COMMUNICATIONS

1103 Reviews: The Art of the Trumpet Maker: ... by R. Barclay; The Baroque Clarinet by A.
-1108 R. Rice; Meraker Klarinetten by B. Aksdal; Music for Oboe 1650–1800: a Bibliography
by B. Haynes; The Conservation and Technology of Musical Instruments ed by C. Karp;

J. Montagu 14

1109 More sympathetic strings?

R. Webb 21

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1111 What is a 'copy' of an original instrument?

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FELLOWSHIP of MAKERS and RESEARCHERS of HISTORICAL INSTRUMENTS

Bulletin 68
July, 1992

It was a good sabbatical while it lasted. A lot of work done, a change of scene, and I've come back refreshed and have, of course, been working flat out ever since and am now exhausted after a heavy term! One concrete result, as mentioned in Comm.1084, is that I've made a good start on a Catalogue of my own collection; it's not complete by any means (there's a lot to do in the way of detailed description and measurements and so forth), but everything is listed with a good deal of comment. If anyone wants a copy of it, it is available, BUT only on disk as yet (I can't afford the cost of photocopying it; it's too long), and only if you can read WordPerfect 5.1. I haven't the time to convert it, file by file, to ASCII (apparently one can't do a whole disk at a time, and it's all in short section files in Hornbostel/Sachs order). Anyone who'd like a copy should send me EITHER a formatted HIGH density (HD NOT DD) disk, OR two low density (called Double Density - DD - though single density doesn't exist as far as I know) with enough money to pay for its return postage in whatever mailer you send it in (whatever your smallest currency note is; I can use foreign currency notes on trips abroad); stamps in UK, of course. I can use either 3¼" or 5¼" disks. Unfortunately, I've not yet got E-Mail here, so that's not a possible way of sending it, though I'm agitating for it.

I am beginning work on a similar update of the Bate Catalogue, but since everything else has to take priority, and running this place takes most of every day, it's going to be a while before I can offer that. If there's room on the disk, I can put the current version of the Bate Checklist on, too, which has just one line for each instrument. That's available in print for £2, surface postage included, and by the time that you get this Q the 1992 version will be ready.

PLANS & MEASURED DRAWINGS: Also ready is our up-to-date LIST of PLANS, and I'll send a copy of that for inclusion in this Q. There are quite a few new ones since we last printed it. We have been doing some exchanges of plans with Stockholm, The Hague, and Boston over the years, and I'll do a list of everything that's here (except Boston, whose list will also be in this Q; we have them all) so that those in this country, or anyone visiting, can know what they can come and see here. Obviously we don't sell them here, but it can help to see if they are what you're after before you order them. Boston Fine Arts Museum has all our plans if anyone wants to see them there, and the Gemeente in The Hague has most of them. For Australian members, Ken Williams tells me that he has deposited all his original plans and photos of Bate instruments with the Powerhouse Museum in Sydney; copies for Australian members are available from them.

LIST OF MEMBERS: The 1992 List herewith; sorry it's three months late, but it's more than Paul could have been expected to do. Do please use it; it represents two days of my time (as well as a lot of bad language when the columns go adrift or have to be reformatted), and it annoys me intensely when members write with questions which are answered in it. Also, please look at the back page; sometimes I have to send Comms back because people haven't read that page. I owe Mats Halfvares an apology; I've spelled his name wrong ever since he joined in 1983. If I've done that to you, please let me know!

A WARNING IN ADVANCE TO EUROPEAN MEMBERS: I'm afraid that we are going to have to close our GIRO Account, which means that you won't be able to put money into it from abroad. There are two reasons. One is that they are going to start charging the iniquitous fee of £2.00 per transaction, nearly 25% of our basic subscription. The other, and more serious reason, is that they are not going to send Barbara the slips which say who paid the money in! We could get round the £2 by charging you that, but there's no point in having money going
in when we don’t know who sent it. So, in October, you’ll have to send us GIRO postal orders (so far as we know, they’ll still work), or Eurocheques, or get together like the Dutch members and pay your subs to one member who can send a lump sum for all the people in your country (use the Geographical Index in the List of Members), or switch to airmail and, illegally, send us a £10 note. It seems to me damn stupid to behave like that, but it’s run by our Post Office and they have a record of making swingeing charges (and massive profits), combined with gross incompetence.

FURTHER TO: Comm.1057: Dr Dieter Krickeberg (curator of the musical instruments at the Germanisches Nationalmuseum in Nürnberg) says that there are technical drawings available from the Berlin Musikinstrumentenmuseum (Tiergartenstr.1, D-W-1000 Berlin 30) of both the black and the white harpsichords by Mietke.

Bull.66 (Vegetable ivory): David Williams has very kindly brought me a nut and one that he had turned on the lathe. The unused nut is brown skinned, rather like a large avocado stone; the skin seems very firmly attached. I’ve tried scraping it, both wet and dry, and while one can scrape off the skin, one scrapes the nut, too, for there seems to be no separation between skin and nut. The turned one both looks and feels more like ivory than any other substitute I’ve met; just as smooth as real ivory, but it seems to be a homogenous mass; there’s no trace of the grain structure that you see with ivory when it’s cut across the length. Also there is a slight flaw in it; whether that’s normal I don’t know. It’s wide enough for ferrule rings on most things, but not for bell rings for either oboe or clarinet. It would do a descant recorder mouthpiece, but a treble might be more difficult. I’m afraid I forgot to ask Dave how it works. It does seem worth experimenting with.

ANIMAL PRODUCTS: I’ve been sent (I’m not sure why we’re on this list) a long note on Implementation of the EC Directive on the Disposal and Processing of Animal Waste (non-food). This covers a lot of material that we use (horn, skin, bone, hair, residues of animal glues, and so on), and it’s going to get pretty complicated. You’re not going to be allowed to toss scraps into the bin; it’s all going to have to be buried (in an approved manner; not just a hole in the garden) or burned (in a proper incinerator; not in the fireplace) or sent to a plant recognised by the Ministry of Agriculture, Fisheries and Food (or presumably to the equivalents in other EC countries). As they want any comments by 31st July, there’s no point in giving you material to comment on. But if you use such substances, it could be worth checking on what 90/667/EEC (Animal Waste Order 1992 in the UK) is going to mean to you. Anybody who wants to see what I’ve got here is welcome to come and look at it.

QUERIES: I’ve been passed a query from Tarak BouaUegue (18 Avenue de l’Amphithéâtre, Carthage, Tunisia). He is looking for the music of the *Adagio in E* for eight concertinas by Edouard Silas. Can anyone help him?

Bernard Brauchli is compiling a list of all extant historical clavichords. Since Dave Weldon has already done this for his own research and has passed all the information on to Charles Mould, it seems rather a waste of effort, but you’ll find one of Bernard’s forms elsewhere in this Q; if you can help him, please photocopy it (enlarging it back to A4 if you can), fill it out and send it back to him.

NEWS: Peeter Talve (new address in this List) has been working for many years as an instrument maker, but only for the last three years has it been his main profession. As there are only a few instrument makers in Estonia, he has to make many different types of instrument, and last year he started working on fiddles. He makes lute, medieval fiddles, rebecs, gurdy-gurdies, and
psalteries. He doesn’t say so, but I think he’d welcome contact with anybody interested in these instruments.

The American Musical Instrument Society has given William Dowd its Curt Sachs Award; various organologists (including Philip Bate and Phil Young) have been previous recipients, but Dowd is the first instrument maker. The Society’s Frances Densmore Prize (for periodical articles) went to Cecil Adkins for his article on Richters oboes. They will award their Bessaraboff Prize (for books) next year; nominations (including self-nominations) for a book in English published in 1990 or 1991 should go to Dr Harrison Powley, 2220 North 1400 East, Provo, UT 84604.

The Cambridge Society for Early Music (Mass, not Cambs) has given its Arion Award to Friedrich von Huene and its Bodky award to the harpist Andrew Lawrence-King.

MEETINGS: The next AMIS general meeting will be in Nashville, Tennessee, May 12-16, 1993. Offers of papers to Dr Robert Eliason, RR3 Box 466, Lyme Center, NH 03768 before October 1st.

The Hardanger Fiddle Association of America is meeting next week, but I mention it in case you are interested. For any of you who don’t know the hardangerfele, it’s a Baroque violin surviving in folk use in Norway, with sympathetic strings, but otherwise a very high-arched baroque violin in all respects and worth attention from any early violin maker. The traditional bow uses crémaillère tensioning. Their address is Suite 211, 2745 Winnetka Ave North, Minneapolis MN 55427.

COURSES: We have two Bate Weekends next term. Michael Thomas will be running a Clavichord Weekend November 7/8. Andrew Bellis will be running a Bow-Rehairing Weekend November 21/22; as always, his last one was over-subscribed so we’ve fixed another. Cost for both is the usual £20 (£15 Friends of the Bate Collection and students), and advance booking is essential for the Bow-Rehairing because there’s a limit of 15 people.

MUSEUM NEWS: Sheridan Germann came in herer at the beginning of the week and she has identified the painter of the soundboards of two of our ex-Michael Thomas harpsichords. The anonymous Flemish was painted by her Richard Painter, so it was certainly made for, and probably in Paris, probably around 1670. The Jean Goermans of 1750 was painted by her Blanchet Painter. See Early Music October 1980 and April 1981 for details of these.

We are recording our first Compact Disc next week, Handel’s first four Suites on the William Smith harpsichord which very probably belonged to Handel. They should be available between now and when the next Q appears, and will cost £11.95 (plus postage if you’re ordering from here). The player is Martin Souter, a very expressive harpsichordist, and the record company Isis Records.

Why don’t any of the other museums who belong to FoMRH or who have members of staff who do so, send me such snippets of information? Surely you’ve got something to offer or something to sell?

FESTIVALS: The Holland Festival Early Music Utrecht will take place from 28 August to 6 September. Too late to book a stand or advertise, but their address for reference for next year’s Postbus 734, NL-3500 AS Utrecht. I hope that this won’t get to you too late to go along if you’re within reach.
Bernard Brauchli's Magnano Festival runs from 7th August to 5th September with five concerts over that period. Details from Via Roma 48, I-13050 Magnano (VC).

DEADLINE FOR NEXT Q: October 1st, please. Let's have some Comms; this one's going to be a bit thin and as I've said before (too often, I'm sure) we can only print what you send. If you want to read anything but Eph and me, you'll have to write it!

That's it, but I'll hold this open while I do the List of Members (I've now done it, and a few odds and ends have been incorporated above). Have a good summer and enjoy your holidays if you're lucky enough to have them (I've got a book to write, so I'm not likely to).

Jeremy Montagu
Hon.Sec.FoMRHI

BULLETIN SUPPLEMENT

Ephraim Segerman

Comm 1107:
I am amazed by Jeremy's report of no mention of FoMRHI whatsoever in Cary Karp's *The Conservation and Technology of Musical Instruments* (reviewed in Comm 1107), but I am not surprised that we are underrepresented. I haven't seen the book and am just responding to Jeremy's review. I am also not very familiar with the sources of abstracts that the book is a compilation of, largely AATA, RILM and the CIMCIM Newsletter. If contributions to knowledge about musical instrument technology that have appeared in FoMRHI Quarterly (which have been many, and some important) were rarely abstracted in these sources, then one can expect their underrepresentation in the book. One reason for this could be our informal style, with no policy of editorial control of quality, making our respectability questionable. Another could be Jeremy's view that FoMRHI's role in the field should be largely ephemeral, and that articles of substance should be published in more formal journals. Yet any decent scholar should be able to recognise the quality and importance of a contribution irrespective of the style of presentation or the type of publication it appears in. But he has to know about it.

Few scholars keep up to date in their fields by searching out all the published research as it comes out. Rarely do they explore much further afield than the journals in which they would publish their own work, relying on abstracting services for the rest. The abstracters should do the searching and be able to recognise quality and importance, but unfortunately they more often just routinely cover specific journals. I get a request for a RILM abstract for any little 'rehash' of my FoMRHI Comms that I might publish in a more formal journal, but never for any of my FoMRHI Comms, many of which are of greater substance. Since Cary has been an abstracter for the museum community, and he was an active member for quite a few years, I expect that they have looked to him to inform them of whatever we produce that was worthwhile. He has let them down. The museum community includes many excellent scholars whose primary interests differ from ours, and this book seems to be intended to be a resource for them to learn about our field whenever their work leads them that way. It is a great pity that they are being cheated out of the comprehensiveness that they have a right to expect from this book.

Bulletin Supplement continued on page 12.
**UNIVERSITY OF OXFORD**

**From:** The Bate Collection of Musical Instruments  
**Curator:** Jeremy Montagu, MA, FSA  
**Tel:** 0865-276139

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**PLANS & MEASURED DRAWINGS**  
**July, 1992**

All plans are photocopies on A3 paper except for the full-size bassoons and the renaissance recorder, which are on A1 sheets. All are full size unless otherwise noted.

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<td>John Mitchell Rose</td>
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Schuchart, boxwood & ivory, 1 silver key. mid-18th c. x 11
Lent A.C. Baines. A-c. 420 Hz. Measured & drawn Ken Williams £ 10.00

Thomas Stanesby jr, ivory & silver, 1 silver key. c. 1735 x 1050
Lent Jeremy Montagu. A now - c. 437 Hz. Measured Andreas Glatt, drawn David Cox, with a trace by Rod Cameron £ 5.00

Stanesby jr FLÛTE D’AMOUR, boxwood & ivory, 1 silver key. c. 1720 1015
In Bb at A- 415 Hz. Measured & drawn Ken Williams £ 10.00

OBOES:
Anonymous, 'THE GALPIN', boxwood & ivory, 3 silver keys. c. 1680-90 200
ex Galpin & Halfpenny Colls. A-c. 392 Hz. Measured Mary Kirkpatrick, drawn Ken Williams £ 10.00

Anonymous German transitional, boxwood, 3 brass keys. c. 1760 292
ex Edgar Hunt Coll. Measured Mary Kirkpatrick & Gail Hennessy, drawn Ken Williams £ 10.00

Charles Bizey, Paris, maple, 2 silver keys. 1st half 18th c. 201

Thomas Cahusac sr, boxwood & ivory, 2 silver keys. 2nd half 18th c. 2013
ex MacGillivray Coll. Measured & drawn Ken Williams £ 10.00

Christophe Delusse, Paris, cedar & silver, 3 brass keys (3rd key F$). c. 1785. Measured & drawn Ken Williams £ 10.00

Richard Milhouse, Newark, boxwood, straight-top, 2 brass keys. 293
ex Edgar Hunt Coll. Measured & drawn Ken Williams £ 10.00

Hendrik Richters, Amsterdam, ebony & ivory, 3 silver keys. c. 1700 2037
A-c. 407 Hz. Measured & drawn Dick Earle, with xeroxes of six detail photos of turned ivory mounts and engraved keys £ 10.00

Jean-Hyacinth Rottenburgh, Brussels, TENOR OBOE, bulb bell, boxwood & brass, 3 brass keys. 1st half 18th c., ex Morley-Pegge Coll. Measured & drawn Ken Williams £ 10.00

Thomas Stanesby jr, maple & silver, 2 silver keys, plain model. c. 1735 29
A-c. 421 Hz. Measured Mary Kirkpatrick, drawn Ken Williams £ 10.00


Anonymous, OBOE MUTE, wood, c. 1800 x 2012
Lent A.C. Baines. Measured & drawn Ken Williams £ 5.00

CLARINETS:
Baumann, Paris, boxwood & horn, 6 brass keys (cross C$). pre-1830, in C. Measured & drawn Alan Mills £ 5.00

Heinrich Grenser, Dresden, boxwood & ivory, 9 brass keys. c. 1800, (cross Bb, Eb, F; double holes instead of cross C$, upper shake) in Bb. Measured & drawn Charles Wells £ 10.00

Heinrich Grenser, Dresden, BASSET HORN, boxwood & ivory, 8 brass keys (normal 5 key + bell note + basset C & D). late 18th c. Measured & drawn David Grant & Peter Sheehan. £ 10.00

Thomas Key, boxwood & ivory, 8 brass keys (cross Eb, cross Bb), 1st half 19th century, in A. Measured & drawn, Charles Wells. £ 10.00
George Miller, boxwood & ivory, 5 brass keys. c.1770, in C.
Restored, measured & drawn Charles Wells £ 10.00

Measured & drawn Charles Wells each £ 10.00
the pair £ 15.00

William Milhouse, boxwood & ivory, 5 brass keys. c.1800, in Bb.
Jeremy Montagu Coll. Measured & drawn Alan Mills £ 5.00

Moussetter, Paris, boxwood, 5 brass keys. c.1780, in Bb. Measured & drawn Ken Williams £ 10.00

I.B.Willems sr., Brussels(?), boxwood, 2 brass keys. c.1720-40, in high F. Measured & drawn David Armitage £ 5.00

Herman Wrede, boxwood & ivory, 6 brass keys, 1st quarter 19th century, in high E♭. Measured & drawn Charles Wells. £ 10.00

BASSOONS:

Thomas Cahusac sr, maple (wing boxwood), 4 brass keys. dated 1769 x 35
ex Brailes Church, ex Langwill Coll. Lent Philip Bate.
A=407 Hz. Measured & drawn Ken Williams full-size £ 15.00
the drawing half-size £ 10.00

Dominique Porthaux, Paris, maple, 5 brass keys. c.1800. Lent A.C.Baines. x 30
A=415 Hz. Measured & drawn Ken Williams full-size £ 15.00
the drawing half-size £ 10.00

BOWS:

Edward Dodd, London, viola da gamba bow, round pernambuco stick, 930
pernambuco frog stamped Norris & Barnes, 1765-80
W.C.Retford Memorial Collection, ex Mrs P.White Measured & drawn David Kerr £ 5.00

Edward Dodd, London, viola d’amore bow, fluted snakewood stick, 931
ivory frog. 18th c. W.C.Retford Memorial Collection, ex Mrs P.White. Measured & drawn David Kerr £ 5.00

The plans by Ken Williams were made with the aid of a grant from the Music Board of the Australia Council. Copies are available in Australia from the Music Librarian, State Library of Victoria.

Orders from all other parts of the world should be addressed to: The Curator, Bate Collection of Historical Instruments, Faculty of Music, St.Aldate’s, Oxford OX1 1DB, UK. Cheques should be made payable to The Bate Collection, Oxford, and must be in pounds sterling. The University has no GIRO account but Eurocheques and Girocheques are both acceptable.

Prices include postage (by surface abroad; please include an estimated extra amount if you prefer airmail), the plans folded flat to A4 size; if rolled copies are required, please send a tube or other container, and add enough to your cheque to cover the postage of its weight.

BOOKS

Jeremy Montagu, The Flute (illustrated from the Bate Collection) £ 1.95
Jeremy Montagu, The French Horn (illustrated from the Bate Collection) £ 1.95
Jeremy Montagu, The World of Romantic & Modern Musical Instruments £ 12.50
Jeremy Montagu, Making Early Percussion Instruments £ 5.00
Clifford Bevan, Musical Instrument Collections in the British Isles £ 7.95

all books plus postage etc
CATALOGUES, GUIDES, HANDBOOKS etc

BATE CATALOGUES etc

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<td>Treasure Trail</td>
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COLOUR POSTCARDS each 25p

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<td>Jean Goermans Harpsichord</td>
<td>Joseph Tisseran Harpsichord</td>
<td>25p</td>
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<tr>
<td>8 Flutes</td>
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<td>25p</td>
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Square piano, Meinke & Meyer, Amsterdam, c.1810
Giraffe piano by Johannes van Raay, c.1830
Clavichord, anon, south German, c.1780, fretted in pairs
Hurdy-gurdy, anon, 18th c.
Traversa, van Heerde, c.1730
Traversa, R.Wijne, c.1750
Alto traversa, van Heerde, c.1730
Alto traversa, Hemsing, c.1700
Bass traversa, Beuker, c.1750
Oboe, H.Richters, 15-x-1952
Oboe, Rijkel, 6-x-1952
Oboe, Rijkel, 440-1933
Tenor oboe, Terton

STOCKHOLM, MUSIKMUSEET

Clavichord, Wahlstrom, 1732 fretted in pairs
Clavichord, anon, fretted in pairs
Clavichord, anon (large fretfree) no.1812
Diskant gamba, Johann Harp
Hurdy-gurdy, Swedish folk
Hummel
Nyckelharp
Nyckelharp
Oboe, Haka

VIENNA
C Great-bass recorder

UNIV CALIFORNIA, BERKELEY
Hurdy-gurdy, Varquain

BOSTON, MUSEUM OF FINE ARTS
See list elsewhere in this Q

These are available at the Bate FOR INSPECTION ONLY - copies are available from the relevant museums. Minimal information is given above on the assumption that you have already obtained a list from these museums.
# Technical Drawings

**Collection of Musical Instruments**  
**Museum of Fine Arts, Boston**

Available from the Collection offices  
(please include an additional $5.00 for postage)

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Maker/Details</th>
<th>Location</th>
<th>MFA accession number</th>
<th>Collection/Source</th>
<th>Drawn by, Date/Size</th>
<th>Price</th>
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<tr>
<td>Fretted clavichord</td>
<td>Unknown maker</td>
<td>Italy</td>
<td>17.1796</td>
<td>Leslie Lindsey Mason Collection</td>
<td>Edward Turner, 1983 (171 x 91 cm)</td>
<td>$35.00</td>
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<tr>
<td>Unfretted clavichord</td>
<td>Johann Christoph Georg Schiedmayer</td>
<td>Neustadt</td>
<td>1977.60</td>
<td>Edwin M. Ripin Collection, Gift of the George A. Ramlose Foundation</td>
<td>John Koster, 1985 (200 x 76 cm)</td>
<td>$50.00</td>
</tr>
<tr>
<td>Double-manual harpsichord</td>
<td>Unknown maker</td>
<td>France</td>
<td>1977.55</td>
<td>Edwin M. Ripin Collection, Friends of the Collection Fund</td>
<td>John Koster, 1983 (2 pages: 233 x 91 cm, 188 x 76 cm)</td>
<td>$75.00</td>
</tr>
<tr>
<td>Double-manual harpsichord</td>
<td>Joseph Joannes Couchet (Antwerp, 1680) with alterations and additions</td>
<td></td>
<td>1977.54</td>
<td>Edwin M. Ripin Collection, Friends of the Collection Fund</td>
<td>John Koster, 1983 (2 pages: 335 x 107 cm, 220 x 107 cm)</td>
<td>$95.00</td>
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Comm 1093:
I have two quibbles concerning the very useful Comm 1093 by Zaerr in the last Q. One is that the Jean Vaillant (?) tuning in fourths is not "inconvenient for a curved-bridge instrument" as demonstrated by the viol. The other is that how well the strings sound on the instrument is a more important criterion than the lowest vocal pitch in determining what the actual pitch level was that the strings were tuned to. In the 16th century, on instruments with a constant string stop, the lowest string was tuned no lower than a sixteenth below the highest string tuned as high as it could without breaking. Let us assume that there were no differences between then and medieval times in the types and quality of the strings available and in the criteria of sound acceptability. Then there is the leeway of a range of a fifth for Jerome's first tuning (with the pitch level of that range depending on the string stop), with the sound of the lowest string being decidedly better the higher the tuning is in that range. Jerome's second tuning is much more restricted, with a leeway range of a tone. If there were pitch standards then for vocal music, it is quite unlikely that these applied to instruments as well.
MAKER

DATE

COUNTRY

CITY

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MUSEUM

CITY

COUNTRY

CATALOGUE / INVENTORY NUMBER

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COMPASS

FRETTEING

(F=FRETTED; F2=FRETTED 2 BY 2 MAXIMUM; F3=FRETTED 3 BY 3 MAXIMUM; F4=FRETTED 4 BY 4 MAXIMUM; U=UNFRETTED)

STAND (YES, NO)

SPECIAL FEATURES OR SPECIAL HISTORY;

==============================================

SEND TO: BERNARD BRAUCHLI
82 OAKLEY ROAD
BELMONT MA 02178
U.S.A.
This most excellent and elegantly written book does not set out to be a DIY manual for the trumpet-maker. Nowhere will you find 'take a piece of metal 63.87 mm long and 37.6 mm wide and do this, that and the other to it'. It is far more than that. Read, digested, and understood, it will enable any aspiring craftsman to acquire the necessary skills and experience to make trumpets to the same standards as those achieved by members of the trumpet-making dynasties of Nuremburg. Indeed, with intelligent expansion of the information given here and knowledge of the instruments produced by other centres of trumpet manufacture, it would be possible to make trumpets on the lines of those also. There are, for example, many differences between the great Nuremburg tradition and that of the equally great Stuart and early Hanoverian trumpets of the London makers, not least in tone quality and decorative features, but it is unlikely that manufacturing methods varied overmuch between the two. Correlating the very clear instructions on methodology here with information published many years ago by Eric Halfpenny in *The Galpin Society Journal* will get makers far on the way with these instruments also. One could take this even further; there aren't so many differences in building authentic trombones, and Henry Fischer has published a good deal of the necessary information to cover many of those differences in his *The Renaissance Sackbut* (see Comm 600 in Q 39, 1985).

Mr Barclay gives bore and bell diameters of a number of original instruments, enough to give any maker an idea of the range of dimensions at different periods in Nuremburg. What dimensions a modern maker will choose must depend on the date and type of instrument that he is proposing to make, and the length of the yards can only be determined by the pitch, in both note-name and Herz, at which he is aiming.

What the aspiring maker will find here is all the information that he needs to replace that acquired by 17th and 18th century makers during the long apprenticeship served in the Baroque tradition. To this he will have to add, for himself, the necessary skills in working the metal which can only come from experience and long practice. With the book to hand, he will have, to aid him, the same advice that the original apprentice would have received from the master, for read with care, and perhaps between the lines, he will hear, again and again, Mr Barclay's voice in his ear 'No, not like that; do it like this'.

There are seven chapters. The first, on sources of information, is brief. The second on the instrument and its history is, for its scope, also brief but adequate, and gives ample references to the full treatments of this subject available elsewhere. The third and fourth go into great detail on the metals involved and the solders and fluxes needed to turn them into instruments. The heart of the book are the fifth and sixth, describing the workshop and its equipment and tools and the techniques of using all those tools to make trumpets. The seventh picks up the thread of the preface, emphasising that extruded seamless machine-made tubing is not likely to give results bearing much resemblance to those of trumpets made by traditional methods.

Many original instruments are illustrated in whole or in detail. Equipment and tools are illustrated both from original sources and from Mr Barclay's own workshop. In the latter case I, at least, would have welcomed a little more information, for example the radii found most useful for hammer heads, angles for burins, and so forth, but it may well be that these are well-known to those who have the skills to do such fine work, and that those who are beginning will inevitably discover them for themselves by trial. The sixth chapter, covering the manufacture and assembly of the instrument, is excellently illustrated, with every process shown either by photograph or, where that would be clearer, by drawings.

As suggested at the beginning of this review, the reader is expected to learn this craft; he is not handed it on a plate. Everything he needs with which to learn it, and indeed to succeed at it, is here. There is much, too, for him to think about.

There is, too, much for all early trumpet players to think about, for if they read this book they will have a far greater understanding of why a well-made reproduction, made in the traditional manner, from the traditional materials with the traditional tools and techniques, will do what original trumpets did, and therefore why the majority of the instruments on the market today will not.
Both this book and that by Bob Barclay, also reviewed in this Q, are in the Oxford Early Music Series, a series which has gone considerably up-market in format and appearance since Jimmy Blades and I started it with our two books on early percussion instruments; his and my joint one is, alas, out of print; my own on Making the things, while also out of print, is still available from the Bate Collection at £5 a copy.

After which advertisement (!), let us turn to this book. It is, I am afraid, something of a disappointment, particularly when compared with Barclay’s. Not that it does not have a great deal of very useful information in it, much of which is new, or anyway fairly new. The writing style is much heavier; it is grossly over-referenced; there is much repetition; every chapter has a quite unnecessary ‘Conclusion’ or synopsis (it would have been unkind, but almost possible, to review it simply by reading each of these conclusions!). In fact, it bears all the hallmarks of a doctoral thesis, which is exactly what it was, inadequately, which I’m afraid is what it is, converted into a book for the general and specialist public. At least one of the references is incorrect (which casts doubt on all the others unless they are checked): my Baroque & Classical book was published in 1979, not 1974.

There are other inaccuracies, also. It is obviously untrue that ‘the end where the tubes (ie the reeds of the arghūl and zummāra) are inserted points either away from the player or towards the player’; if the reeds aren’t at his end, there’s no way he can play them. The buzzing membrane of a kazoo is not in any sense a reed. The French word blié means wheat or grain, not grass. The reeds of a regal are not idioglot. He has misread Garsault’s description of the chalumeau; it has a long opening (fente, not sente), not an idioglot reed. Embouchure was, and is still, the French for a mouthpiece on brass instruments; it is also the standard term in both French and English for the blowing hole of a flute; it is by no means always understood, in either language, only to mean the player’s mouth formation.

There are a few misprints, all fairly obvious, and plate 2.12 is upside down. Finally, on the adverse side, surely in such a book it is not necessary to explain what a socket and tenon are and how they are formed (it might well have been necessary in the thesis, where some supervisors and examiners expect everything to be explained).

Let us now turn to the up-side, to the good qualities. There are extended musical examples of much early clarinet music, some of it in facsimile and some of it transcribed. Some of it, too, is new. All the relevant composers are discussed, as is much about the use of the clarinet in its early days. There is also a great deal of very valuable information on the chalumeau and on the early clarinet itself, with many photographs of instruments, and also detailed references to other books where further photographs can be found. There is a list at the end of all the early instruments known to the author, with where they are and, for museum instruments, their catalogue numbers. 31 two-key clarinets are listed and 13 three-key ones. If the ISW (sorry, this machine won’t combine the S and T) three-key clarinettes d’amour had been included, that list would have been longer; there are references to some of them, though not including the ex-Edgar Hunt example in the Bate Collection, in the text, and I’m not clear why they aren’t included in the list, which is of treble and super-treble instruments only.

There is a copious bibliography (one advantage of this having started as a thesis). I haven’t checked it for accuracy, my own book caught my eye when it was referred to in the text.

I understand that a companion on the Classical Clarinet is in the pipeline, and to this we look forward, especially if some note is taken of the comments in the earlier part of this review.
The Meråker clarinet is a folk chalumeau which is thought to date back to the 18th century and which is unique to this part of Norway, north-east of Trondheim, up towards the Swedish border. It seems to have coexisted with normal orchestral clarinets (5- to 8-key from the look of the three which are photographed in the booklet). It died out towards the end of the last century, and was revived by Haral Gilland, who died earlier this year.

There don't seem to be any surviving pre-revival instruments; at least none are illustrated here. The revival instruments, which are now being made in the Museum (I bought one by Snorre Fjellidal for NOK 480,-), are a simple lathe-turned cylindrical wooden tube with a short bell, all one piece 38.5 cm long, with a reed, very flat scraped, held on to the lower side by a ring of copper wire. Very simple, and very effective. There are eight fingerholes, four for each hand, plus a thumb hole, all burned in; no keys. Judging from the cassette of the instrument (which is available from the Museum for NOK 85 plus unspecified postage), the instrument plays only in the chalumeau register and is not overblown, although I can get three or four overblown notes out of mine. Tonguing is possible (the reed is on the lower lip) and used, but most of the playing seems to be slurred with a lot of grace; was the bagpipe ever used in the area? Or did the older generation of players use circular breathing (none of the players on the cassette do so)?

The instrument is clearly derived from the clarinet, and is thought to be a conflation of that instrument with a duct flute. One wonders how many such instruments there are elsewhere in Europe. Mette Müller published a Danish one, the skalmeje from Jutland, in Studia instrumentorum musicae popularis III, which was made by splitting a piece of wood in two, with the mouthpiece in one half and the idioglottal reed in the other; it had up to 6 fingerholes. I have a plastic equivalent, moulded in two halves, again with the mouthpiece in one half and the reed idioglottal in the other, by a firm called Pediwest, which I gather went out of business quite some years ago; a children's instrument with thumb + 7 fingerholes, and also a wooden keyless instrument by Barnes & Mullins (thumb + 6), also presumably a child's instrument. Reed rozhoks exist in the three Baltic States and have become quite elaborate (see the Vertkov et al. Atlas) with added keys; Anatoly Zajaruzny made me a simple one with 6 fingerholes. The Atlas shows that they derive from hornpipes very similar to the Welsh pibcorn (what is the connexion there, I wonder?) and thus are pre-clarinet and should not be included among the folk chalumeaux in this context, but the modern ones in the Atlas are clearly influenced by the clarinet, so that there is some cross-fertilisation.

For that matter, many of us have one of the German so-called schools clarinets, which are one-key chalumeaux (thumb + 7 + frontal key); they were designed to take children from the recorder to the clarinet. When they were being sold here for £8 they were quite successful, even though they used German recorder fingering, but when the price suddenly jumped up to over £40, nobody was interested; you could get a real Chinese clarinet for not much more. And of course, there's the red-hot fountain pen, a 1920s jazz instrument (mine is vulcanite, made by Keith Prowse) with, like the Meråker clarinet, thumb + 8. It was E O Pogson who first showed me one of those, and he had used his in jazz bands.

The chalumeau is obviously alive and well, and it would be interesting to know where else it exists. It would also be interesting to know how much attention Albert Rice (see another review in this Q) and Colin Lawson have paid to its modern forms.

Coming back, as any review must sooner or later, to the main subject, the booklet is interesting, especially if you can read Norwegian; the English summary is very short but helpful in working out the main text. The music examples are all of pieces which are on
the cassette, and all of those appear twice, once solo, played by Harald Gilland, and again by him with violin and guitar accompaniment. An oddity of the cassette is that both sides are identical; side B simply repeats side A. The tuning (details are given in the booklet) is idiosyncratic (though again reminiscent of some bagpipes), and the tone lively with a strong buzz. The flat scrape of the reed leads to this, and such a scrape suits well some of the reproduction chalumeaux around (eg the one that John Cousen gave to the Bate Collection), and it also suits our Willems high F 2-key clarinet as well as the Oberlender D 2-key clarinet reproduction which Felix Raudonikas gave to us (a copy of the one in the St Petersburg Museum). I haven’t tried it on the red-hot fountain pen, but obviously I must do so; it’s only just occurred to me that it might suit that, too (the advantage of writing a Comm like this; it stirs up one’s ideas as one goes).

I have a strong suspicion that a flat scrape would also suit 5- and 6-key instruments better than the usual cut down Eb reed with a modern scrape with a central spine that almost everybody uses; I think that we still have a lot to learn about playing early clarinets, especially about reeds; no early oboist or bassoonist would use a reed with modern scrape, so why do clarinettists? Certainly some of the 19th century reeds in the Morley-Pegge and Bate collection here have much less spine than modern reeds, and I tried scraping a reed this way when we had a Clarinet Weekend. Keith Puddy was not convinced by it, but I found it an interesting sound, at least. One of the things that worries me (we are getting further and further away from the real subject; I hope you, and particularly Bjørn Aksdal, don’t mind my using this review as a peg to hang thoughts on) is that early clarinets sound much more like modern ones than any other early instruments do. Maybe they did (there’s no way of telling), but it seems improbable somehow.

I would welcome any reactions to this Comm, and I would quite strongly suggest that anyone interested in the early clarinet should at least hear the cassette that the Ringve Museum has published of the Meråker clarinet, and consider whether this might have been the sort of sound which Denner and his contemporaries were aiming at, and the sort of sound that Molter, and all the other composers whom Albert Rice discusses, were writing for.

This is not only revised and greatly expanded since it was first reviewed here in Comm. 690 (Q 43, 1986), but it is now typeset and bound in hard covers instead of being in typescript in soft covers. Thus it will stand harder use, something to which any oboist is likely to put it and, perhaps more important, the 10,515 works cited, over a thousand more than in the first edition, fit into a book only 50 pages longer than it was before, and this despite considerable revision and amplification of the entries in the first edition.

Two important changes are in the terminology of the larger oboes. The use of *Taille* for what had been 'F oboe' recognises the use of other sizes of tenor, a word that has to be avoided in this context because of the languages that use *altoboe* for this size and *tenor* for the intermediate size now called *Haute-contre* instead of 'oboe d'amore' due to the existence of a certain amount of repertoire for oboe in A or occasionally G that may not have had a bulb bell or differed in some other way from the d'amore. These names (with *de Hautbois* added in contexts which are not dealing exclusively with the oboe as here) would be worth bringing into general use since they are less likely to cause confusion than alto, or tenor, oboe and, in this period, they have greater claim to normal use.

The book covers all so-far discovered solo music for oboe of all three sizes, including much chamber music both for wind alone and for wind with keyboard and/or strings. Arias with oboe obbligati are of course included, as are double and triple concerti, but ensemble concertos such as *Brandenburgs 1 and 2* are not (I'm not quite clear why not). Wind sextets and octets are still excluded, the maximum number being quintets, but sex-, sept-, and octets for wind and strings are to be found here. I'm not sure, without going over to the library, whether Spohr wrote his *Nonet* before or after 1800, but anyway eight is as far as we go.

I said in Comm. 690 "I can't recommend this book too highly to anyone interested either in the oboe or in the chamber music of this two-and-a-half centuries. It will be enormously useful to many of us." All that I can do now is to say that if you have the first edition, flog it quick before this new one hits too many bookstores, and buy this one. If you're into oboes or wind chamber music at all, and you didn't buy the first edition, you need this, and now's the time to buy it.

955 abstracts of books and articles concerned with all aspects of musical instrument conservation, restoration, and technology, including making. It’s something that we’ve been waiting for, for a long time, for it brings together material that’s appeared in *AATA* and *RILM* over many years, and the series by Friedemann Hellwig and Cary that appeared in the *CIMCIM Newsletter*, as well as a good deal of other material. The one thing that I regret is that Cary, presumably for personal reasons which I regard as unfortunate, has chosen to ignore FoMRHIQ altogether. Almost all the other periodicals in the field that I’ve ever heard of as well as a good many that I have not come across, are listed in the relevant index, but we’re not, even though we have published more information on instrument technology than anyone except perhaps *Das Musikinstrument* and the *Galpin Society Journal*. I’m not even sure why Cary has taken against us (he’s ignored all letters from me for some years now), but it’s a mistake to allow personal pique to interfere with scholarly matters.

Be that as it may, neither we, nor most of you, can afford to ignore this publication. Pretty well anything that you want to know about doing any sort of work on any sort of instrument is covered here, and although the AATA abstracts are always short, they’re always long enough to give you a good idea whether it’s worth chasing the relevant book or article. Addresses for all the publishers of books, monographs, and periodicals (except us) are given in the indexes, as are all authors whose work is abstracted and all the subjects of the books and articles.

The only thing that I can’t tell you is what it costs. It appears as a Supplement to AATA’s volume 28, and each volume costs $75 to individual non-members of the International Institute of Conservation ($125 for institutions); what it doesn’t say in the back is whether you can buy this Supplement as a separate, and if so what it costs. But I can assure you that it’s worth the cost of a stamp to AATA to find out. If you do any research at all, or use libraries at all to look for material in our field, this is going to be an essential tool, and it will be neither replaced nor superceded for a generation or more.

This is the first special subject supplement since 1985, and we must be grateful to AATA that it was with our subject that they recommenced publication of such supplements, and to Cary for producing it.

Basically this is a detailed technical study of the Stradivarius 'Cremonese' violin of 1715 now in the Stradivari Museum in Cremona. In addition there are shorter studies of the 'Tuscan' of 1690, the 'Medici' viola and 'cello of the same date, and the 'Medici' violin of 1716. The 'Medici' viola is of special importance because it has never been modernised. Unlike the 'Tuscan', and a number of others, which have been said in the past to be 'almost as they left the hand of the maker', it has not been opened and vandalised, with bass-bar, soundpost, bridge, neck, and fingerboard tossed into the rubbish bin and replaced with modern substitutes wholly different from those which the maker envisaged.

All are illustrated in detail and in colour, and all but the 'cello (for obvious reasons) have lifesize colour photos of the bodies; hence the large format. For all there are very detailed measurements, though, again for obvious reasons, these are external only. Maybe one day a museum, or other owner, which possesses such instruments will permit the scholars of today to do what the restorers of the past have done, and open these masterworks; if this were ever to happen, it would be in a worthier cause and done with far greater respect than in the past.

The 'Cremonese' is also photographed under ultra-violet light and with X-rays, and has a number of tables of photogrammetric measurements (not copies of the original photogrammetrics) and a set of profiles taken at various points across the belly. There are also detailed harmonic spectra, though only on the A string, and a dendrochronological study showing that the tree from which the belly of this, and several other violins, was made was felled in 1696 in the Northern Alps.

All main text is in both Italian and English, though, with the exception of Charles Beare's notes, the English is somewhat 'as she is spoke', and in at least one sentence two or more strategic words are missing. The illustrations and tables, however, tend to have captions only in Italian.

Clearly for those working on violins this book is a must. It is the first such detailed study of a Stradivarius violin and there is a great deal of valuable information here. I have no more information about the book than you can see at the head of this review and if, as I suspect, this is insufficient for obtaining copies, all that I can suggest is that either you try major violin dealers (especially, of course, Beare's in London since Charles Beare was one of the authors), or that you write to Marco Tiella, who is in the 1992 List of Members herewith.
Prompted by Comm.1097, where Eph enlightens us as to some of the origins of sympathetic string phenomena, I wondered if anyone had considered the following.

According to existing evidence the Italian 2X8' harpsichord predates the metal sympathetic string 'invention' which Eph credits to Edney & Gill in 1609. Hubbard brings to light that there is good evidence to support the view that both rows of registers were always in the 'on' position in as much that there remain no detectable traces of any device to implement registration changes on many 2X8' instruments. However, the registers were moveable 'for tuning purposes'. We are left wondering whether:

A) The Italian keyboard players preferred the texture of the 2X8'.
B) That they simply needed as much volume from the instrument as possible.
C) (and this is a new theory) That the 2nd row of 8' strings enhanced the sound of the first row by means of sympathetic vibration.

I agree it sounds farfetched to believe that a maker would supply an instrument with a complete choir of sympathetic strings for which he supplied a set of jacks to facilitate their tuning. Yet, anyone who owns a 2X8' instrument and is both a player and maker (as I am), cannot fail to notice that the sound of 1X8' is considerably affected by the existence of an adjacent companion.

(It must be made clear that even when only one register is engaged the other choir is still able to sound sympathetically, since the damper is lifted relevant to the note(s) being played.)

Eph is quite correct when he says that the envelope generated as a result of the presence of an unplucked sympathetic string is different in character compared with its absence. There appears to be a 'messa di voce' style enhancement owing to the combining of two elements:

1) The sympathetic string's characteristic envelope features a very slow attack which increases in gain until it almost matches the output from its plucked neighbour, thus:

2) The plucked string's envelope being thus:

The combined effect:
I must be quick to add that these graphs are artistically derived. A plot of the response curve might look very different yet I remain confident that a scientific test of the combined output would reveal a noticeable change in characteristic compared with the single string. Also the phase relationships have a profound effect on the human ear, and yet although they can be measured, are non-senseful in our understanding of perceived sounds.

Anyone with a 2X8' instrument can conduct their own experiment to evaluate the importance of the notion. Simply tune one choir to 415 Hz and the other to 440 Hz then, playing on just one 8', see if your favourite piece 'sings' in the same way.

Coming back to the issue, I suggest that sympathetic string vibration was not only understood, but indeed utilised sometime before its 'invention' in 1609.

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Heavy and cumbersome though the Viols were, they yet had a weak and unsatisfactory tone-quality that cannot compare for an instant with that of the modern Violin-family. Some few Viols have been fitted as Violas and even as Cellos. Players, however find them difficult to manage. The lower strings have a tendency to sound heavy and funereal, while the whole instrument is easily 'overplayed'. The viol players must have adopted what we should regard as a quiet, lifeless style of bowing. Under the pressure of a very slight 'attach' the instruments cease to do their best. They sulk.

Cecil Forsyth 'Orchestration' 1964 p.299

No instrument had a greater popularity than the Bass-Viol. It was to the sixteenth and seventeenth century amateur what the Cello is to the present day. It provides him with easy recreation. Its pleasant ambling cantabile called for a minimum of technical dexterity. Like all the other members of the Viol-family it was charmingly inlaid with frets, and these contributed not only to its handsome appearance, but also to its player's security of fingering and peace of mind.

Ibid. pp 434,435
WHAT IS A 'COPY' OF AN ORIGINAL INSTRUMENT?

A good copy of a painting looks the same as the original to all but the expert eye. An excellent copy may fool the expert's eye but can usually be detected by physical or chemical analysis of the materials used. A poor copy is indistinguishable from the original only to the casual observer. All are called 'copies' because most paintings have individual visual character of their own and can be clearly be distinguished from the others in appearance. It is obvious to anyone who remembers seeing the original.

This is not the case with violins, where considerable experience is needed to distinguish between the schools of makers, and more experience is needed to look for the details that might distinguish between members of a school. Most violin makers copy the designs of early violins in considerable detail, but they usually call their instruments 'models' rather than 'copies'. The word 'copy' is generally reserved for a very accurate duplicate of the instrument in its current state, including the appearance of all the wear and damage that the instrument has suffered during its life.

What is common amongst these examples is that the word 'copy' is applied when the object is clearly closer in characteristics to the particular object it is supposed to emulate than all other similar objects that are not called copies of it. The emulation is of the object as it now survives and not how one imagines it might have once been. Appearance is the major characteristic in these examples, but others can be important. The violin copy is generally expected to have sound qualities more characteristic of the original than most other violins, which is usually accomplished by copying structural details that are not visually available.

We copied a 1713 viola d'amore in my collection by taking it apart and we copied not only the dimensions of all the components, but also tuned each part to have the same resonance pitches and patterns. It was truly an acoustic copy. When both instruments were assembled and played, I couldn't tell the difference in sound between the original and the copy. Yet it was not a proper copy because we conceptually restored damaged and worn parts and did not attempt to duplicate the look of the varnish. Because of this, we could only claim that it was an 'original-state woodwork' and 'current-state acoustic' copy, i.e. a copy only according to specific criteria.

If the original maker came back from the dead and made another instrument to the same design concept as the original, it and the original would not be identical. I would call this a 'methodological' copy because it incorporates the maker's methods: his design concept and his style in executing it. Some of us are trying to discover what these were. We will never fully understand them, but some of us feel that it is worth trying to go as far as we can in this direction. Our attempts might be called 'attempted methodological' copies, but we prefer to describe them in other ways. We realise that in doing this we are sacrificing the development of our own distinctive craft styles. There is also commercial sacrifice since early standards of precision can raise doubts about quality in the modern customer. Most makers, working from plans drawn by others, know little about the craft style of the original, and are not concerned about knowing more. If the drawing is good, and it is closely followed with respect to materials as well as dimensions, their instruments can be called 'modern craft style' copies, otherwise 'modern craft style semi'-copies.

For something to be called a 'copy', it must clearly be much closer (in all obvious or specified ways) to the original instrument than to any other similar original instrument, observable to anyone who is aware of the different originals. Using the word without qualifications implies that the comparison is with the current state of the instrument. Very few people are making instruments like this. As demonstrated above, specifying the ways that it is different from the original can be awkward, so one generally avoids this unless one is particularly proud of the differences. As a result, early instrument makers are increasingly using the terminology of violin makers, claiming that their instruments are 'modelled after' particular original instruments.
An Analysis of Irish Harp Scaling

Summary
The Irish harp has a long and distinguished history extending over a period of at least 2000 years and yet recreation of the instrument is problematical due to lack of historical data. All that remains following the eventual demise of the harp at the beginning of the 19th C, are a few tantalising contemporary accounts and about a dozen harps in various states of disrepair.

Starting with the question "what if the Irish harps were designed to a perfect scaling configuration", this Comm. sets out to examine the geometry of some of the surviving harps and to speculate as to how they may have been tuned.

Supporting evidence for this exercise has been gleaned from the contemporary accounts and from stringing experiments on a recently completed reconstruction of a 17th C harp.

The Irish Harp
The Irish harp was unique in its class. The construction was massive and thick walled with stringing of heavy gauge brass wire which gave the instrument a resonant, bell like sound that was greatly admired. The triangular shaped soundbox was carved from a solid block of willow, the hollowed out back being closed with a tight fitting board. The pillar was more or less curved and was T shaped in section with a wide front flange, a feature which gave this component great structural strength and rigidity. The harmonic curve on which the tuning pins were mounted, was heavy and gracefully shaped. These three main components were joined together in a triangular configuration by mortice and tenon joints and the whole assembly was held together by string tension alone, no glue or pins being necessary in the construction.

The Irish harp was designed to withstand the stresses resulting from high string tension (400 to 600 Kg, dependant on harp size) which caused the frame to characteristically twist and lean over to the strung side (left hand side as viewed by the harper). This high loading caused a permanent set which may be observed in the extant harps (see also Fig 1).

Irish harps survive in two basic forms described here as "low headed" and "high headed". In the early "low headed" form, the pillar was morticed underneath the harmonic curve giving the instrument a low, compact appearance. This style survived into the 18th C. In the "high headed" harp, which was introduced during the 17th C, the harmonic curve was morticed into the side of the front pillar, giving the instrument a tall appearance rather like the European harp of the time.
The tuning of the Irish harp is given in two contemporary accounts. Praetorius writing at the beginning of the 17th C, describes a single harp (ie with one rank of strings) fitted with 43 strings (see Fig 2) tuned chromatically in the treble and diatonically in the bass. Bunting, writing about the harp as it was at the end of the 18th C, indicates diatonic tuning with provision to retune individual strings as required - rather like the European harps of the 16th and 17th C (see Fig 3). The maximum compass of the harp, as given by these accounts, was from C (66) in the bass to f''' (1408) in the treble (this conforms to the extreme practical range for the human voice and is in line with that for the European harp of the period). However, only the largest of the harps could have been tuned to the maximum tonal range due to the limitations imposed by the physical characteristics of the strings.

The strings of the Irish harp were struck with the fingernails which were grown long and shaped for the purpose. By the mid 17th C, this practice had generally given way (in Ireland at least) to the use of the fleshy part of the fingertips alone. However, the use of nails never did die out completely.

The Irish harp was taught through an unwritten oral tradition and was regarded as being notoriously difficult to master. Performing style and technique was virtuosic:

- It is wonderful how, in such precipitate rapidity of the fingers, the musical proportions are preserved, and by their art faultless throughout; in the midst of their complicated modulations, and a most intricate arrangement of notes, by a rapidity so sweet, a regularity so irregular, a concord so discordant, the melody is rendered harmonious and perfect, whether the chords of the diatessaron, or diapente are struck together; yet they always begin in a soft mood, and end in the same, that all may be perfected in the sweetness of delicious sounds. They enter upon, and again leave, their modulations with so much subtlety; and the tinklings of the small strings sport with so much freedom under the deep notes of the bass, delight with so much delicacy, and soothe so softly, that the excellence of their art seems to lie in concealing it. (Giraldus Cambrensis 12th C)

- Their performance, both vocal and instrumental, is exquisite: but so bold and impassioned, that it is amazing how they can observe the rules of their art amidst such rapid evolutions of the fingers and vibrations of the voice and yet they do observe them to perfection. (Polydore Virgil 16th C)

- Such music before or since did I never hear, that instrument being neglected for its extraordinary difficulty; but in my judgement far superior to the lute itself, or whatever speaks with strings. (John Evelyn 17th C)

- His "whispering notes" commenced in a degree of piano that required the closest approach to the instrument to render them at first audible, but increased, by degrees, to the richest chords. In their greatest degree of softness, they resembled rather the sympathetic tones than those brought out by the finger ...................... He had an admirable method of playing staccato and legato, in which he could run through rapid divisions in an astonishing style. His fingers lay over the strings in such a manner
that when he struck them with one finger, the other was instantly ready to stop the vibration; so the staccato passages were heard in full perfection. (Edward Bunting, end 18th C)

Harp Geometry

The design of a harp may be considered as falling between two extremes. In its basic form, the single harp consists of a row of individually tuned strings set in a straight sided triangular frame - the triangular arrangement of the strings providing rudimentary scaling. Proper scaling is required primarily to achieve equal individual string tension across the compass of the instrument for a given tuning configuration - a desirable condition for optimum "playability" - together with a balanced sound in all registers. As the geometry of a simple triangle is not sufficient in itself to provide proper scaling, further adjustments to the stringing is necessary if this format is to be used in a harp. The range of adjustment possible allows a wide variety of tunings constrained by the physical characteristics of the strings themselves (breaking stress, stiffness, inharmonicity and pitch instability).

At the other extreme, it is possible to design a harp in which all the necessary scaling is provided by the instrument geometry alone - defined here as perfect scaling. A harp constructed to this configuration would have a distinctly shaped harmonic curve, possibly a curved soundboard and equal gauge stringing when tuned to its designed tuning arrangement. For a harp designed to perfect scaling, unlike one designed with a simple triangular geometry, the original designed tuning may be deduced from the instrument geometry alone.

Between these two extremes an infinite number of combinations of geometry and stringing is possible in order to achieve a desired tuning arrangement.

Analysis of Harp Geometry

In order to explore the possibility of perfect scaling in Irish harp geometry, eight original instruments dating from the 16th, 17th and early 18th C were examined. These were grouped for convenience by type and in rough chronological order as follows:

Early Low Headed.......Lamont harp (Edinburgh, National Museum of Antiquities)
- Queen Mary harp (ditto)
- Trinity College Dublin harp

Late Low Headed ......Castle Otway harp (dated 1707)
- Cornelius Offogerty harp (circa 1700?)

Chromatic ............Dalway harp (dated 1621, Dublin, Nat. Museum of Ireland)

High Headed ..........Kildare harp (constructed in 1672?)
- Bunworth harp (dated 1734, Boston Museum of Fine Arts)
Notes: - Both the Lamont and Queen Mary harps, although coming down to us through Scottish families, have been classified here as Irish harps, these instruments having all the characteristics of the Irish harp and the Queen Mary harp, in particular, being a close resemblance to the Trinity College Dublin harp. The dating of these early harps is uncertain and is, therefore, assumed here to be from the early Renaissance period. Both the Trinity College and, to a lesser extent, the Lamont harps are reconstructions - both having significant structural damage or other deterioration.

- The Dalway harp consists of two fragments - the front pillar and harmonic curve - from which it has been possible to make a reconstruction of the original geometry. It has recently been proposed by R. Hadaway that this instrument, having a double row of tuning pins, was originally double strung in the manner of a double harp, and tuned chromatically. The analysis of this instrument is based on this assumption.

As access to the original instruments was not possible, string lengths for each harp were scaled from side view photographs using key dimensions recorded by others, to establish an enlargement factor in each case. The strings of an Irish harp do not lie in a single vertical plane and none of the available photographs portray a harp under string loading conditions. Therefore, the consequent apparent foreshortening effects of the side views was corrected by applying factors derived from measurements on a reconstruction of an Irish harp.

As this analysis is dependant more upon relative rather than absolute values of measured string lengths, the potential errors inherent in the methodology were not considered to be of overriding importance. The scaled up string lengths were plotted against string number, assuming a constant string spacing for comparison, thus defining the scaling geometry for each harp.

In order to facilitate the stringing calculations, the Abbott and Segerman string calculator (see Comm. 162) was used accepting any simplifying assumptions originally incorporated into its design and using the limits adopted for determining string tuning range. It was assumed that each harp was fitted with brass stringing throughout and that string tensions were within a tolerance range of 11kg to 12.5kg (absolute values not being important here). Idealised tuning curves were constructed which represented perfect scaling for tunings ranging from diatonic to chromatic in steps of one accidental per octave. The reconstructed scaling geometry for each harp was then overlaid on the tuning curves to determine if any curve matching was in evidence. The results are summarised in the graphs Plot 1 to Plot 4.

Results and Discussion

Plot 1 - The Queen Mary harp is a close match to the diatonic +2 curve so an original tuning of this kind is a possibility with, perhaps some adjustment to the gauges of the very longest strings. Hence, with a shortest string length of around 7.5cm, the highest note would fall in the range of say a' to f''. If d'' was selected as the top note, then the lowest note would be c giving the harp a range of just over three octaves, covering the tenor and alto ranges of the human voice, and stringing would be equal gauge throughout.
Plot 1 (cont) - Both the Lamont and Trinity College scalings are a less than perfect match with the tuning curves and modification to the string gauges would be required in order to tune the instruments in the range from diatonic to diatonic +2. Tuning beyond diatonic +2 would necessitate some asymmetry in the string gauges used across the full compass of each instrument which might exclude this as an option. (i.e. string gauges that are not all equal or do not reduce in diameter evenly from bass to treble, might not be considered as an alternative. Hence, a tuning that required string diameters to, say, increase evenly from bass to treble is not likely to be how the original instrument was intended to be tuned.)

Another possibility, which would give a near perfect scaling, is to split the tuning into fully chromatic in the bass and diatonic in the treble. (i.e. the reverse of that given by Praetorius). This would give a tonal range about the same as that deduced for the Queen Mary harp above (all three harps being of similar size) which would give the harps a full chromatic capability over the tenor range of the human voice. Perhaps these small harps were intended to be used for vocal accompaniment rather than for purely instrumental performance?

Plot 2 - Both Castle Otway and the Offogerty harps give a close but less than perfect match with the diatonic +2 curve and the options previously discussed for the Lamont and Trinity College harps could apply except in this case, the bass ranges of the larger instruments would be extended downwards somewhat.

Plot 3 - The Dalway harp was analysed assuming two overlapping ranks of strings. Here the curve match is very close to fully chromatic. To allow a continuous unbroken scale from treble to bass for the leading left hand of the harper, the two strings forming the junction of the bass and treble ranks (string no. 28 and 29 on the Plot) were assumed to be tuned in unison. Taking strictly chromatic tuning with the lowest string pitched at D sharp which in turn would give a highest tone of b''flat, the two unison strings would be tuned to g.

The harp tuning recorded by Bunting (see Fig 3) includes two strings tuned in unison to g (called the "sisters" - unison tuning is also mentioned by Talbot). Perhaps this feature was derived from a double ranked harp of this type?

It is interesting to note that the string lengths scaled from the Praetorius engraving are approximately 86cm long for the longest bass string and 8.5cm for the shortest treble string, with a total of 43 strings, compared to the Dalway harp which has 45 strings in the main bank of tuning pins and 7 in the secondary bank. String no. 43 on the Dalway harp is about 87cm long and string no. 1 is about 8.5cm long. Hence the profile of the Dalway harp represented in Plot 3 is probably close to that of the harp described by Praetorius, the only major difference being that the Praetorius harp would require modified string gauges for the bottom two octaves in order to be tuned diatonically.

Note that a string length of 86cm is too short to be tuned satisfactorily down to C as indicated by Praetorius - so perhaps the scale on the engraving is inaccurate? On the other hand, in his brief description of this instrument, Praetorius uses the adjective "grobe" to describe the brass.
stringing, the usual translation of this part of the text being that the harp was strung with "somewhat rough, thick brass strings." The meaning of "grobe" today is rough in the sense of being coarse, rude or uncouth and does not seem to be appropriate to describe brass wire strings, which, because they are made by drawing the wire through a die, can only be smooth in texture. Perhaps the use of "grobe" here is emphatic, in the sense, in English, of heavy, thick strings? On the other hand could Praetorius have been referring to the use of twisted brass strings in the bass in common with the wire strung fretted instruments of the time - the bumpy appearance of these strings being described as rough?

Plot 4 - Both the Kildare and Bunworth scaling lie very close to the diatonic +2 tuning curve, so this tuning may be considered as a good possibility. (i.e. max. range of C to f''')

Bunting's tuning allows for retuning the C and F strings to C sharp and F sharp as required, so perhaps by the end of the 17th C. the Irish harp had become simpler and was well on the way to becoming eventually fully diatonic but at this time still retained some additional accidentals in its tuning, a reflection of earlier traditions?

The reference to the accidentals C sharp and F sharp is interesting as it is mentioned in the context of the French single action harp by Diderot in the middle of the 18th C. He noted that the Ut strings on this harp were coloured red and that the Fa strings were coloured blue, not because this was particularly helpful to the harper but because this was a tradition going back to the ancient Greeks who designated the C and F tones as variable in pitch according to their systems (these tones being called chromatic) - proof he argued of the great antiquity of the harp. The colouring of the C and F strings is still retained today on the modern concert harp.

Conclusions

Having skated on thin ice for the best part of this Comm. it is probably best to leave the comments and observations, made within the text, to stand as they are without further speculative comment, however .......

The European single harp of the 16th C. was tuned diatonically and appears to have been more suited to the performance of music set in the early ecclesiastic modes of Ambrose rather than the secular music of the Renaissance.

There would seem to be a good possibility, on the other hand, that the Irish single harp, may have been tuned chromatically (or at least with extra accidentals per octave) from quite early times, reaching its peak of development by the early 17th C. after which time it went into a steady decline ending up as a simple, diatonically tuned instrument. If the ancient performing traditions embraced the use of such a complex instrument, then this could account, in part, for the Irish harp's reputation as being difficult to learn (at least as observed by others not brought up within a culture based on oral traditions). It might also be part of the reason why the Irish harpers could so readily adapt to the European repertoire and were so popular within the European courts of the 16th and 17th C.
One might envisage the Celtic "fringe" in Ireland, a tribal, conservative and illiterate culture being largely unaffected by the early musical developments and practices in Europe which had greatly simplified the old Greek systems for use in the Christian church.

The early Celtic cultures, located in Central Europe, were known to have been in close contact with the ancient Greek, Persian and other cultures in the Mediterranean and may, therefore, have adopted the musical systems of these cultures. These ancient systems, with their complicated and subtle "colourings", could then eventually have been taken to Ireland where they were further developed within that society. (The use of the harp in Ireland is certainly a very old tradition being referenced in sagas dating to the 5th century B.C.). If this was the case, then it is perhaps not surprising that the Europeans were so impressed with the Irish harp and the "vibrations of the voice" of the Irish singers when the two cultures eventually came into regular contact.

References

9. "hat ziemlich grobe dicke Messings Saitten".

Postscript:- A number of the surviving harps have been modified from their original state by the addition of extra strings, the tuning pins for the latter being located outside the string band (brass reinforcing plate) on the harmonic curve. These extra strings have not been included in this analysis.

For those who would like to spend time exploring the tuning possibilities of these harps further, a tuning guide is currently under preparation which will appear in a future Comm.
An Irish harp player - drawn from a painting of a group of four musicians at the court of Christian IV of Denmark.
(reigned 1588 - 1648)

FIG 1

An engraving of an Irish single harp.
M. Praetorius, "Syntagma musicum", 1618/1619

FIG 2
FIG 3

EUROPEAN HARP TUNING, 1529 (M.Agricola, Musica Instrumentalis Deudsch)

IRISH HARP TUNING, 1619 (M. Praetorius, Syntagma Musicum)

IRISH HARP TUNING, 1792 (E. Bunting, The Ancient Music Of Ireland, 1840)

Bunting notes that with this tuning, the Irish Harp in modern musical terminology, could only be played in two keys that were perfect in their diatonic intervals i.e. C major and G major. However, the harpers also made use of three ancient diatonic minor scales i.e. E minor, A minor and D minor, which were all imperfect according to the modern scale.

( ) denotes alternative tuning of a string.
CASTLE OTWAY - 34 STRINGS (1907)
OFFOGERTY - 35 STRINGS

DIATONIC

CHROMATIC

PLOT #2

STRING N°
DALWAY (1621) - 45 STRINGS + 7

- TREBLE RANK
- BASS RANK

UNISON TUNING

PLOT # 3
• **Bunworth** - 33 Strings (1734)
+ **Kildare** - 36 Strings (1672)

**Plot #4**