made on an electronic dynamometer, with electronic registering of the variations in forces and elongations. We have complied with (French) standards ruling in industrial field.

2. The two mean values in this table are not the average of the extreme values, but the sum of the values of each test divided by the number of tests.

## NOTES ON COMM. 105 .

Eph Segerman

## 1. The term "breaking stress".

In some obscure engineering texts "stress" is synonymous with "force", but by far the most usual practice in English is to use "stress" to mean "force per unit area". Thus "breaking stress" is what is called RR/mm<sup>2</sup> in this paper and "breaking force" is what is called "breaking stress" in the paper.

## 2. Comparing values for breaking stress.

There is a problem in comparing the values for breaking stress used by various authors. In our article "Strings in the 16th and 17th Centuries (G.S.J. XXVII (1974) 48-73) we used the old-fashioned scientific unit dynes/cm<sup>2</sup>. Gug uses the continental engineering unit Kg/mm<sup>2</sup> and engineering books in English often use pounds/inch<sup>2</sup> (psi). Karp in the last issue used the modern SI scientific unit of megapascal (MPa) which is Newton/mm<sup>2</sup>. The following table shows how to convert measurements from one unit to another.

	MPa	dyne/cm <sup>2</sup>	psi	Kg/mm <sup>2</sup>
MPa	-	1.000x10 <sup>7</sup>	145.0	0.1020
dyne/cm <sup>2</sup>	1.000x10 <sup>-7</sup>	-	1.450x10 <sup>-5</sup>	1.020x10 <sup>-8</sup>
psi	6.895x10 <sup>-3</sup>	6.895x10 <sup>4</sup>	-	7.031x10 <sup>-4</sup>
Kg/mm <sup>2</sup>	9.807	9.807x10 <sup>7</sup>	1.422x10 <sup>3</sup>	-

Let us call a unit in the column on the left A and a unit along the row on the top B, and a number in the table T. Then one A = TB. If your stress is a number S<sub>A</sub> in A units and you want to convert it to the value S<sub>B</sub> in B units, S<sub>B</sub> = T x S<sub>A</sub>.

## 3. Comparison of breaking stress data.

Gug unfortunately does not compare his measured data with other data on similar material, either old or modern. Karp stated in Comm. 83 that wrought iron wire cold drawn to the maximum of 90% diameter reduction can reach a breaking stress of 125 Kg/mm<sup>2</sup> and skilled workers could reach 150 Kg/mm<sup>2</sup>. With a maximum value of 110 Kg/mm<sup>2</sup> it is clear that none of Gug's strings was of the Karp super-strong type. Mersenne's measurements on an iron string gives 8.2 Kg/mm<sup>2</sup> and on red copper and bronze strings give 8.0 Kg/mm<sup>2</sup> (from our G.S.J. article mentioned above). Gug's iron or steel strings are consistently stronger than Mersenne's iron and modern values for pure iron, indicating that they are some kind of steel or that they have been treated somewhat in the way Karp suggests. Gug's copper alloy strings are much weaker than Mersenne's but are very ordinary when compared to modern values.

## 4. Other Data.

To have access to museum objects centuries old, and to be able to experiment with them without having to observe the reversibility rules of conservation is a rare privilege. We need to know everything we can about early strings. In his first sentence Gug states that he has measured many parameters on the strings. This is

the right way to use such an opportunity. This paper was very disappointing to us because he has offered only general data on tensile strengths (breaking stress). Is there any correlation between tensile strength and type of instrument or probable age of the strings? Of greater importance is a chemical and physical analysis of the string materials and a search for correlations between these and the other factors mentioned. The best test of whether one has successfully analysed the composition and fabrication of an early type of string is to reproduce it and then find that it has the right measured properties. Since Gug is commercially selling red copper strings for harpsichords which he claims were developed from analyses of original strings, we presume that he has successfully completed these analyses. We sincerely hope that he intends to publish these data since a claim of authenticity without divulging the scholarly basis for this claim is empty indeed.

5 We applaud the message that in stringing of harpsichords one should be very concerned about the relationship between the breaking stress of the original strings and the scaling and pitch standard. This relationship is independent of tension though, and Gug's report of modern stringing distorting the case and soundboard just indicates that his strings were too thick making the tension too high. This has nothing to do with the message.

FoMRHI Comm. 106.

Review of:

Cary Karp, Basic Keyboard Tuning Technique, Rapport nr.13, Musikmuseet, Stockholm, 1977; 6 pp. Available free on request to the author at: Musikhistoriska Museet, S 111 30 Stockholm, Slottsbacken 6.

Jeremy Montagu

This is a useful guide for setting Pythagorean, Meantone (no indication of which; presumably Aron's quarter-comma), Werckmeister III, Kirnberger III and Equal Temperament. It is brief, clear, informative and free, and I hope that more people will write and ask for it than asked for the last free paper which Cary and the Musikhistoriska Museum were generous to offer (see the last page of Bulletin 9 in the last issue under Cary Karp).

As Cary says, though more politely, a lot of guff is written about tuning and temperaments which complicates the whole thing if all you want to do is to tune your instrument. If that's all you want to do, all that you need is access to a keyboard instrument, the ability to hit it (clavichords are more complicated because getting equal tension on each key, and thus avoiding stretching one string more than another, requires practice), a tuning hammer or key that fits the wrest pins, a tuning fork (preferably a C rather than an A) and this six page pamphlet. If you want to know the whys, wherefores and details in cents of all the various temperaments, there are a number of books on the market, probably the best of which is J.Murray Barbour's Tuning and Temperament, Michigan State College Press, 1951, and Da Capo Press, 1972, but you will still need the items listed in the previous sentence in order to actually do the job.

All the processes are very clearly described in this pamphlet and it is very highly recommended to all beginning tuners and to any more experienced ones who, like me, find the job difficult and tiresome.

DETAILED COMMENTS ON "THE WORLD OF MEDIEVAL AND RENAISSANCE  
MUSICAL INSTRUMENTS" BY JEREMY MONTAGU. PART III

53.85.1 The "Triumphs" woodcut referred to with three lutes and two viols shows string lengths (measured by the method in the Appendix of Comm.39) of about 70 cm for the two viols and one lute, and 60 and 80 cm for the other two lutes. Maximillian called the viols "rybeben" and used no modifier to indicate size. Later 16th century writers could have called them "tenors" or basses". Modern writers must try to resist making tidy timeless categories that early musicians would not have recognised if we are to continue trying to find out about their relationship to their music. As for the names for the lutes, none was given in this woodcut but the lute in the one described in the next column and shown as Plate 62, having a string length of about 70 cm was described by Maxmillian as "large lute". I don't know what he would have called the other two lutes in the first woodcut mentioned above.

54.85.2 The statement that the violin was newly invented before 1519 depends on one's criteria for distinction between violins and other fiddles. My definition of the instrument type is "individually bowed strings tuned in fifths on a fingerboard instrument with a shallow body having essentially a flat back", and thus I traced it back to an indeterminate time before Tinctoris. Some violin scholars trace the beginning to the first recorded use of the word "vyollon" which was in 1523 in Savoy or, "violino" which was in 1538 in the Vatican. Other for identification insist on the appearance of the characteristic pointed corners bracketing the waist on both sides of the instrument, and they consider the Ferrari painting at Vercelli (Plate XI) the first. My definition of the individual instrument is "that example of the instrument type with string length of about a foot tuned g to e" <sup>and</sup> "I would put the beginning quite late in the 16th century. On p.114 J.M. seems to state that 4 strings and a few visual similarities will suffice.

55.85.2 and caption of Plate 62. Since English equivalent names are used whenever possible, "gittern" should be used instead of "quintern". The string length is about 50 cm. The viol is the same size as the two mentioned in 53.85.1 and does not deserve a different name whatever nomenclature is used. The use of the term "Broken Consort" in the caption is inappropriate. Warwick Edwards in his introduction to Musica Britannica XL "Music for Mixed Consort" shows why but Edwards doesn't go nearly far enough (I am writing a Comm. on the use of the word "Consort").

56.87.1. I have not yet found gross inaccuracies amongst instruments in Virdung's illustrations which I have compared with other sources.

57.90.2. Bosch's (d.1516) drawings of the hurdy gurdy are straight-sided as the example in plate 67 is. Twelfth century hurdy gurdies such as in Bachmann's illustrations 77, 78 and 80 had waists like Virdung's "guitar-like" one. I do not see the trend in shape claimed in the text.

58.91.1 I don't quite understand what a 16th century "folk instrument" was. Does it mean lower class, requiring low technical skill or something else?

59.92.1 The 16th century statements concerning 4 different sizes need to be taken very seriously. On careful paintings showing two middle size viols which would have been tuned identically we can see small differences which would favour resonance and playability in a higher range for one and in a lower range for the other. To assume just because one can't see the difference in an illustration that for some instrument families the two middle instruments could have usually been identical when early writers said they were different is foolhardy.

60.93.2 The Nurnberg GNM claims that their trumpet marine MI2 is 16th century. If so, it is very atypical of that century and it lay dormant until the 18th century when it became a model for instruments typical of that period.

61.96 bottom. Jeremy missed the recorder sitting behind the bass viol (not violone). By the 17th century, miniature 'lutes' like the one illustrated were usually called "mandoras" and not "treble lute" or "quintern". The dancing master's fiddle would more likely have been called that or pochette than rebec at this time. The little instrument on the chair would probably have been called "treble violon" where "violon" meant the 16th century family in the French sense: it was tuned a fourth higher than the Italian violino. The two viols facing forwards leaning against chairs would probably have been called "tenor" and "alto" (notice how the body sizes differ much more than the string length, thus illustrating 59.92.1),

62.110.2 and 112.1 When Morley specified "treble viol" in his "Consort Lessons" there is no evidence whatsoever that he meant anything other than treble viol. Nevertheless he probably would neither have been surprised nor annoyed if a performance used a violin or a second lute or cittern to play that part. The data concerning deviation from the prescribed instrumentation indicates that such prescriptions were considered advisory rather than obligatory. Similarly Dowland should not be insulted by claiming without supporting evidence that he did not mean "violons" when he listed them as a suggested instrumentation for his "Lacrimae". I am convinced that we have not yet heard a proper set of C.1600 violons (or viols for that matter) so as to be able to pass a comparative aesthetic judgement (which wouldn't be a constructive thing to do in public anyway).

63.112.1 As Bachmann's illustrations show, all medieval fiddles were not large instruments and they were not "always played upwards". The best candidate for the precursor of the viol is the plucked viola (or vihuela da mano). In the 16th century the viols were not always played downwards, but when so held they rested on the floor or a stool as readily as on or between the knees.

64.112.1 In medieval times "Geige" or "Giga" probably referred to a round-backed instrument more often than not (see 11.25.2). We might expect the same for cognates of "rebec" such as "rebebe" around 1500 (see 53.85.1). Yet Virdung and Maximilian used these terms for viols. Whatever happened to the various cognates of "viol" in German (see http://www.viol.org etc.) by 1500?

- 65.112.1 I don't see the same shape in *Virdung* as in Maximilian's 'Triumphs' and they are both central European. The more pictures I look at the more diversity in viols I see. The late 16th century viols such as in plate 85, that survive (in museums but very rarely in pictures) are all from the region of Venice, and the strongly tapering upper bouts is probably a regional rather than temporal feature. My date estimates are Antonio Ciciliano 1570 and Francesco Linarol 1565.
- 66.112.2 French viols usually had 5 strings in the 15th century.
- 67.112.2 The case against sound posts in the 16th century viols is much stronger than that against bass bars (some certainly did have bass bars).
- 68.112.2 Very little is known about string tensions on fingerboard instruments before the 19th century since original strings or string gauge prescriptions have rarely survived. Thus J. M.'s claim of the structural needs of soundpost and bass bar to prevent soundboard collapse cannot be directly refuted. Yet the acoustic functions of each of these as mechanical-acoustic amplifiers is so marked that I can't see how the instrument maker seeking more loudness and introducing one or both of these would not have been satisfied and would feel the need to increase the loudness further by increasing string tension. 17th century viols could easily have had less tension than those without soundposts in the 16th century.
- 69.112.2 In the Renaissance and the Baroque the English rarely used the term "viola da gamba" but used "viol" which was rarely used for a particular instrument without a modifier indicating the type.
- 70.113.1 The two strings running beside the neck on the *lyra da braccio* (which was a noble and important Renaissance instrument worthy of as much attention as the violin in this period) should not be called drones since they did not sound all of the time. Lanfranco called the first three strings "Canto" "Sottanella" and "Tenore", the 4th and 5th "Bordon acuto" and "Bordon grave", and these two strings in question "Basso acuto" and "Basso grave". "Bass" will do.
- 71.113.1 There is no such thing as a standard *lira da braccio* shape. The illustrations in Witten's article in *JAMIS* show the wide variety of shapes. Witten also convincingly shows that the data of the *lyra* in plate 86 by Giovanni Maria da Brescia is 1575-1590, so the similarities of its shape with that of the violin are probably because the violin influenced this *lyra* rather than the other way around.
- 72.114.2 Boyden's 1556 reference is to *Jambe de Fer* where the only description was that it resembles the viol. Three tunings for the 4 sizes ("dessus", "haute contre", "taille", and "bas") are given. Each has 4 strings tuned in 5ths throughout with the nominal pitch of the highest string being e' a' and g. The bas nominal tuning is a tone lower (and note the same as) the modern violoncello. With the gut usually available then, the bas would have had a string length of 90-110 cm if the dessus was a standard violin. The iconographic evidence indicates that the given

itches are about a 4th lower than the actual pitches (at  $a' = 440$ ). Jambe de Fer was careful to state that he was quoting what the players said that the pitches were when he gave them.

73.114.2 There is no data I know of supporting the statement that the redesign of the violin at the end of the 18th century was associated with an increase in string tension. The set-back neck and higher bridge greatly increased the pressing force of the bridge on the soundboard, which in itself increased loudness.

74.114.2 The viola in plate 88 has not been restored to its original state. The fingerboard is too long.

75.116.1 In the 16th century the belly and back often did overhang the sides. French viols had 5 strings tuned completely in 4ths. The bass viol player in the background left of plate XV held his bow palm-downwards.

76.116.1 We cannot tell how far back the bass bar and soundpost on the violin go. The soundpost was first described in 1635 by Mersenne and mentioned (in the name of a character James Sound-Post in a clearly musical context) by Shakespeare in 1592 (*Romeo and Juliet* iv.v.138). What looks like a bass bar can be seen through the sound hole in some medieval fiddles in paintings but the Linarol violin dated 1581 in Vienna (C96) clearly never had a bass bar.

77.116.2 The statement concerning the shape of the arching would make it such that the appearances of the total amount of arching in paintings such as plate XI most misleading. The Linarol violin has an arching of 3.4% of the maximum width which is less than that of any of the Venetian viols contemporary with it.

78.118.1 Concerning lute shapes and Laux Maler, see 43.65.2. The 16th century paintings and drawings show many more pearl-shaped than pear-shaped lutes.

79.118.1 Lutes were made in many different sizes, with various factors governing choice of size (i.e. technical complexity of music played, tonal preferences, hand size, voice range to be accompanied, etc.) but because it is a complete polyphonic instrument in itself (like an organ) there was no strong need to make different sizes to be able to play together. Of course different sizes did play together but the making of sets to be kept together for playing together was not a general practice with lutes as it was with primarily melody instruments. The three instruments in plate 89 were clearly, from a design point of view, not made as a set.

80.118.1 Not one of the three instruments in plate 89 can be considered typical lutes. The one on the left by Venere (who was not Tieffenbrucker according to Witten) has an original back, belly and bridge for 7 courses (as one can see from the stars on it) but it has been converted to a 5-course guitar with a replaced pegbox, and if the neck is original, it has probably been narrowed. The middle one actually is a lute (but not a quintern). The bridge and fingerboard are probably replacements. But at 44 cm string length it is unusually small for a treble lute. The one on the right is correctly labelled "mandore" and thus is not a lute.

- 81.118.1        The string length of the majority of strings on the instrument on the left in plate 90 by Venere is but 69 cm (5cm more than the one on the left in plate 89) so that it is questionable whether it deserves the name "bass lute". Its history needs no speculation since Piccinini in 1623 described his invention of it and his difficulties with it which prompted his subsequent invention of the archlute (which was so successful that the larger theorbo using the archlute principle soon followed). The middle instrument in the plate is an archlute or liuto attiorbata. The one on the right has a stopped string length of 67 cm which is much too small for a proper chitarrone or theorbo for continuo at standard church or opera pitch. That string length is appropriate for an archlute or liuto attiorbata but the unstopped to stopped string-length ratio of 2 is not (see Comm. 59). It was probably a solo or vocal-accompaniment instrument which could have been called a chitarrone or tiorba (Banchieri's usage) or tiorbesca or archlute or liuto attiorbata - not being typical of any of them.
- 82.118. 1 and 2    A "crooked extension to the head" is typical of the 18th century German theorboed lute and not of the theorbo. No distinction between chitarrone and theorbo should be made.
- 83.118.2        Five-course lutes were very rare in 1582 and because of the bridge, the left instrument on plate 89 wasn't originally one of them, yet Mace (p.39) mentioned the existence of lutes with 10 strings in his youth in 1621, so J.M. is not completely out of court.
- 84.118.2.        Lute first courses were usually single except in England and Italy in the 1580's and onwards.
- 85.118.2.        The Maler lute in plate XIII is in the classical French later Baroque state used in the 2nd half of the 17th century and early in the 18th century, the pegbox carrying 9 double courses and two single courses. The "d-minor" tuning was usually used with the basses descending diatonically (whole tones and semitones as required). Dowland never saw such a lute. His earlier solo music requires 6 or 7 courses in Renaissance tuning. His songs require another course between the 6th and 7th - 8 in all. The "Lachrimae or Seven Teares" publication requires 9 courses.
- 86.118.2.        Changes in temperature and humidity affect thick gut strings at least as much as thin ones.
- 87.118.2        I tune my cittern each time before playing. I don't know of any cittern player who doesn't.
- 88.118.2.        The robustness of the back has little to do with staying in tune. The English citternist who so impressed Praetorius had half of the back of his cittern open but didn't seem to mind.

- 89.119.1 Winternitz was concerned with vestigial traces of the Kithara, (as is correctly stated on 13.1). He also correctly traced the 16th century cittern to the 15th century cetra. The gittern is quite irrelevant to the cittern's history until the 17th century when they start interacting.
- 90.119.1 Six double courses were rare in the 16th century. The French and English citterns had 4 courses of pairs and triplets while the Italians had any number from 4 onwards in singles and pairs.
- 91.119.2 We might expect that the Bolognese chitarroni which used wire strings (as reported by Piccinini) used gut frets.
- 92.114.2 The Rose orpharion could well have started its existence as a cittern but its conversion to an orpharion probably happened in the 16th century. Whether the orpharion is a cittern is a matter of definition. If reentrant tuning is essential, as some people assume, it is not.
- 93.119.2 According to Talbot, the orpharion was used in the 17th century as a thoroughbass instrument. With good reason it was often confused with the bandora which Roger North admired. A descendent of the bandora called "pandore en luth" in l' Encyclopedie was used in the 18th century. The bandora was invented in 1582 so it had quite a respectable life span.
- 94.119.2 The guitar did not have a deeper body than the bandora. According to Talbot, at its middle the guitar is 1/8" less deep than the bandora. The tones cannot be compared for resonance since they are so different and respond so differently in different acoustic environments.
- 95.119.21 I know of no early use of the term "treble cittern". The history of cittern descendents in the 17th century and onwards is complex and cannot be simplified to the statement made. It is irrelevant to the topic of the book so I won't go into it. The same holds true for the history of the mandolin.
- 96.120.2 The vihuela Prynne studied is a far cry from the plucked viola of the early middle ages which begat so many European bowed and plucked instruments (e.g. at some time inbetween the lute contributed its tuning).
- 97.120.2 The guitars painted by Watteau were baroque not Renaissance guitars. The last vihuela book was published over a century before Watteau was born.
- 98.120.2 Many gut strung guitars also had rounded backs.
- 99.120.2 According to Piccinini the large bass lutes were not being played as much towards the end of the 16th century as earlier. If J.M. is thinking of large theorboes, these were a 17th century phenomenon. I'm not sure I know what "sustaining an ensemble" means.

100.120.2      A harp with a single row of strings need not play only in a diatonic scale in the 16th century. Agricola's Polische Geigen were stopped in midair with the nail and so there is no reason why harpists could not do the same to get chromatic notes. The harp described by Hinestrosa (as well as the Irish harp described by Praetorius) had chromatic strings distributed amongst the diatonic ones in the string row (so deducing range of a harp by assuming 7 notes per octave could lead to error).

FoMRHI Comm. 107.

Varquain Hurdy-Gurdy Drawing by E.R.Turner

Bryan Tolley

I recently received for review a drawing of an 18th century French hurdy-gurdy by Varquain that is currently in the University of California, Berkeley. The drawing is full size and superbly detailed showing several views and sections of a small but attractive instrument having the usual six strings and a guitar shaped body. All the decoration on the instrument and the carving on the pegbox is shown including the traditional figurehead. The soundboard is of maple stained black and purfled around the edge with alternate blocks of ebony and ivory. Although not drawn in a conventional orthographic projection, the layout of the views is such that the drawing is easy to follow and economical on paper. As well as the main elevations the draughtsman has included several isometric sketches of various component parts of the hurdy-gurdy together with a view of the complete instrument.

From a makers point of view it is an excellent plan from which to work. Clear detail is given for the construction and ample dimensions ensure that a faithful reproduction can be made. Internal strutting and bracing is not original but conjectural being based upon methods use upon similar instruments of the same period. The struts appear rather hefty for such a small hurdy-gurdy so I would expect a rather thin tone.

A useful table of tangent positions is included as well as a tuning guide although I feel sure that the treble drone (la bouche) should be at G and not at A as indicated. This instrument is without a trompette drone, and despite the fact that one could easily be fitted (at the expense of authenticity) it seems a shame that the instrument is devoid of a most characteristic attachment.

The drawing is decorative, well presented and detailed, and with a complete set of materials and dimensions for the craftsman to follow. I fail to understand though why this plan copied on a single sheet of opaque plastic film costs £11:50 when this is probably more than the bulk of the material will cost to make the hurdy-gurdy!

A copy of this drawing can be obtained from John Barnes, 3 East Castle Road, Edinburgh, EH10 5AP or from the draughtsman Edward R.Turner, North Pender Island, B.C. Canada. See October 1977 bulletin for the postage rates.

Wouter Scheurwater and Job van Acht, *Old Harpsichords, Their Construction and Restoration*, No 2 of a series of illustrated books issued by Haags Gemeentemuseum in association with Frits Knuf, publishers, Buren, Gelderland 1977, 64 pp., illustrated, text in Dutch and English, 30 Hfl from Frits Knuf, available for cash sales at the Museum bookstall, 10 Hfl.

John Barnes.

The preface says "This booklet places one of our restoration workshops in the limelight ... We are proud to add to our publications by this first technical guide, and hope that this book will fulfil its purpose for our readers and visitors". The introduction states "The modest form of this book means that it does not pretend to be a scientific treatise; it merely aims at providing a survey of what is involved in building and restoring old keyboard instruments, and it is primarily intended for a wide public, interested in music and instruments in general and restoration in particular ... Obviously this presentation ... will be of special use to the growing group of builders of copies of old instruments, and also to those interested in restoring their own keyboard instruments".

The first question raised by these remarks is whether the limelight reveals good practices at the Museum and the second is whether readers "interested in restoring their own keyboard instruments" are given good advice. Unfortunately, the answer in each case is no.

Following a section which describes the different shapes of plucked keyboard instruments and the way the mechanism works, is a section headed "Why instruments are restored". Here it is explained that "Historically responsible restoration can enable instruments of former times to be played again. They then form a very important contribution to the historical interpretation of the music of those days, an interpretation based on the original sound of the period in which a particular instrument and a particular composition were made". One would like to see a clear explanation of what is meant by "historically responsible restoration", what are the alternatives to restoration, what are the advantages and disadvantages of restoration, how one chooses the most suitable instruments for restoration, and how restored instruments should be conserved. Unfortunately the treatment is unsystematic and fails to mention the fundamental objection to restoration, which is that it often results in the loss of organological information. Consequently, the authors never acknowledge that sincere people might balance the advantages and disadvantages of restoration in different ways and might have different views on how a restoration, once decided upon, should be carried out. Instead, they say, in effect, that restoration is a good thing provided it is done responsibly and with adequate resources, they discuss some very dubious criteria for choosing the instruments for restoration, and embark on "A few restoration guide-lines" which are either unhelpful or misleading. These subjects are, I think, of great importance, and the following quotations raise so many questions that the clearest way of dealing with them is by placing quotation and commentary side by side.

P17 The choice of instruments to be restored mainly depends on two things:  
 1 the general state of the instrument  
 2 the available technical means and resources for carrying out a successful restoration.

If there is any doubt, the right decision would be not to embark on restoration at all, for there can be several, often widely divergent reasons for an instrument's unsuitability for restoration.

One such reason might be that an essential part is missing, in which case there would not be any clear connection after restoration between a replacement and the instrument in its original form, so in its historical context.

Another reason might be the fact that earlier restoration (better referred to as repairs) has altered or extended an instrument in such a way as to have mutilated it beyond repair.

Instruments, finally, which cannot be restored for any of the above reasons ought still to have a place in museum collections to act as study material for builders and restorers. In this fashion they fulfil no mean function in restoration.

A better approach is to consider each instrument in turn to balance the advantages (presumably an attractive and successful musical instrument, together with information on its construction and history) against the disadvantages (possible loss of information, the employment of current restoration techniques and knowledge instead of those available in the future).

This is vaguely reassuring.

If an "essential part" is missing it may be possible to make a new one copying the part from another similar instrument. Whether this should be done depends on what part is missing, how it attaches, and how similar is the other instrument.

It is unclear whether this refers to alterations or extensions which took place during the instrument's period of legitimate musical use, to undesirable attempts at makeshift repair when the instrument had little value or to attempts at repair or historical restoration in modern times. What should be done about an alteration depends on which of these three categories it belongs to. The result of alterations is usually to impair the instrument's historical value, and hardly ever to "mutilate beyond repair".

The Dutch text here reads "Instruments, finally, which cannot be restored to their original state etc" which is materially different. But in any case the authors ought to be discussing not whether a restoration is possible (it usually is) but whether it is desirable (it often isn't).

A few restoration  
guide-lines

1 The first point of departure in restoration should be for the restorer not to make any alterations whatsoever to the historical aspect of an instrument. If this principle is kept to, the builder's intentions will always prevail over the restorer's technical knowledge and skill.

In practice, the restorer has to begin by investigating the alterations exhibited by the instrument, deciding the period and purpose of each alteration and whether restoration should reverse it or preserve it. The authors, however, in so far as their meaning is clear, seem to insist solely on absolute respect for the original state and rely on this to ensure a happy outcome of any conflicts between the builder's intentions and the shortcomings of the restorer.

2 For successful restoration it is necessary for the restorer to be inspired by the instrument he is working on, so that his expertise and professional skill are completely at the service of historically reliable restoration.

If there is a choice between an "inspired" restorer and one who objectively researches the evidence and bases his restoration on scientific and ethical considerations, I recommend that the former kind should be treated with great suspicion.

3 By making use of "old" material and "old" techniques a restorer will be able to create as close an approximation as possible of an instrument in its original state.

The use of old material in a restoration can be highly misleading, even when accompanied by explanatory documentation. The use of old techniques, however, is usually to be recommended.

4 It should always be possible to reverse restoration; i.e. repairs should always be carried out in such a way that an instrument can at all times be returned to the condition in which it was found without any harm being done. This idea of reversibility means that it should always be possible to perform other restorations at a later date according to new information or ideas.

There are degrees of reversibility. Some operations are completely reversible eg. the detaching of a jack or other discrete part, some are for most practical purposes reversible e.g. the gluing or ungluing of a joint using a soluble glue, while some are nearly reversible, e.g. the cutting away of a hammer covering, preserving the old part and refitting a new copy. Some repairs cannot be done in a completely reversible manner, e.g. the repair of a broken jack tongue, but the irreversible part of the process, e.g. cutting back the broken surface for jointing, may be justifiable.

A reasonable, popular treatment of "Photography and Documentation" and of "Decoration and Motifs on the Instruments" is then followed by "Construction and Restoration of Three Instruments from the Collection", (P21) in which it is assumed that "The ultimate goal, that of re-creating the original state, will however always be the

prime consideration". When dealing with altered instruments like the Andreas Ruckers of 1639, the second restoration to be described, this is an opinion with which most restorers would now disagree. Following the publication by ICOM in 1967 of Preservation and Restoration of Musical Instruments, by Berner, Thibault and van der Meer (reviewed in Comm 91, PomRHI Oct 77) there has been general agreement with an important principle suggesting that instruments which have been altered in the course of their history should usually be restored to the last state of legitimate musical use. The reason for this is that restoration to an earlier state usually involves the sacrificing of some historical material in the changes that the restorer then has to make. These disadvantages are well illustrated by the restoration of the 1639 Ruckers, described here (P 45) and also described in J H van der Meer, An Example of Harpsichord Restoration, Galpin Society Journal XVII, 1964, P 5. The instrument was restored to a rough approximation of its original state, involving the extensive rearranging and cutting about of the keys, jacks, etc., dating from an extensive 18th century rebuild. This restoration can hardly be said to follow the fourth guide-line quoted above. On the other hand, it is obvious from a reading of Dr. van der Meer's article that an honest attempt had been made in 1962, when the restoration was performed, to advance the science of instrument restoration. Dr. van der Meer began the article by stating that it was meant "for my colleagues, curators of musical instrument collections", and begged them to "make their opinions known concerning the decisions taken". The actual 1962 restoration is done, and has contributed in various ways to the changes of opinion which have happened during the last fifteen years. But by publishing in 1977 an account of the 1962 restoration without discussing its controversial aspects, the Gemeente Museum give the impression that the restoration would be performed today in exactly the same way (perhaps it would be, at the Gemeentemuseum).

One has sympathy with the restorer of the Celestini spinet of 1589 whose work was much increased by that of a previous repairer who had used resin glue with liberality. The account of the restoration, however, by the use of phrases like "resonance space", "free development of the tone", "amplification by means of the parallel surfaces" and "acoustic relationships in the instrument" strongly suggests that an imperfectly understood subject is being discussed in a pseudo-scientific manner (P 32).

The third restoration described in the book is of a clavicytherium c 1760 by Albert Delin which involved extensive work on the soundboard described as follows (P 59). "The clavicytherium's soundboard was seriously affected by woodworm, with the result that it could not take the string tension in the treble. This part of the soundboard could only be saved by removing the entire soundboard and planing its back down smoothly to an extremely thin fragment at the affected part. The application of a thin layer of spruce to the back with a thin, warm glue, the whole being brought to the correct thickness, made it possible to save the soundboard."

This appears to have been a difficult and delicate repair and the result was probably satisfactory both musically and

visually. But this irreversible process hardly fits the description "saving the soundboard". If the badly affected part is localised and detachable, which from the description it seems to be, I would personally prefer to see the worm-eaten piece of soundboard removed in one piece for separate preservation and its place in the instrument taken by a piece of new wood of similar species, growth and thickness, stained and, if necessary, painted to blend with the rest. This would be almost entirely reversible, giving the future option, if some process of restoring wormeaten soundboard wood should ever become widely accepted, of putting back the original piece in its original place.

I believe that most general museums in European capital cities would reveal practices worse than those of the Gemeentemuseum if they were to focus attention on themselves. My compelling reason for expressing dismay at the appearance of this book is that, with the best of intentions, the Gemeentemuseum has produced a guide to the way restorations were done fifteen years ago. Such a book, produced in 1977 with the authority of an important museum, is potentially harmful and I hope that it will be extensively altered or withdrawn, or at least be accompanied by some additional cautionary remarks.

Mr. van Acht tells me that a gramophone record featuring the three restorations is planned, to be sold with the book in one cover. This may take two or three years, by which time a revised edition of the book may be possible.

FoMRHI Comm. 109.

Review of:

Gerhard Stradner, Die Musikinstrumente im Steiermärkischen Landeszeughaus in Graz; Sonderdruck aus Nr.6 der Veröffentlichungen des Landeszeughauses Graz, 1976; 36 pp, 6 illus. no price given.

Jeremy Montagu

This is a catalogue of the collection of military instruments in this local history museum. The introduction includes a list of local references to suppliers of instruments and the prices paid from 1550 to 1715, and the texts of inventories of instruments from 1590 to 1769. The catalogue lists ten fifes and four multiple fife cases, giving lengths and bores for the fifes and lengths for each tube of each case, makers' marks and approximate dates. It then continues to seventeen side drums, some of which are without counter-hoops which I find surprising as late as the suggested 16th/17th century, with a number of dimensions, including ratio of height/diameter and cubic capacity, neither of which I would have thought significant. It then lists thirty-five individual side drum sticks with numerous dimensions but no indication of whether any of the sticks pair with any of the others. One can, of course, guess from the given dimensions, but few surviving old sticks are as identical in length, diameter or weight as we expect today, whereas details of turning do match up much more closely, and these the author has seen but we do not. Even a suggestion of probable pairing would be much more helpful than nothing. There is an index of players and makers following the final entry, which is for two drum stands, and there are



romani ~~com.~~ 111.

Review of:

Erich Stockmann (ed.), *Studia Instrumentorum Musicae Popularis*,  
 Musikhistoriska museets skrifter, ed. Ernst Emsheimer,  
 Vol. I, 1969, Vol. II, 1972, Vol. III, 1974, Vol. IV, 1976, Vol. V, 1977.  
 All published by the Museum in Stockholm and all 100 Swedish  
 kroner except III which is 200 Skr (and which, being the Emsheimer  
 Festschrift, is edited by Gustaf Hilleström).

These invaluable volumes are the reports of the IFMC Study Group on Folk Musical Instruments. Each includes a number of separate articles in various languages, the majority German, some English and a few French. The first volume I reviewed in detail in *Ethnomusicology*, Vol. 17:2, May 1973, and the first and second in rather less detail in the *Yearbook of the IFMC*, Vol. 5 for 1973, and I do not intend to repeat any detailed comments here on those.

The range covered in each volume is considerable; there are articles on folk instruments, of course, as one would expect from the series title, but there are often also articles on early instruments and these are well worth the attention of us all. To my mind, the articles on folk instruments are no less important, for much may be learned of the manufacturing techniques, as well as the playing techniques and use of early instruments from those of surviving folk parallels. For the first two volumes it should suffice to list the contents with, if any, very brief comments, since the periodicals cited above should be available in any decent library.

Vol. I is mostly on classification and typology (there is usually a theme, sometimes more than one, running through each volume), starting with a general article on the typology of folk instruments. Hermann Moeck's article on European duct flutes falls short of its intent because not all his typological criteria are valid. There are two other articles on duct flutes, one Norwegian and the other Serbian; one very useful one on Swedish alphorns; three on bagpipes, Western European (J.H. van der Meer), Slovakian and Czech, all also useful; one on Russian gusle. There are four more general articles on the folk music of different areas.

Vol. II has two distinct themes, Acoustics and Ensembles. It begins with four fairly general articles and then continues with acoustical studies of specific instruments. First comes Swedish folk duct flutes, akin in type to the recorder; then two early pianos, a Silbermann and a Brodman; then a clarinet, make unspecified but presumably modern; then a general article on transcription. The articles on ensembles include Hungary, Slovakia, Bohemia, Bulgaria, Resia, France and one on the iconography of 18th and 19th century ensembles in Slovenia, winding up with a historical article on reed instruments, mainly single reeds. Many of the ensembles, incidentally, include instruments such as hurdy-gurdies, bagpipes and pipe and tabors that fall well within our orbit.

Vol. III is more than double the size, as well as double the price, of the other volumes in the series and its only theme is the desire to honour Ernst Emsheimer by providing an article on the most interesting subject possible, a theme which is admirably carried out. The most important article for us is Edwin Ripin's masterly study of the organ in van Eyck's Ghent Altar-piece, comparing it with the late 14th century positive from Norrlands in the National Historical Museum in Stockholm. Of equal importance is J.H. van der Meer's study of Italian harpsichord making, but instead of jumping around it is probably as useful to progress through the book from beginning to end. The first article is by Tiberiu Alexandru on the Romanian panpipe, a much more detailed article on this instrument than his brief note in the *IFMC Journal* followed by one on the transcription of Swedish

polskas, a dance dating back into the 18th or 19th centuries and which normally includes notes inégales. Alexandr Buchner contributes a very interesting illustrated article on the 14th century apocalypse fresco at Karlstein, the illustrations to which overlap with those in the second edition of his big picture book (they are not in the first edition, *Musical Instruments Through the Ages*) but the text is new, though there may be some overlap with his study in *Sborník* (that being in Czech, whereas this is in German, this study is much the more useful). This is followed by a short study of a paired single-note stopped flute, and that by one on koto ornamentation in 11th century gagaku. Brigitte Geiser has an article on Swiss citterns and cittern-makers, though what she calls Cister in German we would translate as English Guitars; they are all 19th century in date although the photographs (all full-face unfortunately) show that many of them retain features much more cittern-like than the English or Portuguese instruments; the pair of rudimentary wings at the joint of neck and body are common, for instance, and all those illustrated have pegs, all but one laterally inserted into long peg-boxes, the other dorsal in a peg-plate, rather than any form of machine head. This is followed by an article on horns and trumpets in the Old Testament (I am listing all subjects but only expanding on what seem likely to interest most of our members rather than myself), and that by one on recordings of Mongolian songs made in 1909. Next is one by Gottfried Habenicht on a Romanian bagpipe with cylindrical, single-reed chanter with a paired drone. This is followed by an article on hour-glass shaped drums from Nepal, with some information on construction as well as on technique and usage. Friedemann Hellwig contributed an article of basic importance on the terminology of European plucked instruments, with a multi-lingual vocabulary referred to a group of drawings. This is followed by one on instrumental folk music of the Bulgars, and one on aspects of E.T.A.Hoffmann's writings, one on the function of the musician in Slovenian folk tradition, one on the museum of folk instrumental music in Bohemia. Ola Kai Iedang writes one on the Norwegian langleik, the long box zither which is probably an ancestor of the American Appalachian dulcimer, in which the annotations of direction and method of plucking strokes are very relevant to the subject of stress and accent discussed in our own recent seminar. William Malm has an article on computers in musical instrument research. Next is an article on trumpet-type instruments used by shepherds in Bohemia by Jaroslav Markl, covering material and instruments relevant to us save that little or no work has been done on simple natural trumpet music which might have been used in our music (as distinct from the sophisticated music from L'Orfeo onwards for clarino). This is followed by van der Meer's article already referred to, covering most aspects of Italian plucking keyboards (it includes virginals and spinets under its title of Cembalo-bau) from the early 16th to the late 18th centuries. Hermann Moeck has written an article on walking stick instruments and another on Csakane and English and Viennes flageolets, the first a brief survey of types of instruments used in this way, the second a much more detailed article with a number of fingering charts for all three instruments. This is followed by a potentially very important article by Mette Müller on the Danish skalmjeje, a single reed instrument made by splitting and hollowing a piece of wood and forming the reed by thinning one of the pieces at the mouthpiece end, the block being formed in the other piece, and then fixing them together; the instrument is of unknown age and may derive from or may precede the clarinet; in either case it would seem to have potential as a possible chalumeau antecedent for those of us most willing to stick our necks out and experiment with a new sonority in early music. While there is no

evidence that such instruments were used in early instrument, there is even less evidence that they were not (and what was the douçaine anyway?). There is enough information here on the construction of these instruments for anyone who wants to experiment. Next comes an article on a modern Persian musician, and then one on a fascinating instrument used as a quail-lure in Afghanistan (not really relevant to us but it is by Laurence Picken, one of our members, and is an example of a very early type of duct flute played through a drum). Two of the next three articles are methodological and the third on American Indian Shaker songs. Following these is one by Alexander Ringer on the influence on European polyphony of Islamic culture, which is of considerable interest and is followed by Ripin's study already referred to, in which he demonstrates that van Eyck's organ is not as factual an illustration as I and others had supposed, using both what is visible to the naked eye in the picture and the traces of what was originally painted, revealed by infra-red photography, as well as comparison with a surviving organ of similar type. As so often with Ripin, whose work is already sorely missed since his death only a short while ago, a masterly study in a short compass. This is followed by a study of a melody from the Persian Gulf, and a brief note on the history of dancing bears and of the instruments, especially a bladder pipe with a curved horn bell (? the prototype of the crumhorn sought by Eric Moulder during the seminar). Reidar Sevaag has an article on neutral tones and mode in Norwegian folk music which is relevant to any research in the history of temperaments, especially one which considers possible the fluctuation of pitch as an ornamental device in European art music. This is followed by an article on African instruments, especially on their decorative features. Doris Stockmann contributes one on the profane use of bells in the later middle ages, and her husband Erich Stockmann on shepherds' instrumental music, both quite brief and general surveys. Wolfgang Suppen writes on the melismatic styles of the singers among the Volga Germans, which relates to our problems with embellishment; there are a number of musical examples. This is followed by a description of Albanian Mohammedan wedding music, and finally an article on a horn used by the Masai of East Africa.

This marathon survey shows that this is indeed a worthy tribute to the man to whom we owe the whole series, for he made the *Skrifter* of the Museum of which he was the Curator available to the IFMC Study Group (the first two *Skrifter* were a collection of his own papers and Jan Ling's excellent book on the Nyckelharpa; thereafter the needs of the museum and of Swedish organological studies were sacrificed to the greater need of the organological community at large and all succeeding volumes have been this series under review). The result has been that the Folk Instrument Study Group has been the only study group or committee of the IFMC which has been able to publish the papers presented at its meetings, and this one is of course the one most important to us. All organologists owe a great debt to Ernst Emsheimer.

Vol. IV has several themes, all with a historical bias, which makes most of the articles relevant to us. Partly for lack of time, and partly because this review is already running on a bit, descriptions will have to be fairly summary. Oskár Elschek has an article on the use and reliability of source materials, both in relation to folk instruments and the history of musical instruments in general, but with most of the emphasis on folk instruments. Heinz Becker an article on folk instruments in organological texts from the middle ages on, overlapping to a great extent with my own article in *MAN* 1965:107, but with much wider coverage, and more detail since it is a much longer article. Christian Kaden an article on sociology and the methodology of illustrating this for folk instruments; interesting if you like figures with arrows leading here and

there, which always look good on the page but which I'm never wholly convinced add much to one's knowledge. Heide Nixdorff on comparative morphology, using the frame drum as an example. Ivan Mačák on the verification of iconographic information, always a vexed subject, and at a quick glance not saying much more than that it's difficult. Dagmar Droyzen on illustrations in mediæval miniatures. Walter Salmen on the instruments of popular entertainment from the 14th to 16th centuries, with some interesting pictures and ideas. Brigitte Geiser on a 16th century manuscript at St.Gallen (Codex 542). Christoph-Hellmut Mahling on the bagpipe in western European painting and sculpture from the 13th century onwards, though if his first illustration were English I'd say it was early 14th century rather than early 13th. He cites an example c.1100, but doesn't illustrate it, and I'd certainly want to see that one before accepting it. Equally I'm uncertain about the date in the next one, by Mette Müller on a Danish 16th century fresco, in which most of the instruments look more characteristically 15th century, though presumably valid reasons for assigning this date, and of course fresco painters in a country church may easily have been old-fashioned. This is followed by a general survey of Danish iconographic sources by Dorthe Falcon Møller, in which there is an illustration very similar to those in Mette Müller's article but dated to 1480, a much more probable date, and since this comes from a cathedral its style might well have been copied in a small church. Zmaga Kumer has a very brief article on Slovenian iconography and Dragoslav Dević on frescos in Serbia and Macedonia, where the Byzantine influence is strong so that double shawms appear as auloi and nakers and side drums (or long drums) are very Turkish in appearance. Vergilii Atanassov shows a 14th century fresco in an article on Bulgarian sources which is a fascinating mixture of European and Turkish instruments. Zoltán Falvy on Hungarian sources is the last of the iconographic articles, and again is very brief. Albrecht Schneider writes on palæographic organology and the practicability of studying it, and Eva Perkuhn on a Latin-Arabic glossary (the title of the article is Spanish-Arabic but the language is Latin). Frank Harrison has a brief study on the chronology of Celtic instruments, and his wife, Joan Rimmer, on the Chirimia in Latin America; one of her illustrations may well identify a shawm of unknown origin in my collection and I have another known to be from México of a type which she does not illustrate. Jaroslav Markl has an article on early Bohemian transcriptions of folk music, and Bálint Sárosi on a general brief survey of Hungarian folk music, concentrating more on the music and less on the instruments than in his book *Völkermusikinstrumente Ungarns*, with many of his meticulous transcriptions. The last article is by Géza Papp, on the history of Hungarian dance music.

The theme of Vol.V, the receipt of which I mentioned briefly in Book News in the last issue, is pastoral music. Ernst Emsheimer writes on the magical use of pellet bells in Sweden, an aspect of our Morris Dance costume which is not often thought of. Brigitte Geiser on Swiss cow bells and other bells. MaxPeter Baumann on alphorns, mostly on function and symbolism. Werner Meyer on jews harps, bone pipes, bone whirrers (similar to the buzzing disc in function), bull roares and whistles in mediæval Switzerland. Birgit Kjellström on the Swedish spilopipa which, of all the folk duct flutes, is the nearest to the recorder, with eight frontal finger-holes, the uppermost of which, on mine anyway, seems to function in much the same way as the thumb-hole of a recorder. Timo Leisiö on the taxonomy of Finnish pastoral wind instruments, showing that the way in which instruments are played (trumpet, reed, flute, etc; ie our normal organological concepts) are not important for nomenclature, but people instead think of them as divided by their tone and range characteristics; it may well be worth thinking about this in connexion with mediæval concepts of classification. Christian Kaden on the æsthetics

of alhorn signals. Renate Brockpähler on Pastoral Symphonies (to take Handel's title, which she doesn't use) in Christmas music for organ in Westphalia. Ivan Mačák a brief history of pastoral music in Slovakia. Dragoslav Dević on alphorns in Serbia (alphorns are by no means restricted to the Alps nor even to mountainous areas as readers of my Midwinterhoorn article in GSJ 28 will know). Vergilii Atanassov on the history of pastoral instruments in Bulgaria. Ann Buckley on the tiompán in Ireland from the 8th to the 17th century, which she identifies with the crwth and rotta. Marianne Bröcker on an unknown 13th century source, De Universo of William of Auvergne, who lists the instruments of his period. Alica Elscheková on the instruments of the 17th-19th century pastoral Christmas songs in Slovakia. Christoph-Hellmut Mahling on the instruments in German idylls and shepherd's poems of the 17th and 18th century. Bálint Sárosy on the references to folk musical instruments in the works of József Gvadányi and János Arany, late 18th and mid 19th century Hungarian authors. Gottfried Habenicht on the information on Romanian instruments in a history of Franz Joseph Sulzer of the late 18th century. Samuel Baud-Bovy on the Cretan lyra, a folk rebec. And finally Rudolf Brandl on the instruments of the Greek island of Karpathos, including lira again and lauto (the Greek islands is, like much of the middle east, another area in which the lute survives in common use) as well as other instruments.

All the volumes in the series are well produced, well printed on good paper, in a square format 25x25 cm. which, while it normally provides an excellent margin for annotations, is awkward to shelve. As you will see, every volume has some material important to FOMRHI members and is at least worth taking trouble to find in a library, and to my mind worth owning, and no. IV is extremely important to us, for in the earlier periods with which it is mostly concerned there is no real distinction between folk instruments, at least so far as they are discussed here, and the instruments that we are making. The volumes are all, I think, available from the Museum (S 111 30 Stockholm, Slottsbacken 6, Sweden) and through the normal specialist book dealers (eg Blackwell's Music Shop, Tony Bingham, Brian Jordan, perhaps May & May, though tread carefully there - Mr. May has just told me that he doesn't want to sell me anything any more), but you aren't likely to find them in your local high street book shop. They are worth going to some trouble to get, though, and any of you who are within reach of Dulwich are welcome to come and look at mine if you doubt it.

instruments finished. All too often design simplifications are made to cater for 4 ignoring 1 even though there is no reduction in the demands made on 2 and 3. Granting that 4 is a very important factor in some circumstances, we suggest that a design be devised so that these simplifications are optional (perhaps the authentic bits can be added later). Some amateur makers are rather better off with respect to 2 and 3 than others, and some guidance as to how they may serve 1 with these advantages would help.

What we are saying here is that the cause of spreading valid knowledge about early instruments is not served by presenting only the oversimplified design that an idiot can make in a minimum of time. We are suggesting that the designer offer a design or kit with alternative quick-easy and more authentic components whenever appropriate.

In Comm. 100 Brian Tolley's design of the hurdy-gurdy illustrates a philosophy of making timeless generalized simple instruments without reference to what would have been used at one place and time. It combines the neckless 18th century instrument with the tapered straight sides of the Renaissance and the straight ends of the middle ages. The psaltery is of a modern traditional design. Early instruments resembling it are difficult to find. The medieval fiddle design is more innovative than the others and is unauthentic functionally as well as visually. It also owes more to modern traditions than to early evidence. We believe that a more authentic design is easier to make than his concoction and will draw one up for the next issue if we can find a day free before then to make it and check it out.

#### NOTES FOR CONTRIBUTORS

We are very happy that this issue is the biggest one yet, and we hope you will continue writing in, sharing your research and know-how. But, if FoMRHI Bull/Comm gets much bigger we shall run into problems of expense, and the mechanics of producing it. (It is already getting over-fat for a simple fold-and-staple makeup.) We would hate to have to restrict the amount of information we print, so we are asking for Communications to be in SINGLE-SPACE TYPING. This lets us fit more into the space we have. While on the subject of preparing Communications, I would like to remind you that our printing is done by a photo process directly from your typescripts, and a good final print requires a strong clear original. If your typewriter produces pale grey or very fine-line characters, it will not print well. If this is the case you might improve blackness by typing on thin translucent paper backed up by a carbon paper the wrong way round.

If any of you would prefer it, we can have your Communications re-typed here. We (i.e. E.S. and D.A.) usually hire a typist from an agency to type our own ones, and she could easily do this for other people too. We pay for the typing out of our own pocket, about £1.30 per hour, and would expect you to do the same. FoMRHI funds do not run to paying for typists. Your re-typed Comm. would be quickly read through, but not thoroughly proof-read, by one of us. If you want to do your own proof-reading we should get your copy here at NRI\* a month earlier than usual (i.e. by the first day of March, June, September or December).

The above does not apply to short notes sent to Jeremy for the Bulletin - he always re-types these himself.

I almost forgot - the size of paper for Communications is A4 (210 x 298 mm), and please leave a margin of 20 to 25 mm all round. Everything gets reduced to half size at the printers. Also, blackness is as important in diagrams as it is in the typing. Pencil can come out if you are lucky, but black india ink is best.

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