

Quarterly No. 96, July 1999

FoMRHI Quarterly

BULLETIN 96

Bulletin Supplement

Membership List Supplement

J. Montagu 2

E. Segerman 5

J. Montagu 72

COMMUNICATIONS

- 1635 Review: *Die Geschichte der Klavierbauerfamilie Kaim aus Kirchheim unter Teck* by I. Schulze-Ardey M. Cole 6
- 1636 Review: *Keyboard Instruments in Eighteenth-Century Vienna* by R. Maunder M. Cole 7
- 1637 Review: *The Pianoforte in the Classical Era* by M. Cole R. Maunder 12
- 1638 Review: *Kielinstrumente aus der Werkstatt Ruckers* ed C. Reiche J. Montagu 14
- 1639 Review: *TRAVERSO - The First Ten Years* ed A. Powell P. Bate 16
- 1640 Review: *Starting on an Early Bassoon* by T. Sherwood G. Lyndon-Jones 17
- 1641 Review: *Larigot* N° 22, Décembre 1998 J. Montagu 18
- 1642 Review: *Catalogue des Instruments de Musique de la Manufacture Générale de Gautrot Aîné & C^{ie}, 1867, Larigot Spéciale N° X, Avril 1999* J. Montagu 19
- 1643 Review: *Royal College of Music Museum of Musical Instruments Catalogue Part Ia: European Wind Instruments: Addenda* by E. A. K. Ridley (ed E. Weijs) J. Montagu 21
- 1644 Review: *Violin Fraud: Deception, Forgery, Theft and the Law*, 2nd edition by B. Harvey & C. Shapreau J. Montagu 23
- 1645 Review: *Bow Catalogue (Sammlungen alter Musikinstrumente und Sammlungen der Gesellschaft der Musikfreunde in Wien)* by R. Hopfner S. Heavens 24
- 1646 *Bouwerskontakt Bouwbrief* 93, my summary C. Stroom 25
- 1647 Had we but world enough and time (a rejoinder to E.S.'s remarks in Q95 Bulletin Supplement) C. Goodwin 26
- 1648 Minimalism in historical scholarship E. Segerman 27
- 1649 Notes on transposition E. Segerman 28
- 1650 The silent whistle [instruments in wall decoration] G. Lyndon-Jones 31
- 1651 French fingerings - in the Cotswolds? G. Lyndon-Jones 35
- 1652 Pipe and tablature G. Lyndon-Jones 41
- 1653 Half-holing the tabor pipe G. Lyndon-Jones 46
- 1654 The BIG ones G. Lyndon-Jones 47
- 1655 Irish harp tuning and the sisters J. Downing 51
- 1656 Further to Comm. 1615 [casting a trumpet mouthpiece] J. Downing 53
- 1657 Further on the pitch ranges of gut strings E. Segerman 54
- 1658 A bit more on early fiddle tunings and sizes E. Segerman 59
- 1659 The early development of sixteenth century viols E. Segerman 63
- 1660 The tunings of viols in sets, and their sizes E. Segerman 65

FELLOWSHIP OF MAKERS AND RESEARCHERS OF HISTORICAL INSTRUMENTS

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FELLOWSHIP of MAKERS and RESEARCHERS of HISTORICAL INSTRUMENTS

Bulletin 96

July, 1999

Well, I did say last time that I apologised if the Bull and List of Members were scattier than usual, and they were, and I do indeed, especially to those who got left off the list or had their old addresses left in. I hope they're all corrected herewith. We were also later than usual, partly because our printer had something else on and was away at the critical moment. And if any of you had to pay excess postage, even more apologies – Eph found to his horror, after all had gone off, a clutch of stamps which must have fallen off some envelopes!

Apologies too to those on email that I didn't do an email version of the Bull; lack of time to set up the updated address list. I'll try this time but no promises; greater success (ie a longer list) makes greater difficulties!

In Memoriam: Rémy Gug's copy of the January Q came back to me postmarked 4th March and marked *décédé*. As you can see in the *Permuted Index* which, thanks to Charles Stroom, came with the last Q (more of it will presumably come herewith), Rémy gave us many Comms, all of them useful. We shall miss him.

Even though he was never one of our members, I cannot pass without mention Fred Morgan's death. He was one of the best recorder makers and he was very kind to the Bate Collection, allowing us to sell copies of the measured drawing he made (like all his drawings it was meticulous and instantly recognisable as his work) of Edgar Hunt's famous Bressan treble. That was how the long series of Bate plans began, still (just – Edinburgh are catching up fast) second only to the Hague Gemeente Museum in number – his was the first.

Further to: My remark in Comm.1610 in January that we'd not received a review of Michael Cole's piano book. I had asked one person to review both Michael's and Richard Maunder's books because they were so complementary that a review of each by the same chap seemed a good idea. However, when nothing arrived and knowing how important both books are, we decided that the answer would be for Michael to review Richard and Richard to review Michael. Those reviews came promptly and you'll find them here!

NEMA 'Early Baroque' Conference: This was excellent and well organised; good speakers, every session running to time (how rare that is!) and first rate material – we all learned a lot and sorry not to have seen more of you. One does not need to give a paper to attend a conference; it is possible just to sit and listen and learn. One person was asking, over a lunch, what was NEMA for – to my mind if it just organised conferences like this and produced the *Yearbook* it would justify its existence over and over again. I know we can't all belong to everything, but NEMA really is worth support.

Request: Julian Goodacre (new email address in the list herewith) is 'currently trying to gather any references, stories, folk tales, etc, about birds who have made their nests in musical instruments.' The only one that I can think of is the organ by Gerritz in plate 99 of my *Medieval & Renaissance*, originally in the Nikolaikerk, Utrecht and now in the Koorkerk, Middelberg. This has some pipes in the upperwork with heads down and some with heads up. When I queried this with Guy Oldham he said that it had two advantages, one that it kept the pallets etc together, the other that it kept birds out of the pipes, so presumably this is a known problem with organs.

Museum news: The Edinburgh Collection (EUCHMI) has acquired a number of string instruments, including a Stauffer guitar. They have published a number of drawings, now totalling 38, including two oboes and a Sellas guitar. They have added more pictures of instruments in the collection (now 114, all downloadable) to their web site www.music.ed.ac.uk/euchmi/ and they have started a new web site with digitised recordings with video files and still photos.

The Kunsthistorisches Museum in Vienna are putting on an exhibition 'Sight and Sound – Music in Aristocratic Treasures' in Ambras Castle (from which many of the instruments came) near Innsbruck, 7-31 October. Their notice says that the opening will be on 5th July, so either it runs from 7th July, or else it opens on 5th October. You can email the director's secretary and ask: eveline.koellner@khm.at – NB that Austria is at; presumably Australia got in first with au!

Publications: There is a review elsewhere here of Ardal Powell's *Traverso* anthology, a complete reprint, with useful additions, of his quarterly newsletter. I'd like to add that I saw a few of the early issues, and it's wonderful to have them all again reprinted in the one volume – he sent me a copy and of course it had to go to a reviewer, but I took the opportunity to read it through first and remind myself how much very useful information he managed to get on to – a quarterly single sheet of paper folded into four pages. Doing so did encourage me to think very seriously, as Eph I hope is suggesting in his section, that we should reprint ourselves. There is too much good stuff here, and in *Traverso*, to lose.

American Recorder for January (I'm not sure why I get this but I do) has an interesting article by David Lasocki on 'Amateur Recorder Players in Renaissance and Baroque England'. Henry VIII and Pepys are well-known but there seem to be records of and information about a fair number of others. There's also a quite entertaining article about Friedrich von Huene, celebrating his 70th birthday.

The second issue of *Munnharpa* has arrived (information from Bernhard Folkestad). Again an interesting issue, and Bernhard provides an English translation with it for overseas members.

Courses: West Dean has their usual Annual Early Music Summer School. Not much point in telling you about it as it's 14-20 August and they want full payment six weeks before the course begins (ie last Saturday). If you might be interested for next year you can write to them (West Dean College, West Dean, Chichester, PO18 0QZ) and hope that they might send you information earlier than they do to FoMRHI.

Also arrived is their complete list of courses from last April to next October. There are various useful technologies, such as blacksmithing, silver smithing, various aspects of woodworking, gilding, and so on, but nothing, despite what people keep telling me, nothing on musical instrument making.

The Magnano Festival has also sent a list of their concerts, also too late to be useful.

Notice of the Flanders Festival may just be in time; it's called Music for Sir Anthony and takes place in Antwerp from 22 to 30 August. The Sir Anthony is Van Dyck and courses cover Monteverdi, accompanying monody, interpretation for ensembles, Italian arias, English cathedral music, and lute songs. Address for information is Musiekaktief, Postbus 45, B-3990 Peer, Belgium. There's a lot of concerts going on at the same time.

The Cremona Liutaria has already happened – wonderful how these people seem to think we can get their publicity out instantaneously.

The Hardanger Fiddle Association of America has a workshop on making it next week! It seems worth telling you about it because of the instrument's strong link with early baroque fiddles and there isn't much information on it around. If you want to know more, their address is Lynn Berg, POBox 23046, Richfield, MN 55423, USA, lberg@pond.net

And finally, and this one in time, Facture Instrumentale en Bourgogne have a colloquium and round table on Music and Material in Cluny, 17-19 September. A good list of speakers, 9 titles in French and 4 in English. Information from FAB, c/o Pascal Cranga, Le Hameau, F-71250 Donzy le Pertuis, France, fax: 03 85 50 05 38, cranga@wanadoo.fr

Reminder: I'll be at the RCM for the Early Instrument Exhibition, 29-31 October, and anyone who wants to do so can renew their subscriptions there, or at least just say hullo.

Coda: A short Bull but the last Q went out so late that there's not been much time for any of you to send news. A good batch of Comms, though – thanks from us all! As usual I'll hold this while I finish off the Memb List Suppl in case anything arrives late. Nothing did.

Date for next Bull: Let's say October 4 – I shan't do anything over the previous weekend because of other things on.

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Apology for error in initial

I must apologise to A. V. Loretto for getting his middle initial wrong in the Contents page in the last two Q's. Since I am insisting that source errors need explaining in scholarship, I think that it could be a useful exercise to explain this error. There are three interacting contributing factors here. One is aging, which increases frequency of trivial errors as well as, hopefully, wisdom. I'll be 70 this year. The other is modern computer technology which speeds up work by allowing instantaneous copying from one place to another. So the initial error of poor aim, hitting the C key instead of the V key next to it, was compounded by copying the faulty name from one Q to the other. The third factor was that I didn't pick up the error in proof reading because the set of initials A. C. looks particularly fine to me, probably because I've become so used to it in front of the 'Baines' surname.

Out-of-print Quarterlies

From what I've heard of it, modern computer technology using a scanner and OCR (optical character recognition) software should, in principle, be able to put all of the out-of-print Quarterlies onto our web site. There is plenty of available space for it at no cost. I've just acquired a scanner made redundant at the University and picked up an OCR CD-ROM at a charity sale, but haven't learned how to use them yet. Offers of help on this project would be most appreciated.

As for policy, I am inclined to put everything that appeared in the original Q's on the web site. The out-of-date stuff would still be useful for any future historian who wants to chronicle what was thought, right or wrong, at the time. But if any authors insist that their articles should be deleted, that will be respected.

Lute paper

I have set up a new section in my own web site <http://www.nrinstruments.demon.co.uk> entitled 'Prepublication Drafts'. Papers there will be removed when accepted for publication in a journal. Any comments or suggestions, would be very welcome. The paper on lute sizes and size names mentioned in the Bull. Supp. of the last Q is there. The Comm. in this Q by Goodwin is relevant.

Late Q

Q75 was a month late because of delays at the printer. The combination of the Index, Quarterly and Membership List (on top of a management course) somewhat overloaded the system. We'll try not to let it happen again. Apologies for the delay from the printer.

Newly available earliest evidence on the invention of strings wound with wire

Peter Holman, in a paper given at the NEMA conference at York on 4 July, mentioned that there is a research archive in Sheffield called 'The Hartlib Papers' which has been reproduced as a CD-ROM by (and can be purchased from) UMI (The Old Hospital, Ardingly Road, Cuckfield, West Sussex, RH17 5JR, U.K.). In that archive, there is a report that in 1659, a fellow named Guretsky (I'm not sure of the spelling) invented winding wire around a gut string, and found that it gave a string a sweet sound. A full report about this evidence would be very welcome.

In the discussion after Peter's paper, Jeremy reminded us of his wife Gwen's Comm. 139 (Q12, July 1978) entitled 'Metal-covered threads before 1600'. Gold-covered embroidery threads date back at least to the 10th century in Britain. The Montagus put a similar modern embroidery thread on a Mexican folk fiddle, and tightened it up enough to produce a note. It had a tolerable tone which was a little rough for bowing but was better when plucked. Jeremy's point was that the technology of covering with metal was available much earlier than the middle of the 17th century.

Most modern early musicians prefer metal-covered bass strings for viols, fiddles and lutes for playing music from before the middle of the 17th century. This is in spite of the authenticity pressure from audience expectations, which should apply to the overwhelming evidence that such strings were not used then. Modern aesthetics prefers metal-wound to all-gut bass strings because they provide greater pitch focus and richness, and a smaller difference in tone quality between treble and bass. This preference only started to develop during the 18th century, and didn't apply to the orchestral double bass until well into the 20th century. Musicians were quite happy with the sound of all-gut basses before then, and there was no reason for them to consider that metal-wound basses were any 'better', no matter when (or how many times) they were invented.

REVIEW: *Die Geschichte der Klavierbauerfamilie Kaim aus Kirchheim unter Teck*, Ira Schulze-Ardey, Stadtarchiv, Wollmarkstrasse 48, D-73230 Kirchheim unter Teck. 1999. 167 pages. In German. Numerous half tone illustrations and tables. DM 30.

This history of the Kaim family - who were pianomakers in Kirchheim for over a century - is a fine example of what can be achieved with enthusiastic support from a town archivist and diligent research work. The book is very well produced, on glossy art paper with clean, clear printing, good illustrations, and bound in nicely decorated boards.

Kaim & Sohn was founded in Kirchheim (very near Stuttgart) when Franz Anton Kaim returned to Württemberg after his journeyman period in Vienna. This was in 1819, when he applied for his *Burgerecht*. He then started making hand-crafted square pianos, surprisingly, not in the Viennese idiom but, as Ms Schulze-Ardey is careful to point out, with 'English Action' (of a type unfortunately not specified). This line continued for several decades - apparently persisting with square pianos long after they had fallen out of favour in France and Britain - and progressed to volume production of grands and uprights in a large, purpose-built factory under a partnership known as Kaim & Günter. After reaching dizzy heights of fame when the firm promoted its image through the Kaim Concert Hall in Munich, it crashed in the great depression, and was declared bankrupt in 1933.

The museum in Kirchheim unter Teck has a collection of Kaim pianos, but the earliest dates only from 1841/2, so the early stages of technical development cannot be traced, except through newspaper advertisements - which generally provokes more questions than answers. A particularly curious notice appeared in 1824, describing a new model square piano with a 'deeper than usual case' in which the strings were hidden from view under the soundboard. Kaim never claimed to be the inventor of this, but to have taken up the ideas of a Swiss maker. Schulze-Ardey proposes that this was Hans Jakob Goll of Zurich, who, according to Hirt [*Meisterwerke des Klavierbaus*, 1955, p.110] designed an up-striking *Zugmechanik* [pulling action] with strings fastened to the underside of the soundboard. The idea was that the hammers would strike towards the soundboard, thereby gaining the advantages of a down-striker, but the action, not needing return springs or counterweights, would be much less troublesome to construct and maintain. All very interesting; but neither Schulze-Ardey nor Hirt identifies a surviving instrument. In 1840 Kaim announced another innovation - a piano in the American style [*nach Amerikanische Art*]. But again details are lacking.

The six-octave (FF-f⁴) square piano of 1841/2 (in Kirchheim museum) looks quite similar to a Collard & Collard, with a plain veneered exterior with canted corners, four turned legs, and a lyre-shaped pedal support. Two pedals are visible on the lyre but the author neglects to tell us what the function of the extra pedal is. As the lid is open we can see that inside it has a metal hitchpin plate and the wrestpins are at the back - but we cannot see the action. We are told that it is 'English' but unfortunately Schulze-Ardey has made no action drawing of this or any other piano in the Kirchheim collection. There are seven excellent technical drawings, but these are taken from nineteenth-century, non-copyright sources, and most relate to other makers. They can in no way compensate for the author's frustrating reluctance to describe and analyse the Kaim instruments that were so readily accessible to her.

If this is the book's chief failing, it also has virtues. Schulze-Ardey provides plenty of data on Kaim's sales, usefully compared in bar charts with the output of other makers in the Stuttgart area. There is an survey of Kaim's output by type (square, upright and grands) and an analysis of export destinations (in the 1860-80 period) together with much other information. A useful table, drawing on research by Martin Friedrich Jehle (Frankfurt/Main, 1982), gives a comprehensive list of piano-makers from the Württemberg region.

The History of the Piano-making Family Kaim is No.24 in a local monographs series available from the town archive/library (address as above). If you read German it is very good value at DM 30.

REVIEW: *Keyboard Instruments in Eighteenth-Century Vienna*, Richard Maunder, Clarendon Press, Oxford, 1998. ISBN 0-19-816637-0. 266 pages, octavo. 8 pages of photographs, 14 line drawings, 14 musical examples. £50.

This is one of those startling books that make you reflect how little you really knew before you read it. It's no wonder. As Maunder remarks in his introduction: 'Although much has been written about eighteenth-century Viennese keyboard music, especially that of the Haydn-Mozart period, there has been surprisingly little serious research into the instruments for which it was composed. Viennese harpsichords are not mentioned at all in Hubbard's *Three Centuries of Harpsichord Making*.' If that is a surprising thought, there is more to follow.

Although Maunder does not say so, much the same could have been said of Viennese fortepianos until very recently. For example, in Rosamond Harding's landmark study - *The Pianoforte - its history traced to the Great Exhibition of 1851* there is no description of a Viennese piano earlier than 1825.¹ This is of course a bizarre omission, crying out for remedy, yet for decades there has been little serious research in this area. And since most of the surviving instruments in museums were not inscribed with a date when they left their makers' workshops, the inadequate state of knowledge allowed many of them to be ascribed to significantly earlier periods than was ever justified. Instruments made after 1800 were often passed off as being c.1780, and regrettably they still are. Thankfully, this situation is beginning to improve since Michael Litcham's important research began appearing in print.² But how long does it take to turn a supertanker? Over the last two decades the public has accepted the sound of Mozart on the fortepiano - as performed by Bilson, Lubin, and Tan - and has formed ideas of what the instrument is and what it can do. How shall we now persuade them that they've been sold the wrong article? It may take many years before even the most enthusiastic 'early music' audiences can be convinced that the ubiquitous 'Walter fortepiano' is not representative of the Mozart era. Performances on such instruments may not bring us much closer to the Mozartian soundworld than Landowska's recitals can be said to have re-created Couperin's. For example, many 'Walter copies' are based on a prettily veneered specimen in the Kunsthistorisches Museum, which was dated 'c.1785' in Luithlen's catalogue, and given pride of place in colour on its front cover. However, it is certainly much later, and this makes a huge difference with regard to string tensions, hammer weights, touch, and sonority.³ Perhaps the root of this confusion and misinformation has been the acceptance of 'c.1783' as the true date of Mozart's piano in the Gerburtshaus Museum in Salzburg. Now, at last, this instrument is being seriously re-examined: read on.

With clavichords from Vienna the neglect has been almost total. So, as Richard Maunder notes, when Ed Ripin suggested that Haydn might have composed some of his pieces with such an instrument in mind, his comment - made in a paper at the 1975 Haydn Conference in Washington - was taken to be merely provocative, and drew a dismissive response from those who thought they knew better. 'The clavichord was primarily a north German instrument' wrote his posthumous editor (1981), 'and, as far as we know, was little used in Austria'.⁴ This despite the easily verified fact that the Mozart family owned three or four clavichords, one of which Vincent Novello described clearly and unequivocally on his visit to Maria-Anna (Nannerl) in Salzburg.⁵

So this is a very timely intervention by Dr Maunder. The stimulus for it arose curiously in an invitation from Katalin Komlós to contribute an article on Haydn's keyboard instruments for a book that sadly never materialised. But having accepted, Maunder had committed his spare hours to looking through microfilms of old Viennese newspapers. To his delight he found so much useful information that he was encouraged to make a thorough and systematic search, taking him through every copy of the *Wienerisches Diarium*, from 1703 to 1780, and then through the *Wiener Zeitung* (as it was renamed) from 1780 to 1800. This trawl brought

to the surface a gleaming harvest of fresh information; and as he considered it Maunder realised that it was simply too good to leave unpublished. His first thought was to find some indulgent journal that would be willing to take a paper of one hundred-plus pages, where the whole story could be properly reported. But in the event, rather than trimming his report to squeeze it past a reluctant editor, he was persuaded by a friend to expand it, adding to the newspaper material complementary descriptions of surviving instruments -very necessary, since very few people were aware even what a Viennese harpsichord might look like. The result is this handy 266 page book in OUP's 'Monographs on Music' series.

Maunder begins in earnest with an exposition on the terminology relating to keyboard instruments, in which he clarifies the seemingly ambiguous names given to them in eighteenth-century German and Austrian usage (*Flügel*, *Clavier*, *Instrument*, *Cembalo*, etc). This is obviously a very necessary preliminary if we are to get to grips with texts in Austrian newspapers. Much depends on the reader's acceptance of this, so it is as well that Maunder draws on a wide selection of eighteenth-century sources to establish the basic validity of his interpretations. This also constitutes a salutary rebuke to some, who, trusting their own intuition rather than hard information, suppose that *Flügel* or *cembalo* can be freely taken to mean 'pianoforte' wherever they think that the music suggests it. Can we hope that Maunder's diligence in setting out the basic literature will deter this unhelpful practice?

The regulation of instrument making through the power of the craft guild system (which persisted longer in Vienna than in northern Europe), is also clearly explained, and a helpful map is provided showing Vienna as it was in the eighteenth century, with markers superimposed to show where various key-board instrument makers were living. This was mostly in the southern area, either side of the Mariabillerstrasse; in Laimgrube; and across the river in the Wieden district. If you know your Vienna, this is the area west of the Kunsthistorisches Museum and the Opernring, where you might have made a pilgrimage to find the house where Franz Schubert passed his last days, in a little room in his brother's apartment in Kettenbrückgasse.

How needful this study has proved is revealed as soon as we come to the section describing surviving harpsichords made in Vienna. Those readers who can remember the NEMA Conference organised by Lewis Jones at the Guildhall in 1988 may recall a paper by Daniel Spička from Prague in which he described, as a baffling curiosity, a harpsichord with an extraordinary 'short and broken' octave. Peter Bavington reported this to a wider audience in the *Harpsichord & Fortepiano* magazine [Vol 4/6 p.151]. The strange layout of the bass keys is shown below. Two examples were then known in Bohemia but others have since been brought to light. With Maunder's exposition everyone can now see that this is one of the most surprising and distinctive features of Viennese keyboards made during the first sixty years of the eighteenth century, present in many of the instruments sold through the newspapers.

	BBb			F#	G#		
	AA	BB		D	E	Bb	
FF	GG	C	F	G	A	B	

At least three more harpsichords, including those by J.C.Panzner (1747), and J.Leydecker (1755), and an example listed in Boalch 3 as 'H.A. 1696' but signed under the soundboard *Walter fecit 1703* [i.e. Franz Walter], should be added to the list. All are indisputably from Vienna. Eagle-eyed, Maunder also spotted a humble fretted clavichord sold in a recent London

auction, with this same distinctive bass octave. After chasing it around England he has been able to include details and a photograph of this too. In discussing Haydn's keyboard music (p.95) Maunder examines the inescapable evidence (which has been pieced together by many observers over a decade or so) that this distinctive type of broken octave is a true and sufficient explanation for some seemingly unplayable left-hand passages that appear, most notably, in the G major variations Hob.XVII/2 composed in the mid 1760s. This discovery scotches Franz Eibner's inept suggestion (Wiener Urtext Edition) that these impossibly wide-stretched chords must indicate 'Haydn wrote his earliest keyboard pieces for the Hammerklavier' [=pianoforte] using the sustaining device. (This invocation of a later pianistic styles is a ludicrous anachronism: but faced with Haydn's extraordinary notation I suppose he felt compelled to offer some sort of explanation.) On the Viennese harpsichord or clavichord with its special kind of broken octave these passages can be played with ease.



Final bars Hob.XVII/2

Equally importantly, we see from Maunder's carefully collected evidence how rarely double manual harpsichords were encountered in the Imperial capital. All known Viennese harpsichords, and the vast majority of those described in the newspapers (whether indigenous or imported) are basic single manuals, with two eight-foot registers only, generally with no means of effecting quick registration changes during a performance. They are short-scaled instruments in the south European idiom, built around the bottom boards, and very probably intended to be strung in brass. The key fronts and 'nameboards', as well as the touch plates of the broken octave, usually show a characteristic style of geometric inlaid decoration. Externally the appearance of these harpsichords is very like a conventional fortepiano, with walnut casework and sloping cheeks. Beware, therefore, of misinterpreting iconographical evidence!

When he comes to consider fortepianos Maunder's findings will be equally surprising for most readers. Noticing that Joseph Haydn's 1788 piano from Wenzel Schantz cost only 31 ducats, Maunder compares this with the price range for grands from various makers, and concludes that Haydn's instrument was in fact a **square** piano. Importantly, such instruments, as made by Johann Schantz (brother to the above), and several other local makers, can be shown to have had *retro Stossmechanik* (with escapement) - the mechanism that Harding unhappily calls 'Anglo-German' - and **NOT** the more familiar *retro Prellmechanik* which so many wrongly consider to be synonymous with 'Viennese Action'.⁶ This latter type, as used by Anton Walter and his followers, where the hammer is fitted in a brass *Kapsel* on the back of the key, is taken for granted in reproduction instruments created for the music of Haydn and Mozart, yet there is every reason to think that it did not become standard in Vienna until the mid 1790s. By then Mozart was dead, and Haydn had acquired a sonorous English grand with a $5\frac{1}{2}$ octave keyboard. Before 1795 Viennese pianos contained a variety of actions, often of the *retro Stossmechanik* type, as seen in both grand and square pianos by Ignaz Kober who was appointed Court Instrument Maker from c.1798. Maunder gives proper attention to these mechanisms, and also the more basic form without escapement which appears in several pianos that are likely to be Viennese but lack inscriptions.

Regarding Mozart's piano, generally attributed to Anton Walter c.1783, there can now be little doubt that the present action, stringing and hammer weights represent a final, comprehensively updated version, installed in several stages, concluding with a workshop refurbishment by Walter shortly before 1810. The piano is therefore something of a hybrid, a mongrel, representing several phases of fortepiano technology in Vienna. Thanks to the painstaking research of Michael Latham and Alfons Huber we can be fairly sure that the original action cannot have much resembled the present one since the original key guidance system used blades working in a rack, as in the harpsichords listed above.⁷ Maunder gives a useful reminder too that the present knee levers are a certainly later modification. The original black-stained, hand-operated levers on the side yokes of the wrestplank are still *in situ*, and were connected to knee levers some time after the instrument was made. So there is much food for thought, and further investigation.

It appears that there is no longer any Walter fortepiano in existence that remains unaltered from the 1780s. So for the Mozartian soundworld we would probably do much better to consult the instruments of Johann Andreas Stein - not the adulterated copies, with heavier stringing, added hammer checks, and moderators which Stein would not have provided, but 1780s originals with their much lighter and delightfully expressive tone. Let there be no mistake, the ubiquitous 'Walter' sound is very different from Stein's. No-one who has heard the two, exemplified by original instruments could possibly confuse them afterwards. Stein pianos we know Mozart played: by comparison the rather inflexible Walter sound usually heard these days, relentlessly employed in modern concerts and recordings, seriously impoverishes an area of music-making that should be, at the least, cheerfully and pleasantly varied.

In his discussion of published music and related instruments, Maunder makes many interesting points, and usefully directs readers' attention to the use of the clavichord which has hitherto received scant regard. The perplexing matter of continuo instruments is given a good airing too, from which one can see that contemporary reports cite the use of a harpsichord, whenever the band was of any size, whereas those sources that seem to suggest the use of a fortepiano in the 1790s are all retrospective writings and thus not so reliable.

But the core of Maunder's invaluable contribution to the study of Viennese keyboard instruments is, as I have mentioned, his thorough reading of the newspapers of the time. All the necessary passages from every advertisement are reproduced in his Appendix A, quoted both in the original words and in an English translation. Clearly this will constitute an invaluable resource for decades to come. So when Maunder collates many entries, as he does in Chapter 8, making deductions about the identity of otherwise anonymous advertisers and their status as dealers, or the legatees of deceased musicians, as licensed burgers or unregulated but silently tolerated outsiders, one can turn to the relevant texts and examine his reasoning.

There are, as Koster has noted (GSJ 52, pp. 356-62), some doubtful interpretations. Personally, I am reluctant to agree with Maunder's conclusion that 'the *Tangentflügel* attributed to Späth of Regensburg and the German style of square piano with bare wooden hammers ... found no favour in Vienna - at least among serious musicians' (p.5). When Maunder meets with '*ein grosses Fortepiano, so in Regensburg von dem berühmtem Meister Spad gemacht worden*' he speedily dismisses the idea that it had a tangent action, taking fortepiano in its more restricted sense. But in 1782, when this item appeared in the small ads, I doubt that Viennese musicians were sufficiently settled in their ideas about fortepiano tone to make such a distinction. This 'large Fortepiano' by Späth had four stops - exactly the number to be found on most of his tangent-action specimens - and rather more than would commonly occur on an instrument with leather-faced hammers. An interesting advertisement appeared on 12 April 1777 when someone hoped to sell a 'Pantalon with long octave' (described as a 'French' octave, therefore a chromatic bass to FF). This too suggests an instrument with bare hammers, indicating that the aesthetic of the Pantalon (i.e. playing habitually or frequently without dampers, modulated by many varieties of tonal registration) which was then so popular in southern Germany was also known in Vienna.⁸

In a very useful *Appendix B* Maunder provides a new list of Viennese keyboard instrument makers, including some who have not been known before, collated with exemplary thoroughness, citing the sources of information or inference at every point. For myself, I could only wish for more, particularly with regard to the descriptions of surviving instruments, but there can be no mistaking that the central corpus of information and evaluation presented by Dr Maunder will remain indispensable to any serious student of Viennese keyboard music for decades to come.

FOOTNOTES

1. Harding has an action drawing of a grand by Stein of Augsburg [p.25 2nd Edn], dated 1773. She evidently drew this from an action model she had seen at Stuttgart; and the date is dubious. Regarding the Viennese grand or its action there is nothing till we reach the photograph of a 'Viennese Pianoforte about 1800' (again from the Württembergisches Landesmuseum Stuttgart) - Plate I facing page 98. This is dreadful gaffe for in reality it is a six-octave piano from about 25 years later. Harding's action drawings for Viennese grands [pp. 152 ff] likewise relate to Streicher pianos post-1825.

2. Notably in *Authenticating and Dating the Pianos of Anton Walter* in *Restaurieren, Renovieren, Rekonstruieren: Methoden für Hammerklaviere* (Vienna, 1997) pp.67-82. (Latham's paper is in English).

3. The other popular Walter for copying is the one for which the Germanisches Nationalmuseum issued drawings, regarding which Latham argues (I believe soundly) a post-1791 date. I have a hunch that the soundboard and bridge were replaced after 1800 in any case, and it is this kind of detail that is copied unthinkingly, producing a Beethoven instrument on which to play Mozart.

4. In *Haydn Studies; Proceedings of the International Haydn Conference, Washington DC 1975*, (New York, 1981), pp 302-8.

5. *A Mozart Pilgrimage*, Nerina Medici di Marignano, Edited by Rosemary Hughes, (London, 1955) p.90. 'In the middle of the room stood the instrument on which she often played duetts with her brother... you may be sure that I touched the keys which had been pressed by Mozart's fingers with great interest.' See also, *Mozart's Keyboard Instruments* R.Maunder in *Early Music* Vol.20, 1992, pp.207-19. A clavichord was still in use in the family c.1785.

6. Pianos by Kober, Seydel, Christoph, Johann Schantz dated 1788-95 all exemplify the *retro Stossmechanik* with escapement and there are others less readily attributed.

7. As it now exists, the back rail of the keyframe incorporates a box or pigeon-hole key guidance system like Stein's, i.e. *Kanzelenführung* with an over-rail, which suggests that it might have been modified before c.1795 when Walter switched to the subsequently universal guide pins under the front of the keys.

8. This may have actually been one of the Schwabian harp-shaped Pantalons, commonly catalogued as 'lying harp pianos' and attributed to J.M.Schmahl of Ulm. -----

Review of: *The Pianoforte in the Classical Era*, by Michael Cole. Clarendon Press, Oxford, 1998. xiv + 398 pp, 24 plates, many drawings.

This is an absolutely first-rate book, which contains a vast amount of new information culled both from surviving instruments and (primary) documentary sources, lucidly presented. It is most refreshing to read so much common sense from an author who is himself a professional maker and restorer, and who therefore has a far better understanding than most of the instruments and the way they work. His feeling for the problems the makers faced, the mistakes they occasionally made, and the ingenuity of some of their solutions is absolutely unrivalled. Best of all, Cole combines impeccable scholarship with an elegant and entertaining style of writing. I particularly enjoyed his Gibbonesque dismissal of Christoph Gottlieb Schröter, self-styled inventor of the piano: 'like so many habitual controversialists, he combined a passionate belief in the justice of his case with a pitiful inability to perceive the weakness of his own position'.

Despite the book's title, there is an excellent summary of the first half century of the piano's development, in Cole's first two chapters. His experience as a maker is immediately apparent in the suggestion that Cristofori inverted the wrestplank simply to create space for the action to be removed easily, not to obviate the theoretical possibility of disturbing the strings on the nut by a strong hammer blow (which troubled few makers when hammers were so light). Among the many other important insights, Cole's account of the parallel development in Germany of the Hebenstreit-inspired *Pantalon*, alongside instruments derived from Cristofori's design, instantly makes sense of so much that happened there, where previous accounts simply describe numbers of apparently dissimilar instruments with hardly any discernable relationship between them. Cole is surely right, too, to regard Zumpe's English square piano as a sort of refined and updated *Pantalon*: its action owes nothing to Cristofori's, and for that matter the instrument bears only the most superficial resemblance to the clavichord. A newly-researched biography of Zumpe explodes the old myth that he was ever a pupil of Silbermann

(whose alleged square piano of 1749 is shown to rely on a fake label for its ascription and date, as also does the often-quoted 'Johann Socher 1742').

Subsequent developments in England are described in magisterial style. Cole makes a strong case for Americus Backers, inventor of the English grand, whose achievements ought to rank him with such giants as Cristofori and Stein: 'it would be hard to think of any maker or inventor who has contributed so much to the instrument as we know it'. William Southwell, too, is shown to deserve more credit than he usually gets for his many innovative ideas that were often licensed to more well-known manufacturers. English squares and grands were exported all over the continent, even to the homelands of Johann Andreas Stein and Anton Walter. A whole chapter is devoted to the latter's instrument for Mozart, whose present action, Cole emphasizes, almost certainly post-dates its owner's death so is not quite the ideal medium for his music it was once thought to be. The chapter on Stein himself paints a picture of a restless innovator, for ever experimenting, whose most enduring invention – the so-called 'Viennese action' – was but one of many attempts to perfect a keyboard instrument combining the best features of the harpsichord and the piano. It is a little misleading to suggest at the start of this chapter, however, that the instruments so much admired by Mozart in 1777 were the same as those he played in the 1780s. As Cole says later, there is no evidence that they already had 'Viennese action', for no Stein pianos survive that can be reliably dated to the 1770s. Another minor criticism is that a fifth type of large pianoforte should probably be added to the list in Chapter 11 of those available in Germany and Austria in the late eighteenth century: the type with the action apparently developed by Ignaz Kober of Vienna in the 1780s (what Harding misleadingly calls 'Anglo-German action'). True, Cole says in Chapter 13 that this action was used on Viennese squares of the period, and he mentions the Kober instruments in passing; but the action had certainly not disappeared 'even before the [eighteenth] century

was out'. It lingered on for several decades: a similar instrument of c.1805 is illustrated by Laurence Libin in *Early Music*, November 1990, and another was made by Stein's grandson J. B. Streicher as late as 1841.

Later chapters include an enlightening account of combination harpsichord-pianos, with a discussion of the special technical problems involved in their manufacture, and a convincing reason for their existence: they allowed amateur musicians to explore the possibilities of the new instrument without giving up their cherished harpsichord and its familiar repertory. In a chapter on upright pianos Cole is rightly sceptical of the claims of C. E. Friederici, c.1745: there are serious doubts about all three surviving alleged examples, one of which

probably dates from c.1790. A maker's description of construction methods is a particularly valuable addition, as is the chapter on 'touch and tone'. The differences between various types of piano touch (including that of the modern instrument) are quantified in some detail; as a result the usual simplistic statement about the 'heavier' English action c.1800 has to be qualified. It is the *depth* of touch that is greater on the English instruments, not the touch *weight*, which in fact tends to be greater on Viennese pianos, especially in the bass.

Some beautiful action diagrams (by the author) and a good selection of photographs, each with full technical specification, fittingly complete what will without doubt quickly become the standard classic 'history of the piano'.

Review of: Christiane Reiche, ed, *Kielinstrumente aus der Werkstatt Ruckers - zu Konzeption, Bauweise und Ravalement sowie Restaurierung und Konservierung: Bericht über die Internationale Konferenz vom 13.-15. September 1996 im Händel-Haus Halle*, Schriften des Händel-Hauses in Halle 14, 1998. 320 pp, many illus, DM 19.--, Händel-Haus Halle, Gr.Nikolaistr.5, D-06108 Halle.

I received a friendly letter from the editor asking me to write an announcement of this book in our next Q; hence the following, but I hope that there will also be a proper review by someone more expert on harpsichords than I, though all the most eminent Ruckers authorities were giving papers at this conference, so cannot be asked to review it.

Despite the language of the title, 15 of the 23 articles are in English; all the others are in German. Much, as one might expect, is on transposing instruments and perhaps the most exciting article is that by Andreas Beurmann, one of our members, on his recent discovery of three Spanish transposing harpsichords from the 17th century. The first, by Fray Raymundo (probably Truchado who made the Brussels *Geigenwerk*) and Fray Antonio of 1624, is the earliest known transposer to survive (the Edinburgh Ruckers is dated 1638) and the earliest known surviving Spanish harpsichord of any sort. If I understand the description correctly, the transposition is similar to, but not the same as, that of the Edinburgh Ruckers. The second, by Fray Pedro Luis Bergaños, 1629, is also a fourth-transposer, and also somewhat different. The third, perhaps the most exciting, by Fray Bartomeu Risueño of 1664, is a whole-tone transposer, something of which Grant O'Brien had postulated the existence, from clues on the woodwork, etc of instruments which had later been *ravalé*. Here, at last, one has been found to prove Grant correct, the only one known, and one late enough that it has a fully chromatic bass – the other two of Beurmann's instruments, like the Edinburgh harpsichord, are both C/E short octave. The discovery of more surviving transposers increases our knowledge and understanding of how this was done and emphasises the wide

range and variability of such instruments. There was a general assumption (save for Grant O'Brien's work in this area, of which more below), that all these instruments were the same, all transposing a fourth in the same way. Our impression now, almost certainly equally inaccurate, is that all were different and no two the same!

Nicolas Meeüs has an article on the very vexed, and somewhat complex question, of what was the musical purpose of the transposers, concentrating on the only one previously known, the Edinburgh Ruckers, which transposes a fourth. Very briefly, he traces the reason to the fact that music in the Middle Ages and Renaissance was octotonic and not heptatonic: both the Bs were of equal status. This equality survived through the soft and hard hexachords into *durum* and *molle* scales and systems and into the sixteenth-century conceptions of the church modes, the *durum* with B \sharp and the *molle*, with B \flat , and its *finalis* a fourth higher than those of the *durum*. Meeüs cites references as late as Van Blankenburg in 1739 to such a dual diatonic system, and of course to Praetorius and Schlick. And finally he expands on what he wrote in our Quarterly, Comms. 680 and 735 in Qs 42 and 44 respectively, to relate this to some actual musical works.

Most of the other articles are more on the technological aspects of the Ruckers's work, with John Koster on a very hypothetical, though very plausible, reconstruction of the Ruckers's geometrical methods, Grant O'Brien on details of Ruckers double-manual harpsichords which may be relevant to the one in the Händel-Haus, with descriptions and many diagrams of transposer lay-outs (as we have seen, there is a surprising number of possible variants

and, as Dr Beurmann notes, none of the four surviving instruments are the same). John Henry van der Meer discusses transposers outside the Netherlands, describing the transposing effect of stringing with brass or iron, a matter greatly complicated by our lack of knowledge of the string tensions employed (as he says, most people now are properly scornful of the 'just under breaking point' dogma) and of which string material was used on each instrument. John Koster has a second article (several people seem to have presented more than one paper) on pre-Ruckers transposers. Stewart Pollens describes a series of *ravalements* which were carried out on the Flemish harpsichords in the New York Metropolitan, and Grant O'Brien with Stefan Ehrlich and Christiane Rieche describe those on the Halle Ruckers and reconstruct its original state. Thomas Belz describes its painted decoration.

A series of more general articles includes one on the history of Ruckers scholarship by Jeannine Lambrechts-Douillez who, for so many years was curator of the Vleeshuis Museum in Antwerpen and who founded the Ruckers Genootschap – in reality she is the *fons et origo* of Ruckers research and it is very proper that hers is the first article. Florence Gétreau discusses the French passion for Fle-

mish harpsichords, with new inventories, descriptions of paintings, and previously unpublished sale records. Van der Meer describes in a second and even more important paper the position of harpsichord-making in the Northern Netherlands, an area which has been badly neglected compared with the Flemish areas, with very informative lists of makers in the various cities and provinces.

Finally there is a series of articles on the restoration of various harpsichords, with a good deal of philosophical input of the 'should we, shouldn't we' sort, with one article specifically on that subject by Klaus Gernhardt.

This book is fantastic value at the price quoted above, a price so low (about £7) that I still wonder whether it is a misprint. There is no excuse for anyone involved with early keyboards not to buy it, and as I shall have to pass this copy on to a reviewer, I shall order another for myself, even though I'm hardly a keyboard man. There are so many aspects here, pre-eminently the ones on transposers, so vital to our understanding of early keyboard practice, that the book is essential reading and rereading (for a number of articles are sufficiently technical that they are fairly difficult to understand at first go) and far too much so just to leave it to sit in libraries. We all need it for ourselves where it is immediately to hand.

Review of: Arnold Powell, ed, *TRAVERSO – The First Ten Years*, Folkers & Powell, 49 Route 25, Hudson, NY 12534. 198 pp, US \$24.95

It is just over ten years ago that Ardal Powell of the New York musical instrument firm of Folkers and Powell, recognising that musical instrument enthusiasts are distributed worldwide and need means of communication and exchange of ideas, decided that a quarterly newsletter devoted to one aspect of their interests would be useful. Each issue should contain a major article by an Authority and a "Bulletin Board" section containing up-to-date information on musical matters in general, publications, competitions, instruments for sale, etc. The subject chosen by Powell as the focus of his newsletter series was his own special interest in the structure, music, and use of the flute during the period generally known as "The Baroque" (c.1580-1710 approx.) Contemporary musicians, by reason of its playing position, had called this instrument "Traverso", hence the title adopted for Powell's newsletter series.

This, with a slight extension of coverage, we have today in the form of an elegantly bound paperback volume of forty unedited photo-reproductions, with a preface by the editor, various subject indexes, and an "Historical Flute Bibliography 1989-98" compiled by David Lasocki. The origin and inclusion of this item is explained in Powell's introduction.

Looking in detail at this book one small question does arise. Should Folkers and Powell perhaps be described as "makers of reproductions of the 'Historic Flute'" rather than simply as makers.

All in all this volume is, as hoped, a very useful contribution to organology.

Comment by J. Montagu:

Traverso: I would like to congratulate Ardal Powell, not only for keeping *Traverso* going for over ten years but also for republishing the whole of Vols 1-10 in a single, slightly smaller format volume. This is, I hope, reviewed elsewhere here, but I read it myself with considerable interest before passing it on, and it is quite extraordinary how much very useful information has appeared on a quarterly single sheet of paper folded into four pages. We must be grateful to Folkers & Powell for making it available in the first place and now for reproducing it for \$24.95 so that anyone who missed the early numbers can acquire them all.

"Starting on an Early Bassoon" Thomas Sherwood

Such a practical and helpful booklet as this could well have been longer, so the cliché "too little, too late" comes to mind, too late anyway for those who have already taken the plunge. The author has not set out to write a tutor, rather a more general treatment including a brief history of the bassoon, pitch considerations, and advice on finding an instrument. There are however helpful tips on technique. On one topic, I question the manner in which he says the top finger-hole is leaked for g. Even on modern bassoons and in various tutors this is not standard, rolling the finger forward being only one possibility. The pedant in me finds one other small quibble; on page 8, a crook that is judged to require reshaping to give the right reed angle is described as "hot". I suggest that it might be allowed to cool down, (even after prolonged jazz sessions!)

There is a helpful section on reeds by Barbara Stanley, and a bibliography of reliable relevant references. In short, this is a must for anyone contemplating starting the Baroque Bassoon, or adding one to their existing instrumentarium. Teachers will find it useful and being such sound advice, it should be found under the boot joint of every new instrument when the purchaser opens the case.

"Starting on an Early Bassoon" is available from The Early Music Shop, or directly from Dr T. Sherwood, 19 Clarendon St., Cambridge. CB1 1JU

Review of: *Larigot* N° 22, Décembre 1998, ACIMV, 136 Boulevard de Magenta, F-75010 Paris.

A rather belated review (apologies). The first article is 'Reflections sur l'"Embouchure"' by Jaap Frank and thus, as one would expect from this author, on that of the flute. It is mainly a philosophical discussion on whether this is the correct name for the mouth-hole or whether, for example, something such as *focalisateur* might be better.

A reprint of part of Oscar Commettant's report on the 1867 Paris International Exposition (*La Musique, les Musiciens et les Instruments de Musique chez les Different Peuples du Monde*, Paris, 1869) is of considerable interest. Like Kastner's *Manuel Général de Musique Militaire* of 1848, this, or anyway this section of it, is mainly a puff for Adolphe Sax. Sax had a genius for organising publicity, one reason of course that he was so hated by other makers. All Sax's instruments are wonderful and many others, especially those of Gautrot [see another *Larigot* review herewith!] are terrible and fall apart at a glance. Commettant's remarks on the Sax instruments are interesting and well worth reading and his style is chatty

and entertaining. For instance while discussing Sax's timpani without shells, he says 'Then why have shells, I ask myself? Mon Dieu, that's simple. One day somebody stretched a skin over a cauldron, and all those who stretched new skins did it over other cauldrons...', saying at some length that it's because things were always done that way.

Then follow some pages from an undated catalogue from Decart of Lierre in Belgium. There is also a single page from a Louis Lot flute price list of 1874. Cornette's *Nouvelle Méthode de Flageolet* has tablatures which show the use of up to five keys as well as the normal keyless French flageolet. Jean Luc Trouttet contributes an additional form of saxophone mute to add to those which appeared in *Larigot* 20 and 21, and an engraving of some soldiers entitled *Le retour... 1877* shows one of them playing an ophicleide, which one would have thought was uncommonly late for that instrument.

As always an interesting and useful number of this excellent periodical.

Review of: *Catalogue des Instruments de Musique de la Manufacture Générale de Gautrot Aîné & C^e, 1867, Larigot Spécial N° X, Avril 1999, 168 pp, illus, FF50. ACIMV, 136 Bd de Magenta, F-75010 Paris.*

I am supposed to know about these things, but I have to say that running through this catalogue has made me revise some of my ideas about general wind instrument practice in the last third of the nineteenth century. This is always one of the great values of early makers' catalogues: not just the prices (always fascinating in themselves) but the range of instruments available, all the different models, and what those models were.

The catalogue begins with various novelties and specialities of the house, to which we shall return, but it is what one might call the normal instruments that are what I find most surprising. Here we are in 1867 and with all the normal brass instruments the 'pistons ordinaires' are still the Stölzel. Most instruments are also available, at enhanced prices – often considerably enhanced, with 'gros pistons', the Périnet valves, not the Berlin pumpen which were used by Gautrot's great rival Adolphe Sax, but still the basic valve is the Stölzel which I had thought long outmoded by that date. Not only that, but a number of instruments have only two valves, which one would have thought even more old-fashioned (this leaves middle G# and the E♭, D and D♭ immediately above middle C unobtainable on cornets and trumpets).

The woodwind are in much the same condition. Bassoons are not too bad with from ten to nineteen keys but oboes are still fairly simple, not even as elaborate as Triébert's Système 3, though very surprisingly there are Boehm system oboes and cors anglais available. Equally the 'ordinary' clarinets are with 13 keys, though a lower-joint *brille* is available if required, as are Boehm-systems. The 'ordinary' flute has five or six keys, though flutes with a C-foot are available with seven to ten keys. The seven-key is not illustrated so one cannot tell which key is missing, whether one of the two F naturals or the upper C#. The

ninth key is the usual long upper shake and the tenth looks like an F# vent: it is in the space between the right-hand index- and middle-finger holes. The Boehm system is also available, but only the conical Boehm, at, as with all the others, about double the price of the ordinary. The cylinder Boehm was already well known from Rudall Carte in London, even if mainly in Carte's adaptation of that same year, and one would have expected it to be equally available in Paris, but if so not from Gautrot.

There then follows a *Seconde Division*, with the less expensive instruments, and here, while Albert may be glanced at, Boehm might never have lived. The most elaborate clarinet has brilles on both hands but that is the only instrument where rod axles are to be seen. Everything else has the old simple keys. English catalogues also include one-key flutes and five-key clarinets, and that right into the twentieth century, but not usually quite so blatantly as to call them the 'ordinary' instruments.

The novelties at the beginning of the Catalogue are the most seriously interesting things. The sarrusophones lead with an article in which Gautrot says that they were 'invented and patented by me. I gave them this name of Sarrusophone to render homage to M. Sarrus, director of music of the 13th of the Line, who gave me the first idea of making these instruments....' He gives a range from E♭ sopranino though B♭ bass, in unison with the bassoon, down to E♭ contrabass, plus a *Contre-Basson* in C or B♭ a third or fourth lower. He also sells, and presumably makes, saxophones, without any comment on their origin.

There is a range of what he calls Duplex Pelitti, and Bruno Kampmann suggests in his foreword to this reprint that these were probably imports rather than made by Gautrot. They are all the usual wide + narrow bores, a single lead pipe and valve setup with two bells with a switch to change from one to the other. Gaut-

rot emphasises that each half can be used independently of the other, so that one can have either a cornet or a flugelhorn.

A long article describes his Instruments Système Équitonique, which are transposers, so that the horn, for instance, is a true double horn, E♭ and B♭ (E♭ rather than F because with that crook and a combination of valves one can cover down to B♭ basso whereas with F one could only go down to C). One would expect with that name that this was a compensating system, and he suggests in the article that it does also work in that way, though he only mentions this in connexion with the bass. Thus, as Kampmann points out, he anticipated Blaikley by a decade, for his system is essentially the same, and Kruspe, with the double horn, by over thirty years. Either, like Köhler, Gautrot was adept at taking other people's ideas as his own (as is suggested with the sarrusophone, though here he does give full credit to Sarrus) or he was much more inventive than has ever been reckoned. He has a chromatic model of timpani (of which I have an example with Köhler's name on!) which is an ingenious system which raises the pitch by

pressing an inner hoop up against the head. He also has what appears to be two effective models of omnitonic horn, one just covering the cor solo pitches, the other replacing all ten normal crooks (he includes A♭ alto but not B♭ basso), which can be used either as a handhorn or with valves to save transposing. It seems as though Gautrot and his work would repay further study – he has always been over-shadowed by his rival Sax.

There is much else of interest, though I shall mention here only the series of rotary valve saxhorns (it must have galled him to have to use that name!) which, as Kampmann says, do look in all other respects as though they were made by Gautrot rather than being imports from Germany or points east.

We must be very grateful to ACIMV for reproducing this catalogue, and at such a reasonable price. I suppose what we really need now is for another Association des Collectionneurs d'Instruments de Musique à Cordes or à Claviers, instead of à Vent, to reproduce similar catalogues from makers of string instruments and keyboards. And of course to encourage this Association to produce ever more catalogues à Vent!

Review of: E.A.K.Ridley (ed. Elizabeth Wells), *Royal College of Music Museum of Instruments Catalogue Part Ia: European Wind Instruments: Addenda*. Royal College of Music, Prince Consort Road, London SW7 2BS, 1998; 40 pp, 39 illus. £5.00 + £1 pp UK, £1.30 Europe, £2.25 elsewhere.

The first volume of the wind instrument catalogue was published in 1982 and was reviewed here in Comm.446 (it's still available at the same price as this addendum, though postage for the two together is £1.60, £2.00, or £4.00). It covered 198 instruments, and this addendum covers the 91 instruments which have been acquired since then, a few of them additions to Keane Ridley's munificent gift and from other sources, the greater part of them from the collection of Geoffrey Hartley, all of which was given to the College in 1985 to arrive there after his death, which occurred in 1992. As before, descriptions are summary, with inscription, material, number of keys (but no detail of what they are), and the overall length the only dimension. There is seldom any provenance (it may be that this is not known; there are many gaps in that respect in my own catalogues, and even when I know the immediate source I can seldom go any further back than which sale room or dealer, so this may well have applied to Mr Hartley also).

The new accessions vary in significance, as might be expected. There is a treble recorder by Preston with a flute-type foot, like some by Stanesby. There is a number of double flageolets and one triple (the ocarina-type bass pipe not very clearly described). Of the transverse flutes, only one (an anonymous ivory one-key with what looks like its original embouchure) seems to be of any significance. Although the photograph of a walking stick shows a quite phenomenal distance between the embouchure and the uppermost fingerhole, no notice is taken of this in the description which is, in any case somewhat incoherent ('thumb hole for C' – which C and why?). This is one of several instances where the lack of any sounding lengths raises eyebrows.

One of the oboes is described as an oboe d'amore by Charles Mahillon, but it has a nor-

mal, oboe-type bell and the stamp includes the letter G, suggesting that it was some attempt at a high tenor; this seems to have occasioned no surprise to the cataloguer, for it has elicited no comment, nor is its system identified. A bassoon by Milhouse has a very un-Milhouse wing and bell; doubt is cast on the originality of the wing but not on that of the bell. With two Savarys, both of whose provenance is given, a Milhouse tenoroon, a Buffet-Crampon, a Distin, and three German instruments, by Heckel, Kessels, and Lange, and a Heckel 'Stritter' contra, the bassoons are the strongest section, as might be expected, for Hartley was a bassoonist. (Stritter was Heckel's foreman and was allowed to put his name on a few instruments). One of the more interesting clarinets is a Haynes 'Thermal' into the gap between the metal inner and outer walls of which one blew warm air to help it keep its pitch.

Of the two serpents, one can be seen to have an out-turned bell; the other is not illustrated and this feature, quite important in assessing its use, is not mentioned in the descriptions. Nor are we told which model of disc-valve cornet is represented here. The Courtois cornet has three B flat shanks 'not significantly different in length' but there must have been enough difference to make them all worth having, and the photograph shows that there is at least as much difference as a tuning bit would make, quite enough to enable its use at the different pitch standards of its day.

The brass instruments are not as well described as the woodwind, for there are some peculiarities in the entry for several of them. The Millereau F trumpet, for example, is described as having two extra crooks, though there is no provision for such a thing; it seems probable that 'tuning slides' is meant since one is said to be lacking a (or its – it is unclear which) water key. The Hawkes 'long D' trum-

pet (the traditional name for the straight D piccolo) is said to have 'hawk mark / rough medallion', but the standard Hawkes stamp on their brass instruments was a hawk riding a globe, and obviously this is what appears here. It is said, too to have an E♭ shank, but my own example uses the same shank, coming between valve section and bell section, for D and E♭, the D with the slide out to the marked line and the E♭ with it pushed right in – I suspect that this is probably the same.

It is very useful to have this catalogue and we should all be grateful that the College Museum has not succumbed to that all-too-common state of 'we have a catalogue, and it will

do for the next century'. To have a supplement so soon after the first edition is welcome indeed. Also very welcome is the index of makers which covers both volumes, as does the index which correlates catalogue numbers with pages. More welcome still is the assurance that Part II, covering the keyboards, is in active preparation and will be followed by further volumes to cover the string instruments and the Asian and African. The RCM collection is an important and extensive one, and catalogues, even as summary as this (though perhaps we may hope at least for *stichmass*, range, and string length as well as overall length), are invaluable tools.

Review of: Brian Harvey & Carla Shapreau, *Violin Fraud: Deception, Forgery, Theft, and the Law*, 2nd edition with a lengthy American section, 212 pp, Clarendon Press, Oxford, 1997, n.p.

When this book first appeared, in 1992 I wrote the following review (Comm. 1134, Q.70, January, 1993):

A very useful book, highly recommended to anybody who sells instruments of any sort, and well worth reading by anyone who buys them or handles them in any other way.

The law is quite clear, and every time anybody sells a plastic recorder stamped Stanesby or Bressan, they are committing a criminal offence. It is not sufficient to say that any fool knows that Bressan didn't use plastic, nor is it a defense to say that the instrument does say Zenon and Made in Japan on the back. The only protection is to put a disclaimer of equal size and prominence beside the false name, or of course to change the stamp to Bressan Model or something similar. Far more does this apply to stamping a wooden recorder Ganassi, because this could be judged to be seriously misleading and lead to quite a heavy fine. The same would apply to stamping a bassoon Denner, and any other similar names and instruments.

So don't think that this is just a matter of fiddles, in the violin sense or in the dishonesty sense. As far as you and I are concerned, the label that says 'Antonius Stradivarius, etc, etc, made in Czechoslovakia' is a standard joke, but the public have been taken in by them (every museum curator sees them brought in all hopeful after being found when Granddad died) and they are an offence. This applies just as much to the wind instruments. It's not mentioned in the book, but various modern approximations to !! !! and other marks of that period might be adjudged poten-

tially fraudulent by an over-zealous Trading Standards Official.

Get a copy of this book and read it carefully.

We don't often review second editions, but it seemed worth doing so this time because of some updating and, more important, the advantages of the American section for our members there and for those who might be exporting instruments to that country. American law is even more chancy than British and in fact if you intend to commit or combat instrument fraud over there you need to check your locations carefully. Every state has its own legal set-up and things that would get restitution in California could fail in New York or *vice versa*. As a result this section tends to be repetitive and confusing, but enough is clear to give useful guidance. Certainly there are differences from English and Welsh practice – Scottish law is different and it is perhaps surprising that Clarendon gives us an American survey before even attempting to cover the third part of these islands (I have no idea where the Northern Ireland legal system comes in).

I repeat: this is an important book. Ignorance of the law is no excuse, and anybody selling violins with false labels or wind instruments with wrong names is asking for trouble. However obviously false such labels may be to us, ordinary people are still fooled by them, and to sell instruments like that is a criminal offence and can lead to fines, if not prison, and, please note, a criminal record. Equally criminal are many other acts which many of us know little about. They're all here – read about them and be safer.

Review: - Rudolf Hopfner: Streichbogen (Katalog der Sammlungen alter Musikinstrumente und Sammlungen der Gesellschaft der Musikfreunde in Wien). German text, published by Hans Schneider 1998, 257 pp, ISBN 3 7952 0930 7. Price not indicated.

This book contains a catalogue of the 119 stringed instrument bows found in the musical instrument collections of the Kunsthistorisches Museum and the Gesellschaft der Musikfreunde in Vienna. There is an introductory section describing the cataloguing procedure and outlining the historical development of bows from the 16th century to the mid-20th century. The main part itemises constructional details, including a table and graph of stick diameter along the length (both in-plane and at 90 degrees), and includes photographs of the frog end and the tip. Other constructional details listed for each bow include stick type, tip shape, material, length, diameter at frog end, minimum diameter, balance point as a percentage of overall length, elasticity of the stick as measured by an ultrasonic tester, hair length, frog material and dimensions, tensioning method and total bow weight. In some instances an attempt is made to identify the bows maker or provenance, and brief comments on the condition and probable alterations such as replacement frogs are provided. For 38 selected bows, full scale drawings are included in an accompanying folder. The standard of presentation is excellent.

Inevitably most of the catalogue items are 19th or 20th century violin bows based on the Tourte model. Around 25 are of earlier designs, and unfortunately none of the bows is actually photographed in full, so one has to visualise the overall shape (the exception is Knud Vestergaards Vega Bach bow, which is a modern curiosity). Players of historical stringed instruments looking for associations between bow type and length, period, place and repertoire will derive few if any insights from this book. The stamping of bows by a maker or distributor started only at the end of the 18th century, and identification of time and place of manufacture for earlier bows depends on recourse to stylistic criteria, which usually means iconographic evidence already well documented elsewhere, although in some cases more specific circumstantial evidence concerning their likely provenance is mentioned; the bows referred to as 16th century Italian are attributed to the Este collection in Catajo castle in Padua.

Nevertheless the detailed measurements and ancillary information contained in this book should be of value to bow makers, and perhaps to stringed instrument makers as well. There seems to be some evidence to suggest that during the baroque period it was normal for the instrument maker also to supply the bow; which would seem to be so obvious that one wonders why this is not common practice nowadays.

For those looking for heavyweight bows for violone and double bass instruments there are some interesting specimens in the collection, including early ones with clip-in frogs.

Of particular interest are three quite early headless bows. As one approaches the tip of the stick, the diameter flares out by about 60% over a cm or two. Then, on two of these bows, the diameter precipitously decreases to rather less than the thinnest found elsewhere, forming a cylindrical button at the tip, around which the hair is tied. On the third of these bows, the hair is looped over a conical tip after the flare. One of the first two bows has the remains of a wrapping which could be from a wrapping of the whole tip (perhaps in vellum), forming a point, that one occasionally sees in old paintings. These bows have clip-in frogs, but the catalogue suggests that originally the hair fixing on the frog end could have been similar to that at the tip.

The collection of bows described here is one of the most extensive there is. The quality of this catalogue is truly excellent, a model of what a catalogue of a bow collection should be. It is worth careful study by anyone interested in the history of bows, even if they can't read a word of German.

Bouwerskontakt Bouwbrief 93, My Summary

BB-93 starts off with an article by Andreas Richter, called "Aspects of the flow mechanics in the central chamber ("kernkamer") of an organ pipe". It is a rather extensive, 5 page, A4-sized (as the Bouwbrief is) treatment with graphical illuminations of the air flow pattern between the air inlet to the chamber and the labium in the pipe. Five different chamber forms are described (all for square wooden pipes) with indications of laminar and turbulent flow regions. At the end of the article, a cylindrical metal pipe is shortly described as well. It could be that the article has appeared elsewhere, because it is noted that it has been translated (from the German, I suppose).

Various pages are dedicated to the usual other periodicals, such as "Das Musikinstrument" and the announcement of courses, events and other more or less useful information. I don't cover these.

John Boersma reports on the "Open Zolderdag voor Orgelbouwers" (the regular gathering of the organ builders of the Bouwerskontakt), which was held on 6th of March. It included a presentation by Wim Meijer on building the wind "lade" and the distribution of pipes over the "lade" (sorry, not an organ builder at all myself, I have no equivalent English for this term). Viewgraphs were presented (but not included in the BB). An alternative building technique was demonstrated by John Boersma.

The regular series "Technical Basic Knowledge" (or Technische basiskennis) handles "materials 7". It covers glues and it gives a rather superficial overview (on 2 A4 pages) of the various types and basic characteristics.

Gijs van Ulsen describes the Giuseppe Guarneri del Ges violin, nicknamed "Il Cannone", which was used by Shlomo Mintz in a concert by the Limburgs Symphony Orchestra. Apparently there was also a TV interview with the Italian violin builder, who has the care of this instrument and many interesting details of this instrument are mentioned (1+ A4). In another short note (1- A4), Gijs van Ulsen explains the function of the "hars" (rosin?) on the hairing of violin bow.

Two new working groups reported their initiating meetings:

- The Houtblazers group, (I participated in this meeting), where about twenty members came together (out of the nearly 30, who expressed an interest).
- De Gitaar bouwers started actually on the same day (10 April); five participants joined and will continue.

Undoubtedly, more to come from these Groups.

The Editorial Board of the Bouwbrief consists of 6 people and short introductory notes of each of them feature in the BB-93. Remarkably, all male and 50+, quite like me.

Toon Moonen raised a number of questions:

- concerning the knowledge of the shape of organ pipes, in the Renaissance;
- the relation of shape of the organ pipe and tone colour;
- are out-of-tune harmonics of interest in organ pipes;
- how to un-glue the various glue bondings;
- which mistakes can be made with gilding.

Short answers are provided by members of the Editors.

In a 2 A4 page article Gijs van Ulsen gives an overview of the history of strings since 1700: from the gut strings until ca. 1920 to the modern types in use now. The basic string formula is explained and the basic conditions considered for the more modern strings.

BB-93 ends with a report from the Working Group on Strijkinstrumenten (Strings) and contains a sequel to the last article of BB-92. The investigation on the pull strength of hot glue has been further continued by a number of high school students and Tim de Vries. They concluded that heating the glue up to 100 deg.C for extended periods does not effect strength but it delays the setting of the glue, as long as to 15 minutes (i.e. no need for very fast glueing anymore). The short article contains a handy graphics showing the pull strength as function of the ratio glue pearls/water. Roughly speaking the pull strength at a ratio 1:2 (glue:water) is about 5 times the strength at a ratio 1:12.

Andries Oosten reported an oil lacquer (mastix, copal, turpentine, linseed oil).

And that was BB-93.

Had we but world enough and time:
a rejoinder to Eph Segerman's remarks in FoMRHIQ 95

Eph's remarks in FoMRHIQ 95, on 'Reactionary attitudes to music history . . .' complaining about my refusal to publish one of his papers in *The Lute*, cannot go unanswered. I am more than happy to apologise, publicly, if I failed to explain adequately my reasons for this refusal, and I regret any hurt caused to his feelings, but I am afraid I must stand by this decision. On reflection, the decision comes down to cost. I have in my 'in' tray at the moment enough material for two, if not three issues of our annual journal, while our quarterly magazine, weighing in at over 300g an issue (32 pages of text plus 58 pages of supplements, at last count) is reaching, if not exceeding, what our budget will allow. We simply cannot print everything we receive.

Eph's ideas on scholarship seem perfectly respectable to me. For Eph, truth emerges from the refiner's fire of heated academic debate; from the dialectical confrontation of truth and error. Any idea, however controversial it might seem to established scholarship, might in the end turn out to have been the truth, and so it is vital that no new idea should be stifled for want of a publisher. One snag with this view, though, is that it presupposes a world in which paper is free. Sadly, it ain't.

Eph might have mentioned that he has had quite a lot of airtime in our publications of late. In March 1998 we published a paper by him on lute stringing, which drew forth a number of responses - some of them too rude to print - and rejoinders in the next issue drew a counter-rejoinder from Eph in September 1998. No doubt the debate would still be going on now had the editor of *Lute News* not felt that the main points on both sides had already been made. In our June 1999 issue we printed a piece by Eph responding to an article by Martin Shepherd on the subject of gracing. These contributions have provoked lively and fruitful debate, and are valued accordingly.

But the above papers were of natural interest to the majority of lute society members - who are amateur players. You can change your strings, and the way you play graces, but you cannot change the size of a lute that has already been made! A paper on lute sizes - particularly one which is heavily technical, as the article in question is - is obviously more suited to a journal for instrument makers than one mainly read by players, hence my suggestion that it should go in FoMRHIQ.

I can only suggest that Eph publishes the full text of his paper in these pages. Readers will then immediately see why it was thought unsuitable either for an annual publication which (at the risk of being unadventurous, Eph may say) aspires to be authoritative rather than challenging, or for a quarterly magazine whose readers just happen to quite like lute music. Come to think of it, I don't see many physics equations in the pages of *Classical Guitar* magazine . . .

* * * * *

The paper in question, somewhat improved for clarity since its original submission, can be seen at <http://www.nrinstruments.demon.co.uk/lutesize.html> - E.S.

Everyone interested accepts that evidence is what scholarship is based on. Though all agree about what each piece of it basically says, there can be disagreement about whether it is true or representative, what it seems to be, and what it implies. Objectivity in the observation and collection of evidence is being careful to avoid the natural tendency of bias towards what one expects or wants the evidence to be. Objective knowledge is the objective observations of evidence plus generalisations (called theories) that are apparently true because they make sense of the evidence by logically explaining how it got to be what it is. Subjective knowledge is what we believe is true that isn't objective knowledge. Society looks to scholarship to generate and collect objective knowledge.

In scholarship, the amount of knowledge that can be deduced from evidence depends on the amount of certainty one expects for the knowledge. In the highest level of certainty, one indulges in gross distrust of the evidence, so a high degree of redundancy or duplication of supporting evidence is required before one can accept a theory. People who insist on this level of certainty accept such theories as facts, and others which do not have this level of evidence support are just speculations and matters of opinion.

These people have no objective way of coping with the very many situations where the level of redundancy in the evidence is low. In these circumstances they rely on judgements of what is likely to be true, which they tend to trust more than strict fidelity to the evidence, and can only be subjective. They can accept that a 'speculative' theory is probably true if they judge that it is 'convincing', and will happily consider evidence without such a 'convincing' theory as 'mysteries'. This approach employs a minimum amount of imagination and skill in analysis, and since it makes minimal objective or logical use of the evidence, it generates a minimal amount of knowledge. This is minimalistic scholarship, and amounts to little more than just research and presentation.

Fashions of thinking in society have been changing since the 1960's. A youth culture of rebellion against the restrictions of authority has spread. This resonated with the mantras offered by therapists that one should be true to one's feelings, and to trust one's instincts. This has led to increasing mistrust of authority in all areas, including scholarship (especially in the scientific fields). In the field of music history, the minimalistic approach, which was always strong, has become so dominant that the professional scholars will just ignore any theory about a 'mystery' that is unexpected, no matter how well it explains the evidence. The mistrust of evidence has become institutionalised, apparently to leave the field free to pursue a culture based on democracy in subjective judgements that is expected to lead to consensus, mimicking fashions of criticism in the field of music performance.

The opposite approach in scholarship makes maximum use of the evidence. The maximum of objective knowledge that can be generated from a set of evidence is the sum total of all different valid theories, i.e. those that can reasonably explain all the evidence. Unnecessarily fanciful ones are rejected by Occam's razor. The explanations include those for how each piece of apparently contradictory evidence got to be what it is without being contradictory. It is much easier to be objective in judging the reasonable likeliness of an explanation than the truth of a theory.

Each theory has a least likely reasonable explanation for some piece of evidence. That is where it is most vulnerable. Then the theory that has the most likely (between theories) least likely (in each theory) explanation is the closest to truth (determined as objectively as possible) that scholarship can offer with the available evidence.

The smaller the amount of evidence there is, the more theories there might be that can reasonably explain all of it, and the greater the probability that new evidence will change the choice of which is the best in the near future. Though the knowledge so generated is not necessarily stable as time goes by, it is the best that scholarship can offer at each time.

In practice, even with very little evidence, we rarely find competition between different valid theories. The requirement of reasonably explaining each piece of evidence is remarkably successful in eliminating most possibilities that one can think of. This approach to scholarship trusts the evidence to the extent that what might be wrong with it must be reasonably explainable. It makes maximum use of the evidence, and generates a maximum amount of knowledge. I am sure that fashion in music scholarship will move away from minimalism and go in this direction some time in the 21st century.

Notes on Transposition

I prepared these notes when I offered a paper on Pitch Standards and Transposition to the NEMA conference in York. It turned out that this paper could not be fitted into the programme. These notes are a rather academic exercise attempting to be comprehensive, and I had intended to use it as a framework into which I would insert interesting examples. The attempt to be comprehensive led me learn about aspects of transposition I had not previously considered, and hope others will be also find this interesting

Reasons for Transposition

- A. To make the range of the music more appropriate for current purposes.
 - 1. To get the music in a good range for current resources.
 - 2. To give the music (by being high or low in the possible range) a particular character.
- B. To make the key of the music more appropriate for current purposes.
 - 1. To match the key of other performers.
 - 2. To be in a good fingering key for chords or for improvised ornamentation.
 - 3. To exploit the sound characteristics of a particular key, e.g. in a particular temperament.

Transposition methods

- A. Change sounding pitch without affecting the reading process
 - 1. Mental vocal adjustment to a different absolute pitch (voices getting pitch from instruments).
 - 2. Mental instrumental adjustment to a different fingered note as the key centre (shifting from one scale to another, as with the voice)
 - 3. Play on another instrument tuned higher or lower (viols - Holborne, Praetorius; alternative keyboards).
 - 4. Retune strings (treble lute, cittern, bandora - English Consorte music played at fiddle-recorder or treble viol-flute pitch).
 - 5. Move bits of the instrument (bridges - medieval fiddles; shifting keyboards).
 - 6. Simulate an instrument tuned higher by placing a nut alternative on the fingerboard (first-finger barré on viols - Ganassi; capotasto on English guitar).
- B. Learn alternative relationships between the written notes and the fingering.
 - 1. Play an octave higher or lower (in many clef substitutions)
 - 2. Play a double-octave higher or lower (in some clef substitutions).
 - 3. Alternative pitch assumptions for fingering a tone apart (viols - Alfonso della Viola, Ganassi).
 - 4. Alternative pitch assumptions for fingering a 4th apart (viols - Ganassi, Gerle).
 - 5. Alternative pitch assumptions for fingering a 4th apart - for possible further 4th and octave transposition to get transposition by a tone (organs - Tomkins, Mersenne).
- C. Modify the music or the reading of it.
 - 1. Rewrite the music transposed (lute intabulations, many others).
 - 2. Substitute clefs

One already knows how to finger reading in 7 clefs: G2, C1, C2, C3, C4, F3 and F4. The following tables include all of the possibilities of substituting one of these clefs for any of the other clefs:

		DOWN 5th	UP 4th
<u>orig-</u>	<u>replace</u>	<u>add 1 flat or</u>	<u>add 1 flat or</u>
<u>inal</u>	<u>by</u>	<u>subtract 1 sharp and go</u>	<u>subtract 1 sharp and go</u>
G2	→ C2		up 1 octave
C1	→ C3		up 1 octave
C2	→ C4		up 1 octave
C3	→ F3		up 1 octave
C4	→ F4		up 1 octave
F3	→ G2	down 2 octaves	down 1 octave
F4	→ C1	down 2 octaves	down 1 octave
		UP 5th	DOWN 4th
<u>orig-</u>	<u>replace</u>	<u>subtract 1 flat or</u>	<u>subtract 1 flat or</u>
<u>inal</u>	<u>by</u>	<u>add 1 sharp and go</u>	<u>add 1 sharp and go</u>
G2	→ F3	up 2 octaves	up 1 octave
C1	→ F4	up 2 octaves	up 1 octave
C2	→ G2		down 1 octave
C3	→ C1		down 1 octave
C4	→ C2		down 1 octave
F3	→ C3		down 1 octave
F4	→ C4		down 1 octave

If one learns how to finger G2, C1, C2, C3, C4 an octave down, and C2, C3, C4, F3 and F4 an octave up, one can readily transpose all clefs a 4th up or down. One needs to learn how to finger G2 and C1 two octaves down, and F3 and F4 two octaves up, to transpose all clefs a 5th up or down. The 'chiavette' set of clefs (G2, C2, C3 and C4) are good for transposing down a 5th because there is no need to learn to finger two octaves away.

		DOWN tone	UP minor 7th
<u>orig-</u>	<u>replace</u>	<u>add 2 flats or</u>	<u>add 2 flats or</u>
<u>inal</u>	<u>by</u>	<u>subtract 2 sharps and go</u>	<u>subtract 2 sharps and go</u>
G2	→ C4	up 1 octave	up 2 octaves
C1	→ F3	up 1 octave	up 2 octaves
C2	→ F4	up 1 octave	up 2 octaves
C3	→ G2	down 1 octave	
C4	→ C1	down 1 octave	
F3	→ C2	down 1 octave	
F4	→ C3	down 1 octave	
		UP tone	DOWN minor 7th
<u>orig-</u>	<u>replace</u>	<u>subtract 2 flats or</u>	<u>subtract 2 flats or</u>
<u>inal</u>	<u>by</u>	<u>add 2 sharps and go</u>	<u>add 2 sharps and go</u>
G2	→ C3	up 1 octave	
C1	→ C4	up 1 octave	
C2	→ F3	up 1 octave	
C3	→ F4	up 1 octave	
C4	→ G2	down 1 octave	down 2 octaves
F3	→ C1	down 1 octave	down 2 octaves
F4	→ C2	down 1 octave	down 2 octaves

The same requirements for fingering up and down one octave as for transposing up and down a 4th are required for transposing up and down a tone.

		DOWN minor 3rd	UP 6th
<u>orig-</u>	<u>replace</u>	<u>subtract 3 flats or</u>	<u>subtract 3 flats or</u>
<u>inal</u>	<u>by</u>	<u>add 3 sharps and go</u>	<u>add 3 sharps and go</u>
G2 → C1			up 1 octave
C1 → C2			up 1 octave
C2 → C3			up 1 octave
C3 → C4			up 1 octave
C4 → F3			up 1 octave
F3 → F4			up 1 octave
F4 → G2	down 2 octaves		down 1 octave
		UP minor 3rd	DOWN 6th
<u>orig-</u>	<u>replace</u>	<u>add 3 flats or</u>	<u>add 3 flats or</u>
<u>inal</u>	<u>by</u>	<u>subtract 3 sharps and go</u>	<u>subtract 3 sharps and go</u>
G2 → F4		up 2 octaves	up 1 octave
C1 → G2			down 1 octave
C2 → C1			down 1 octave
C3 → C2			down 1 octave
C4 → C3			down 1 octave
F3 → C4			down 1 octave
F4 → F3			down 1 octave

The 'chiavette' set of clefs (G2, C2, C3 and C4 or F3) are good for transposing down a minor third, and the 'chiavi naturali' set of clefs (C1, C3, C4 and F4) are good for transposing up a minor third, because they don't require learning to finger any octaves away.

Miscellaneous observations

- A. High organ pitches - Transpositions helped in the coexistence of high organ pitches with lower ones for congregational voices and most instruments.
 1. One a tone lower, and another a minor third lower - this happened in Lutheran Germany in the 18th century (Chorton to Kammerton or tief- or A-Kammerton), and in Venice in the 17th and 18th centuries (mezzo punto to tutto punto or tono corista).
 2. A fourth lower when the organ pitch was higher than in 1. above - this happened in Lutheran Germany in 17th and 18th centuries (plainsong organ pitch to Kammerthon), and in early 17th century England (quire pitch to viol-lute pitch).
 3. A tone lower than the organ pitch for orchestral instruments - this happened in England around 1700 (Church pitch of F or Gamut proper to Flute or new Consort pitch), and in late 18th century Germany (lower Chorton to tief- or A-Kammerton).
- B. When transposed parts survive, they are evidence that the particular players the parts were written for were not competent in executing the transposition mentally while playing, and not necessarily evidence of what transpositions most musicians then could or could not do.
- C. Vocal parts were often written in keys without sharps and no more than one flat because the singers preferred that, but often in performance, the key was transposed to suit the voice ranges. Any theory that assumes that parts were written to be automatically transposed needs some reason for not being written in the intended key. This is a possible one, but it is more likely that a particular transposition was not intended.
- D. Keyboards a 4th apart can cover keys within a 5th with transposition up and down a tone from the extremes with only skill in transposing 4ths - relevant to B5 above and Ruckers doubles.

The Silent Whistle

This is probably the first Comm. to have as its title the name of a pub. In Oakle Street, Gloucestershire, the inn sign shows a railwayman's hat and whistle. It was renamed to commemorate the demolition of the railway station in 1964. Just 2.5 Miles (4 km) away is Highnam Court, once the home of the Parry family. Sir Hubert Parry, dare-devil athlete and adventurer, and composer of "Blest Pair of Sirens" and much church music, lived there for most of his life.⁽¹⁾ The main decorative feature of the music room is a series of five arrangements of foliage with musical instruments, modelled in plaster. In one of them is an oboe overlaid with a tabor and pipe of the Cotswold "Whittle-and-Dub" type. The whistle is so convincingly accurate, it can only either be an actual instrument, plugged, plastered and painted, or cast from a mould made from a tabor-pipe. On a recent visit I was permitted to examine this and the other instruments, to try to discover whether there were more plaster models or silent whistles. Counting clockwise from the fireplace, on panel no. 1, there is (a) a one-piece keyless piccolo, and (b) another three-jointed one with one key. (c) An alto flute; four joints (in F) (d) A lyre. 2. (a) A one-piece keyless flute (alto in G) (b) Octave bassoon (c) An English guitar. 3. (a) One-piece keyless flute (treble in A) (b) Three-jointed treble recorder (c) Violin and bow. 4. (a) One-keyed piccolo, probably jointed but head not visible. (b) Oboe, mostly hidden behind (c) tabor and pipe. 5. (a) Horn (b) Flute; four joints and one key (in D). The pitches of the flutes are of course estimates!

Eighteenth century decorators usually put more instruments in each bundle, of which most are in bas relief surmounted with three-dimensional models. One of each type is generally deemed to be enough, with repetition being seen only in the garlands and foliage. Is it likely that a craftsman, working solely in plaster, would choose to include so many flutes? Here there are seven, including what appear to be renaissance ones; descant, treble and alto, and four baroque flutes. The only obvious representative of the modeller's art is the highly conventionalised lyre. Everything else is too accurate to look good or to blend with the sashes that bind the instruments, and the festoons of leaves. Since much detail is obscured by plaster and paint, I could not be certain that all the assemblages are made using actual instruments. I intend to study them and take measurements on a future visit. Certain details however were immediately apparent:

- 2(b) The bassoon crook is damaged revealing a brass wire as its core.
- 2(c) The guitar has all eight strings which are not heavily covered with paint. It is definitely an actual instrument.
- 3(a) The violin has no back. The bridge is "resting" (i.e. fixed) just above the tail-piece.
- 4(b) The oboe has two tone-holes too close together, just above where it passes behind the tabor.
- 4(c) The (broken) stick is an ornately turned one, like the one in the V and A.⁽²⁾
- 5(b) The E key is thick and too high above the body. Otherwise on all flutes, the embouchure holes, socket swellings and keys look right.
- 5(a) The horn is definitely sheet metal, and though small could well have been musically useful.

The music room ceiling was done later in the style of Adam (Robert Adam fl 1762 - 1792). Whoever actually did it must either have liked the walls, or in any case have been told to leave well alone. However, Nikolaus Pevsner⁽³⁾ says "The plaster decoration of the Music Room is of a very high order - wall panels with musical instruments in **high relief** and elaborate swags and drops,

Rococo in style, and probably by William Stocking of Bristol, together with a ceiling in the Adam manner." From this I think we can gather that Pevsner's man was taken in, as indeed might any non music specialist on a brief visit. If we have here a time-capsule collection of instruments, valid comparisons can be made with the near contemporary ornamental use of actual instruments at Freiberg (see Comm. 1186) and Waldsassen (Comm. 1284), where the instruments are unpainted and are held by putti. By way of contrast, Grinling Gibbons' bunch of six instruments in The Carved Room at Petworth House, West Sussex is so detailed and accurate, that although you know they cannot be real, they look real, whereas those at Highnam Court somehow do not, plaster decoration not being concerned with realism. Such accuracy, as at Petworth, could only be achieved as a woodcarving, and *is* carved in high relief, with add-ons, such as the limewood strings on the violin.⁽⁴⁾ There is even music written on the open pages of a manuscript book, which has recently been identified as being from "The Fairy Queen", which is rather appropriate as Henry Purcell was Keeper of Instruments at the Chapel Royal.

But returning to Gloucestershire, we can't even feel the thumbhole of the tabor pipe, so the tuning cannot be ascertained. The shallow dub is typical of those used in Cotswold morris dancing, so if there *is* one under all that plaster, it could be the earliest known extant example. Sadly, it remains as silent as the silent whistle. All of which prompts the question; is this sort of decoration to be found anywhere else? And so back to The Silent Whistle, the pub, that is, alas shortly to close, for another half-pint of silk-smooth Tetley's. It houses a collection of railway memorabilia, including a photograph of the GWR 4-6-0 locomotive "Highnam Court", no. 2944. I rather suspect that *its* whistle is silent too.

- (1) C. Hubert H. Parry, Jeremy Dibble, 1992.
- (2) Illustrated in Grove.
- (3) The Buildings Of England, Gloucestershire and The Forest Of Dean, David Verey Ed. N. Pevsner.
- (4) Grinling Gibbons and the Art of Carving, David Esterly, V and A, 1999. Musical instruments illustrated in The National Trust Guide, (1977) p 165.

General view of the music room.





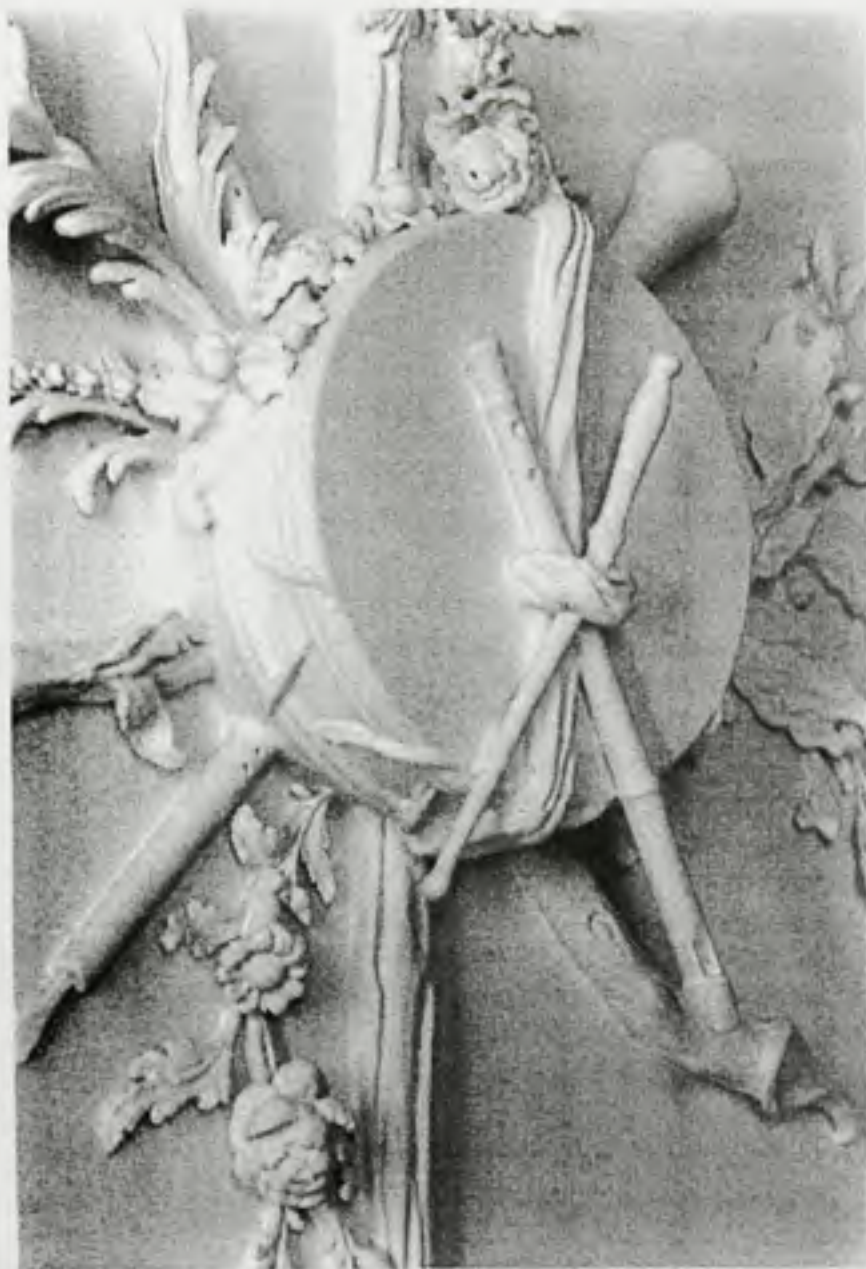
Panel 5



Panel 1

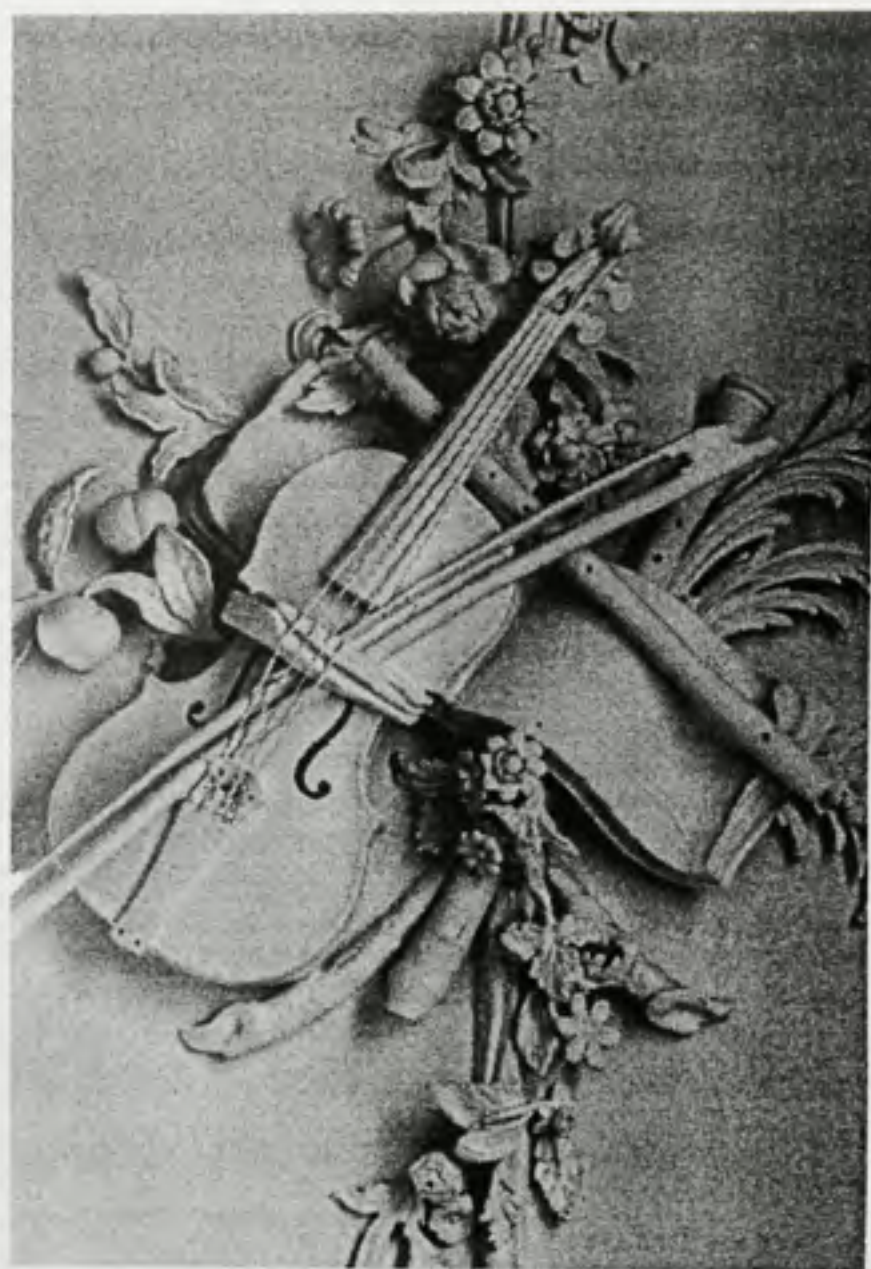


Panel 2



photos by G. L. -J.

Panel 4



Panel 3

French Fingerings - In The Cotswolds?



Arbeau's Piper ⁽¹⁾

The pipe and tabor combination is widespread, both historically and geographically. It is abundantly illustrated both flat and in the round from the middle of the 13th century. Many pipes survive, including one known to have been used for accompanying the morris dancers at Bucknell, Oxfordshire. A number of folk music collectors visited their musician, Joseph Powell between 1912 and 1937, in search of traditional dance tunes, but with mixed success. It seems that for part of this period he had no pipe available, and yet there were two occasions when he refused to sell it! A new pipe was obtained, but found to be "wrong", and was taken away with a view to altering its fingering system.

Francis Baines ⁽²⁾ states that there are two tunings in use for folk music. The French (Provençal) pipe, the galoubet, gives a sequence of three whole tones when the holes are uncovered. The other tuning produces tone tone semitone. This latter is the system described by Arbeau ⁽¹⁾, and it was the tuning of the replacement pipe offered to Joe Powell. This kind of pipe, giving a major scale starting with the lowest note as the tonic, seem at first sight to be the more logical of the two. Pitched in d^{'''}, they were used by other morris sides including Bampton (Oxon). ⁽³⁾ Apart from locally made instruments, galoubets were being made throughout the 19th century, and some were imported for the English market. It seems as if pipes made by Potter and others ⁽⁴⁾ were not sufficient. Fingering charts for both tunings are given below. I have coded them for convenience (I hope), Type TTS (Arbeau) and Type TTT (Bucknell = galoubet).

	3	2	T	0	3	2	T	3	0	2	T	0	3	2
	●	●	●	○	●	●	●	●	○	●	●	○	●	●
	●	●	○	○	●	●	○	●	○	●	○	○	●	●
	●	○	○	○	●	○	○	●	○	○	●	○	●	○
TTS d ^{'''}	e	f#	g	a	b	c#	d	d	e	f#	g	a	b	
TTT d ^{'''}	e	f#	g#	a	b	c#	d	d#	e	f#	g#	a	b	

Musicians with a Type TTS pipe will usually play the first note of "The Willow Tree" ⁽⁵⁾ with all holes closed, and the rising fourth to the tonic with all holes uncovered. This will not work with a Type TTT pipe. To get the semitone in the right place, one has to play one tone higher. The first note is played with the fingering 2, and the tune is now played in the key of a major. Now if Joe Powell had assumed he had in his hand a Type TTT pipe, he would have played it in a, with these fingerings:

THE WILLOW TREE (Schofield MS) $\frac{1}{2}A(AB)^3A$ fine B

2 3 .. 2 T 3 3 2 3 2 T 2 . 3 2

T 2 T . 2 T 2 3 2 T 2 T 2 T 3 2

However, if a collector gave him (in all innocence) a Type TTS pipe, he would have started the tune the same way with fingering 2, and never notice that the fingering 0 is not required. The knowledge that the pipe was different to the one he was used to would have been enough to put him at a disadvantage, even playing this tune. Perhaps he tried manfully and failed with other tunes requiring the all off fingering. Conversely, a Type TTS piper with a Type TTT pipe couldn't play the tune in the lower key of g, and it might not occur to him that it would be possible a tone higher. I once went through this experience myself. This perhaps explains the uncooperative mien of Mr Powell, but we are not told if any of his inquisitors had spotted that it didn't matter which kind of pipe he had, as long as he stuck to the three tunes that he remembered best!

The following is the list of (mostly) relevant events in chronological order. They cover most of the many visits made to Bucknell, and subsequent developments in tabor pipe making.

- 1846 Birth of Joseph Powell.
- c. 1860 Death of Jim Timms of Bicester. J.P. is given his pipe, and takes lessons from Tom Hall of Islip (Wheatley Morris).
- c. 1875 Bucknell Morris team photographed.⁽⁶⁾
- c. 1880 Bucknell Morris stop dancing.
- 1886 J.P. unwilling to sell "pipe and dub" to D'arcy Ferris, who was trying to revive Bidford Morris.
- 1901 T.J. Carter calls on J.P. and collects seven tunes.
- 1911 J.P. refuses to sell pipe and tabor for 1 sovereign (about £50 equivalent value).
- 1912 Cecil Sharp hears J.P. play Maid of the Mill & Shepherds Hey.
- 1912 Sharp (accompanied by E.V. Lucas) collects 6 tunes, most of them from J.P.
- 1912 George Butterworth notes that J.P. is a poor player, but obtains 3 tunes, plus one more from another Bucknell man, Eli Rolfe.⁽⁷⁾
- 1913 Morris Book V published by Novello, in which Sharp says "Jim (sic) Pole (sic) played while he recorded the dancers' steps".
- 1916 Butterworth killed in action. His notebooks "disappear".
- 1921 Sharp's field notebook refers to "Mr Joseph Pole's whittle and dub". The length of the pipe is 11 3/16 in. (29 cm) and has a half inch wide brass ring around the foot.
- 1922 Sharp and Maud Karpeles visit J.P.
- 1923 In the E.F.D.S. News: "Arrangements have now been made with Mr Pole, the Bucknell pipe and taborer, for the supply of tabors to the Society. The price will be about 30s. Orders should be sent to Miss Joan Sharp", (daughter of Cecil Sharp)⁽⁸⁾
- c. 1923 Louis & Co., of Chelsea, commissioned by Helen Kennedy to make pipes, copying one given to her by Billy Wells of Bampton, and reputed to be 200 years old.⁽⁹⁾
- 1924 Death of Cecil Sharp, possibly in possession of J.P.'s pipe.
- 1925 Photo taken of Joan Sharp playing for Douglas Kennedy who is dancing a jig. Is this J.P.'s pipe?⁽¹⁰⁾
- 1927 Arthur Peck takes down tunes from J.P., humming some and playing some, but "not accurately", including Shepherd's Hey and Maid of the Mill. It seems as if he got on better with J.P. than Butterworth did 15 years before. Peck and Sharp were both pipers and so had an easier task.
- c. 1928 Kenworthy Schofield (founder of St Albans Morris Men, accordionist and piper) makes pipes out of brass tubing, with Type TTS fingering. He may have regarded this system as being historically correct.
- 7 Helen Kennedy takes a Louis copy of the Bampton pipe to J.P. This instrument had been played by Wells and repaired by Arnold Dolmetsch, and was Type TTS. J.P. refers to her as "that damned woman from London".

- 1934 Schofield takes down Willow Tree from J.P.
- 1936 Lionel Bacon meets J.P. who played on his "new" pipe. Bacon recorded no tunes, but says that J.P. could not get on with it, i.e. the pipe provided by Helen Kennedy. Russel Wortley writes to Frances Fryer, "I wonder if you have been able to alter the pipe for him yet? Arthur Peck has searched Cecil Sharp's notes in Clare Library and finds that there are no Bucknell tunes there at all, so presumably if Pole's tunes have been recorded they must be in Butterworth's manuscript, and we do not know whether this is still in existence. So I think it extremely important to get Joe Pole to play again if we possibly can. I enclose Shepherd's Hey and Maid of the Mill, as taken down by Peck in 1927, but he says he cannot vouch for their accuracy."
- 7 Butterworth's notebooks found to be in the keeping of Vaughan Williams. (Why didn't someone look there before?) They are now in the library at Cecil Sharp House.
- 1937 Death of Joseph Powell, possibly never having played any altered pipe. In a letter from Douglas Kennedy to Roy Dommet (1961), he says "Joe Powell played the tabor differently from anyone else I saw. He held the very short stick in the middle and used both ends on the surface with a fast alternating rolling tap." Fryer writes ⁽¹¹⁾ that the French and Spanish ⁽¹²⁾ tuning "is the scale to which the late Mr Pole of Bucknell was accustomed... and he never got on well with a major scale Louis pipe which was presented to him in later years. Was his pipe of English origin? It was possible at any rate up to 60 years ago to buy galoubets imported from France, at Thibouville Lamy's shop in Charterhouse Street, Holborn."⁽¹³⁾
- 1930s Schofield invents the 4th hole, for the little finger. Makes larger pipes: those in g being favoured by revival Morris sides ⁽¹⁴⁾
- c. 1958 Jim Jones starts making "Schofield" pipes, including some in stainless steel, while Wortley commissions the Generation penny-whistle factory to produce pipes. These have red plastic heads with a chromium-plated body.
- 1967 Wortley's "How to Play the English Pipe and Tabor" published (2nd edn) ⁽¹⁵⁾ In a footnote he says that galoubets "differ in giving the key note of the major scale with one hole uncovered, and was imported during the last century and occasionally found its way into the English countryside"
- 1970s "Sweetheart" wooden pipes (TTS) being made by Sweet, Enfield Conn., and "Susato" plastic ones by Kelischeck of N. Carolina.
- 1981 Pipe in g (T T S) and two larger ones found in the wreck of the "Mary Rose", which sank in 1545. ⁽¹⁶⁾ These are contemporary with Arbeau, writing in 1589 at the age of 69 about the dances of his youth.
- 1992 Joe Powell's pipe found in the keeping of his descendants in Bucknell ⁽¹⁷⁾ Mrs Lindsay Dean arranges with the Morris Ring for Bert Cleaver to play it and make a tape recording. He describes the pipe, but there is no mention of an altered hole. Is this J.P.'s (ex-Timms) pipe? He also points out that he had some difficulty, since it is not the tuning he is used to, and explains that he is playing one whole tone higher than he does on his own pipes. He plays just one tune, "The Willow Tree", and this only after (not after only!) 3 pints of Hook Norton! Mrs Dean had traced the dub to other descendants in Coventry, and on the tape says that she hopes to be permitted to deposit the instruments in a museum.
- 1994 Tony Barratt notices that J.P.'s most frequently collected tunes do not require the thumb to be taken off, and can be played on Types TTS and TTT with identical fingering.
- 1998/9 G.L.-J. can't find any museum in Oxfordshire or Coventry holding these instruments, nor the whereabouts of Mrs Dean. Writes this Comm.
- 1999 Quite by chance, and while none of us were looking, Richard Sermon locates Mrs Dean, who had moved to Wales. We now know that Joe Powell's whittle and dub are being kept by his Coventry descendants.

My first pipe was a "Schofield" with the 4th hole. It was made by Jim Jones who was the accordionist in the St Albans Morris Men. Michael Chandler was the Pipe and taborer, and taught me to play, using an ancient Provencal tambourin that used to belong to Kenworthy Schofield. Closing the 4th hole with the little finger gives the lower semitone. It necessitates a ring for the ring finger to support the instrument. On a d pipe the notes c# and g# are now available, the very same notes that are provided by a Type TTT pipe with only three holes¹. If Schofield knew this he must have believed that the advantages of Type TTS were paramount, the tonic bottom note and an alternative fingering for its octave. Arbeau says "When all the holes are stopped it sounds the octave also because of the natural disposition of this type of flute, which jumps, when fully stopped, to the fifth and then to the octave".

From the foregoing it is not to be inferred that Joe Powell was a bad piper and unhelpful. We must remember that he was first approached over twenty years after he had given up regular playing. Also there is no reason why he would have enjoyed the notoriety of being England's last surviving traditional pipe and taborer. I hope that this paints a picture of the collecting mission of the inter-war years, being just a selection of items concerning one man and just one of the one hundred and fifty one recorded Morris traditions, the majority of which had pipers.⁽¹⁸⁾ Now that this sort of "collecting" is no longer possible, the task of pipers, local historians and museum curators must be to seek out the dozens of whittles (and dubs) that must abound in attics and bottom drawers, and not forgetting street markets. Then perhaps it will become clear whether the English invented the galoubet without any help from across the Channel.

- 1 Thoinot Arbeau. *Orchesographie* (1589) English translation, Dover 1967.
- 2 Anthony Baines, *Woodwind Instruments and Their History*. Faber 1957.
- 3 Cecil J. Sharp & Herbert C. Macilwaine, *The Morris Book* Part III, Novello, 1924.
- 4 Makers of tabor pipes in England include: Thomas Cahusac II, Falkner & Christmas, Louis, Henry Potter, Rudall Carte. A number of anonymous pipes survive, some of which may have been made locally, e.g. the Chipping Camden pipe (Type TTS), converted by plugging the upper holes of a 6-hole whistle, and one found by William Waterhouse in an East End street market in 1994. It is pitched in low e flat and is Type TTS overall length being 473 mm. See William Waterhouse, *A Rare English Tabor Pipe*. Sine Musica Nulla Vita, Moeck Verlag, 1998, p. 73 (Available as an off-print.)
- A word of caution: instruments with the carefully controlled appellation "galoubet" have not always had the TTT tuning, but for the present purposes it is assumed that they do (See Guis, *Le galoubet - tambourin*, 1995).
- 5 Lionel Bacon, *A Handbook of Morris Dancing*. The Morris Ring, 1974.
- 6 Russel Wortley, *How to Play the English Pipe and Tabor*, E.F.D.S.S. Also the frontispiece of *Folk Music Journal* 1977.
- 7 Russel Wortley & Michael Dawney, "George Butterworth's Diary of Morris Dance Hunting", *Folk Music Journal*, 1977.
- 8 E.F.D.S. News, 193.
- 9 Peter Kennedy (son of Douglas) has three pipes, one of which is likely to be the Louis pipe given to J.P.
- 10 *English Dance and Song*, Vol 42, no 3, 1980.
- 11 Francis Fryer, "Pipe Tunings" *Journal of the E.F.D.S.S.*, Vol 3, 1937.
- 12 i.e. Basque?
- 13 French galoubet makers include: Bain, Bresson, Chateauminois (Alphonse), Collin, Delusse, Grasset, Jacquot, Long, Lot (Gilles), Michel, P., Michel, G., Naust, Noblet & Thibouville, Olivier, Sambuc, and Verhasselt. See New Langwill Index, Wm. Waterhouse.

- 14 Jeremy Montagu, *Was the Tabor Pipe Always as we Know it?* Galpin Society Journal, 1997. I disagree with the statement that the 4th hole was to be closed with the ring finger, with a ring for the little finger: the illustration shows that the ring is for the *ring* finger. Some instruments by Schofield and Jones have a hook. My experience playing these metal instruments did not reveal any problems with tuning, though their bores are indeed very wide, and pipes made by Jones have large fingerholes.
- 15 Wortley, *op cit*.
- 16 Frances Palmer, *Musical Instruments from the Mary Rose*, Early Music, Jan 1983.
- 17 Lindsay Dean with Joe Powell's whistle and dub, photo and article in Oxford Times, 14th Aug 1992.
- 18 Keith Chandler, *Ribbons Bells and Squeaking Fiddles*. Folklore Society: Hisarlik Press, 1993. Also, *Morris Dancing in the English South Midlands, 1660 - 1900*, a Chronological Gazetteer. Hisarlik Press 1993.

My thanks to Tony Barratt, Bert Cleaver, Michael Chandler, Roy Dommet, Peter Kennedy, and William Waterhouse, for being in when I was pestering them on the phone, and for sending me such interesting material, and to Maggie for persuading the computer to do things it won't do for me.



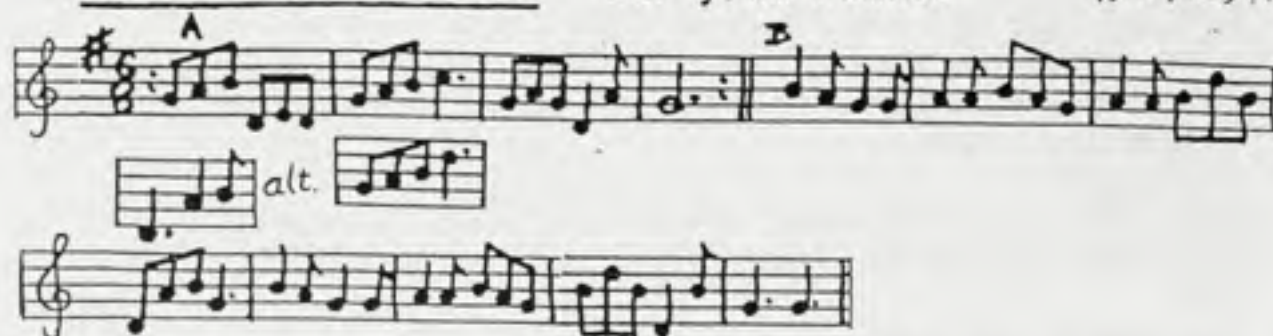
Joseph Powell (Taken from (6))



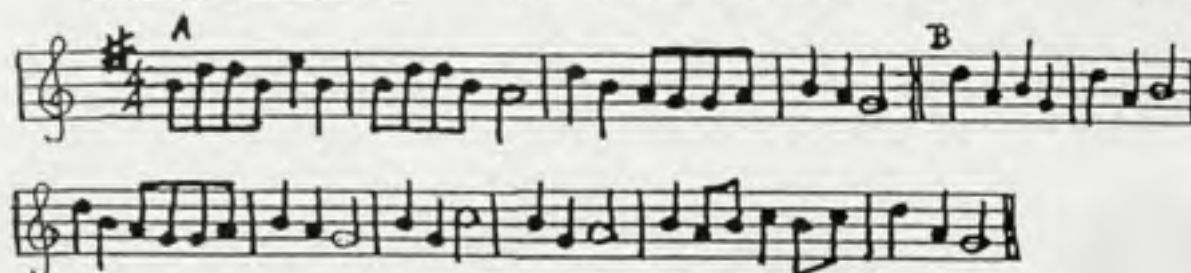
Joan Sharp and Douglas Kennedy

THE MAID OF THE MILL

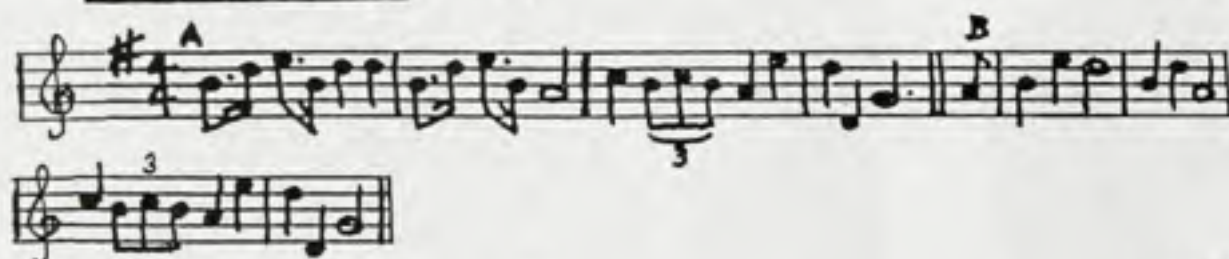
ALP from Powell

 $\frac{1}{2} A. (AB)^3 A$ SHEPHERDS' HEY

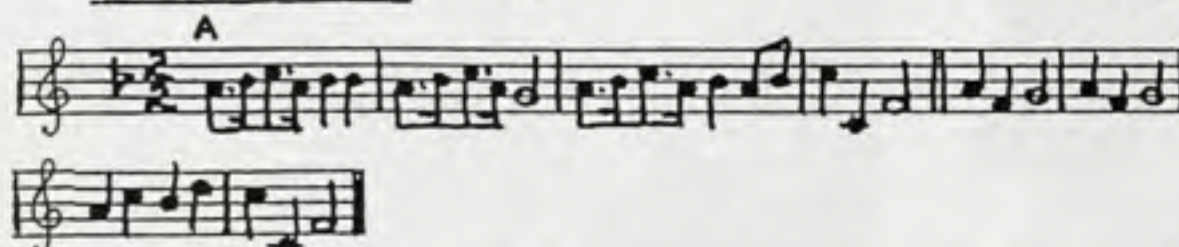
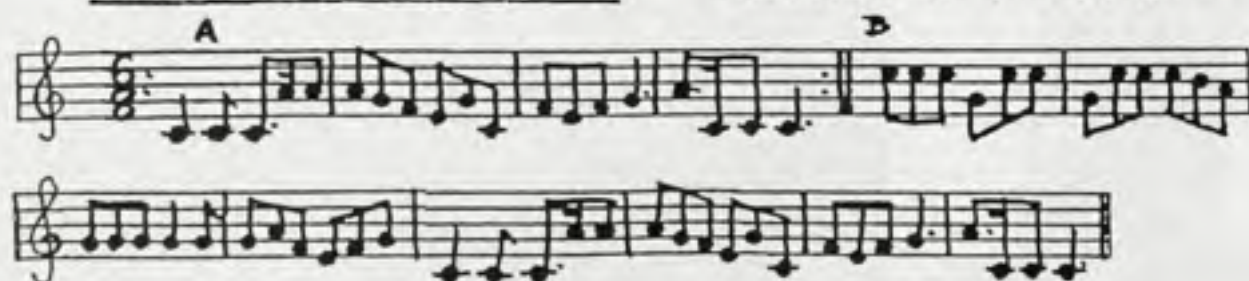
ALP from Powell (1927)

? A.B⁺SHEPHERDS' HEY

RD

A(AB)⁺SHEPHERDS' HEY

BC

A. (AB)⁺THE OLD WOMAN TOSSED UPButterworth (MSS). $\frac{1}{2} A. (AB^3)^4$ 

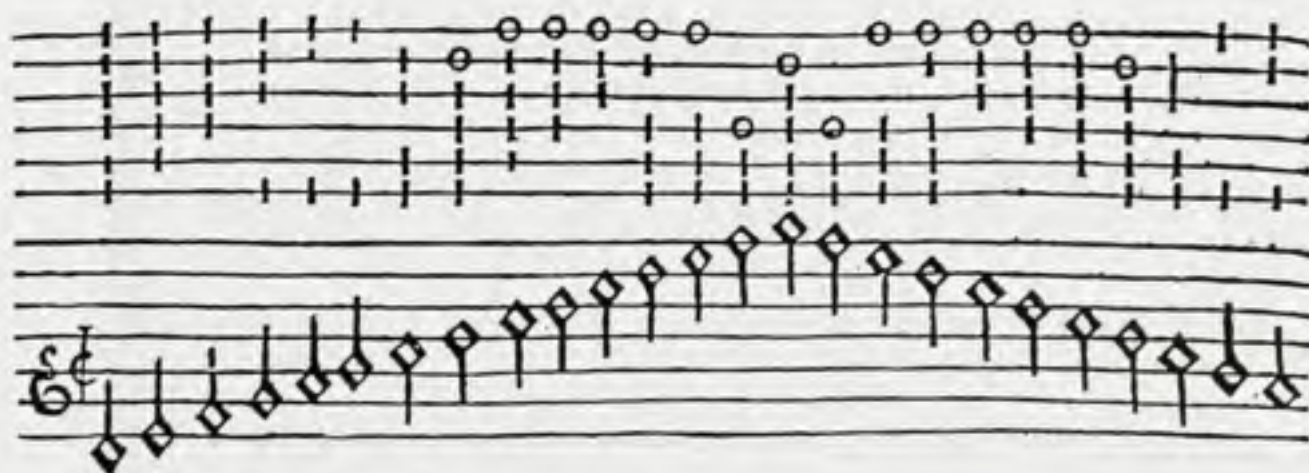
The other two Bucknell tunes, with variants, requiring "no thumb-hole", and one of the remaining ten that do.

Pipe and Tablature

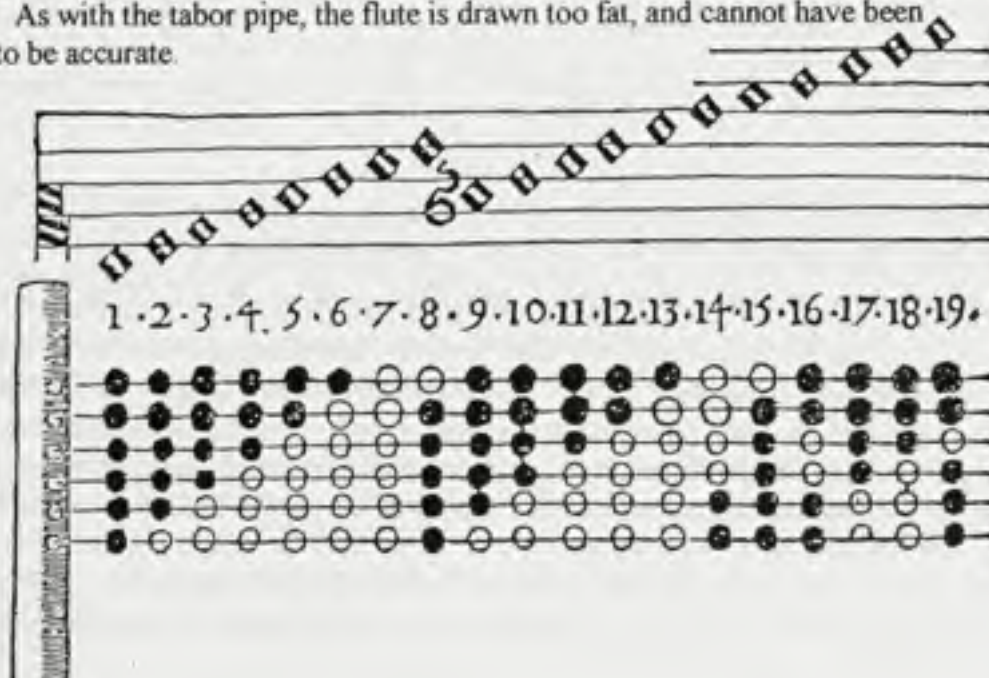
It is all too easy to ascribe as error anything that is problematic in books written as long ago as Mersenne's *Harmonie Universelle*⁽¹⁾. This well-organized treatise on music and musical instruments does have mistakes, as do many books (and perhaps even this piece) written since 1636. The author⁽²⁾ has the annoying habit, probably because he was a mathematician, of giving detailed explanations of the obvious. He then lets his readers grope around for any important subtleties!

The tablature for the *Fluste à trois trous* is puzzling at first sight, but rewards closer inspection. To help find out why so many more symbols are used than for other similar wind instruments we need to first study his tablatures for these in the same *livre* as the tabor pipe.

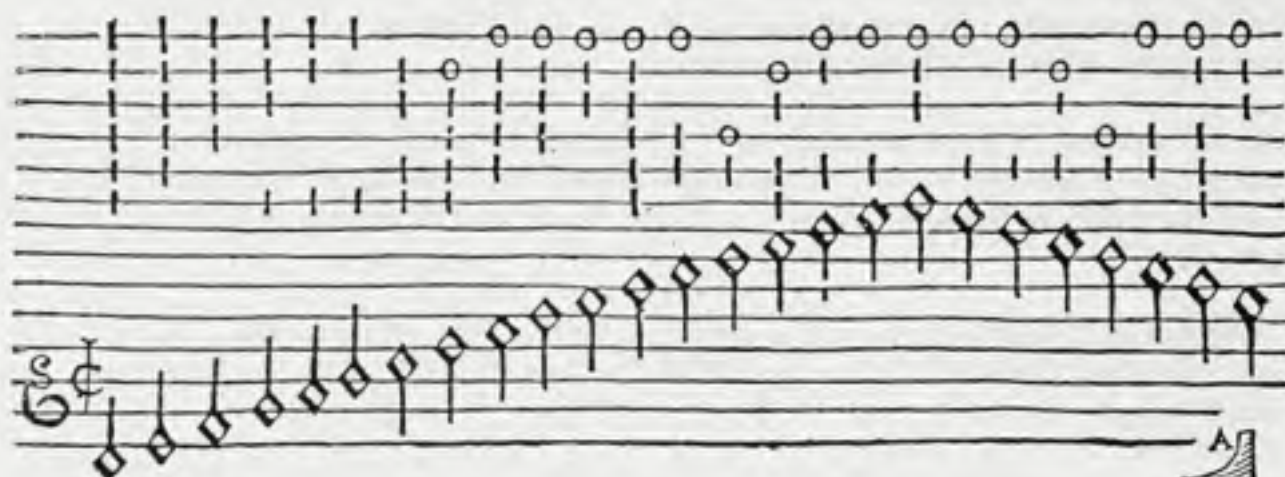
Turning over a few pages we come to two schemes for flutes and one for the fife. These three charts are, sadly, only diatonic and exhibit a number of anomalies, such as the fife fingering for d'' which is given as -- 0 1 1 1 1 instead of the only possible fingering 0 1 1 1 1.





The tabor pipe chart has two extra symbols, the half stroke and the filled in circle. Open and filled-in circles are used for the first German flute. This instrument, which we know as the renaissance flute, has lowest note g and could either be a bass, or an alto an octave higher⁽¹⁾. As with the tabor pipe, the flute is drawn too fat, and cannot have been intended to be accurate.




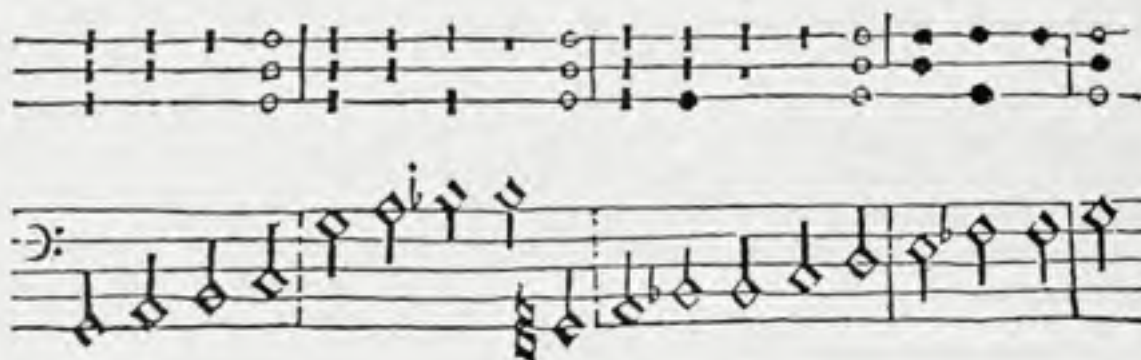
The chart for the second flute, in d' , works in the same way as that for the fife and the fingerings are much the same for both, differing only for the notes higher than g'' . They all look good except for the d'' , already discussed, and there is a spurious half-stroke for the ascending a' for the fife. It is not obvious why a descending scale is included, but at least it gives us an extra chance to spot any mistakes, and it gave him the chance to add alternatives, such as that for the a'' on the flute: both the given fingerings are good.



Returning to the tabor pipe scheme, the fingerholes are treated in five different ways. Hole 2 variously has whole stroke, nothing, open circle, $\frac{1}{2}$ stroke

and black circle. We might guess that  means close hole 2, and  and

leave it open. What then does  stand for?




Mersenne says that 'holes are stopped more or less' for playing in the key of $b_b^{(4)}$. Accordingly, b_b , e_b and f are given in the chart, along with b and e , but not $f\#$. With a g pipe it would be expected that $f\#$ would be given by $\bullet \circ \circ$. But for the fife, uncovering the three lowest holes gives tone – semitone – tone, favouring a scale in c , without the key note ⁽⁵⁾. If this is also the system for the pipe, (TST) then the notes of f major are being given priority (but we must not overlook the four fundamentals, which are given as TTS). With a flute whose lowest note is d' , f could be obtained with $\bullet \bullet \bullet \bullet \circ \bullet$, with leaking hole 4 for $f\#$. Also hole 6 must be half closed for e_b'' .



With such techniques being widely practised on flutes and fifes (and recorders), it must be expected that they would also be applied to the tabor pipe. So we have to fork to get b flat on Mersenne's pipe, and leak to get b natural. Here, it must be pointed out that there is just one difference between the tablatures in the vernacular and latin editions. The above scheme, from Chapman's translation from the French is taken from the latin version of 1648 *Libri Harmonicorum*, in which the b ♮ has a half-stroke. However, in 1636 it had been given a full stroke, i.e. a closed thumbhole, so that the next harmonic, a 5th up, would have been f[♯]. But as we have seen, Mersenne is not interested in this note! So did he take this opportunity to make a correction? If so, it would show his concern for getting things right. The two diagrams are clearly from the same block, and this small alteration could have been done quite easily. (Also, the text is far from being parallel; has anyone researched this?)

The next note is (written) c', and as with the fundamental an octave lower, it is indicated by open circles. This fingering is given emphasis by this treatment, open circles for 'all fingers off'. Now we come to the first black circle, for e_b. As with fifes and flutes, the only way to play this note is by half uncovering hole 3. Therefore the black circle signifies half-hole. Perhaps it was intended to look like **◐**. The next problem is e' This

does not seem to want to come from  which was fine for the a below.

Perhaps this harmonic gave a flat interval and hole 2 had to be leaked. I have to do this on my big Carlick pipe in d. The next note f' is also sharpened, by not forking as was required for the lower b_b. The all off fingering is given for g', which is only strange because the all on would be just as good, if not better. Perhaps there was no room to put in the alternative fingering.

The last four notes are given a different treatment altogether. Can it be that for top a' holes 1 and 2 are half covered? After all, the harmonic below was too flat and had to be leaked. Normally, closing the top two holes would be expected to give a', with all three tuning systems, but not, apparently, on Mersenne's pipe! A forked fingering is given for high b flat. Overblowing this fingering gives b natural on all the small and medium-sized pipes I have tried, because it enhances the fourth harmonic, and is not a flattening fork. I tried converting the Carlick d' pipe from TTS to TST with the aid of a small lump of blue-tack, and found that these last four fingerings actually work, taking black circles to mean half hole, or optional half hole. I do not think that a smaller pipe could give these notes with Mersenne's fingerings, so am forced to conclude that he is dealing with a pipe in low g. Where then are his mistakes? Surely there's only one – you would not get a good low b_b fundamental from his fingering, but you could if you leaked the thumb-hole. However you shouldn't want this note anyway!

It seems that Mersenne's tablature is for a TST pipe, like the Basque txistu, and would play nicely in the favoured early music key of g minor, as well as f and b_b major. It must also be allowed that pipes may have been made with compromise tunings, any necessary corrections being made by the technique of leaking and half-holing. The pipes in the Bate Collection ⁽⁶⁾ require the thumb-hole to be shaded to get a TTS tuning, and blowing hard on the all off fingering gets close to TTT. Seventeenth century pipers were probably soloists and would not have been concerned with absolute pitch, or even the system of tuning. Neither would they have read *Harmonie universelle*! But they would have devised a simple tablature to instruct beginners and to serve as an *aide memoire*, and so avoid those embarrassing delays at the start of a dance that has already been announced. This would take the form of a code or pictogram to indicate the position of the fingers, as was done for lute music, and for the banjo chords on pre-war sheet music.

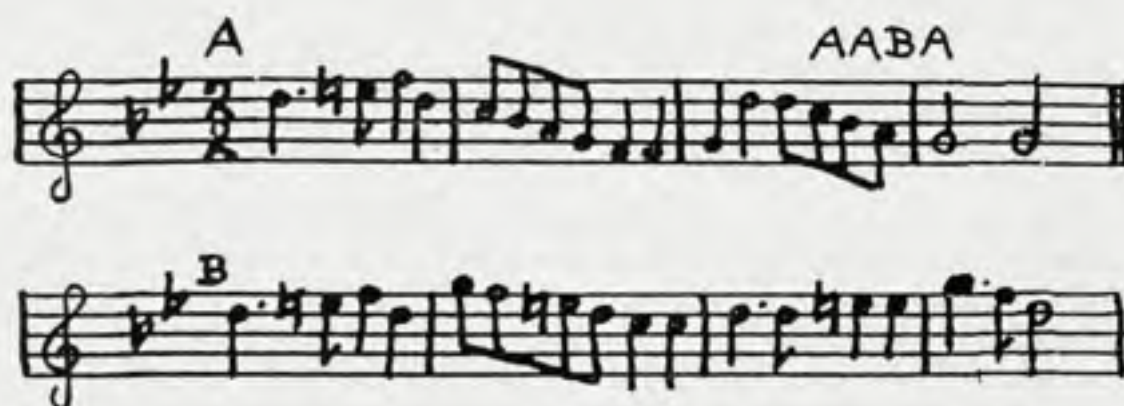
As a **Tablature for Today**, I offer the following for consideration : on a TTS pipe in g, the scale of g major is written ; 3 2 T 0 3 2 T 3. From here the higher notes are ; 2 T/3 0 3 2 T 3 2, taking us to a'''. T is used rather than 1, to show that it is the thumb-hole, and that we are not counting from the bottom up ! Half-hole fingerings are indicated by 0½, T½ and 2½. If an interval rises or falls on the same fingering one can either use a slash or an arrow, 2/2 or 3↘3. Thus the tablature for a (small) g pipe (TST) would look like this :

g	a	b _b	c	d	e	f	g	a	b _b	c	d	e
3	2	T	0	3	2	T	3	2	T/3	0	3	2

Any tune can be given an underlay, completely or just the first few bars. It is of course possible to write the tablature only, for example, for a TTS pipe, *London Pride* ;

2 T 0 2 30T2 3 2/2 230T 2 2 ↘2 T 0 2/23T2 3 3 2 2T 0 2/2 3 2 DC

But here's the music just in case!



It's in g minor (melodic ascending) but a traditional piper wouldn't need to know that!

1. F. Marin Mersenne, *Harmonie universelle* (Paris 1636). Version in latin, 1648. Facsimile, Paris 1963. Instrument *livres* tr. R. Chapman with graphics in facsimile, The Hague 1957.
2. 1588 – 1648, fellow pupil of Descartes at Jesuit College, and spent most of his life at the convent of L'Annonciade, Paris. Biog. H.de Coste, *La Vie du Rév. Père Marin Mersenne*, (1649) ed. B.T. Larroque, with additional material (1892).
3. The diagram of the flute looks as if it is upside down ! It is more likely that it is the body joint of a two-piece bass, in which case the notation is given at sounding pitch, and not an octave lower. It represents a simplified treatment, as there are no forked fingerings.
4. Les notes qui sont précédées de *b mols* signifient les feintes, les accidents, ou les demy-tons, que l'on fait en moderant le vent, ou par l'industrie des doigts, don't on bouche plus ou moins les trous, afin de sonner les chansons qui sont par *b mol*.
5. This also applies to cornetts which play in g but without a fingering for low g.
6. Ken Williams, Drawings of Tabor Pipes by Henry Potter and Rudall Carte & Co. Ref no. x01 and x02, Bate Collection, Oxford 1984.

A "Universal" Tablature (or Musical Periodic Table?) for g and d pipes

	2nd harmonic \neg							3 rd \neg					4 th \neg				5 th \neg				6 th \neg 7 th						
	f#	g	g#	a	b _b	b	c	c#	d	e _b	e	f	f#	g	g#	a	b _b	b	c	c#	d	e _b	e	f	f#	g	
TTS	4*	3	2½	2	T½	T	0	4	3	2½	2	T½	T	3	2½	2	T½	T/3	0	4	3	0½	2	T½	T	3	
														0													
TTT	-	3	2½	2	T½	T	0½	0	3	2½	2	T½	T	3	0	2	T½	T/3	0½	0	3	0½	2	T½	T	3	
TST	3½^	3	2½	2	T	0½	0	3½	3	2½	2	T	0½	3	2½	2	T	T/3	0	3½	3	0½	2	T	-	3	
	d	d#	e	f	f#	g	g#	a	b _b	b	c	c#	d	d#	e	f	f#	g	g#	a	b _b	b	c	c#	d		

* The 4th hole on a Schofield/Jones pipe, making this system fully chromatic.

^ Half close bell with little finger – the txistu ring for the ring finger facilitates this.

Half-holing The Tabor Pipe

I have chosen to deal with this subject separately from the previous Comm. because it has no direct bearing on the Bucknell case history. Arbeau describes a pipe in g, giving tone tone semitone when the holes are uncovered in sequence (Type TTS). This is fine if the tonic is the lowest note required. Very often it is not, and the piper wants to play a tune in c. Mersenne says that even pieces of music in b flat are playable on the g pipe. "The notes b flat and e flat (on his fingering chart) are the accidentals and semitones which are made by moderating the wind or by working the fingers by which the holes are stopped more or less so as to perform music in b flat". So half-holing and possibly flattening by fork-fingering must be involved. The most useful half-hole fingering is T $\frac{1}{2}$ to give f natural. It is the easiest to do, as the holes are covered by the middle joint of the fingers, and the feel of the correct amount of shading is soon acquired. However there are two others: 0 $\frac{1}{2}$ and 2 $\frac{1}{2}$. The following analysis refers to pipes pitched in d'', and cover both tuning systems dealt with in the French Fingerings Comm., namely Type TTS and Type TTT.

	T $\frac{1}{2}$	2 $\frac{1}{2}$	0 $\frac{1}{2}$	
	●	●	●	
	●	●	○	The higher harmonics require less shading of the hole being "halved".
	○	○	○	
TTS	f'' c''' f'''	d#''' a#''' d#'''	—	
TTT	f'' c''' f'''	d#''' a#'''	g''' d''' g'''	

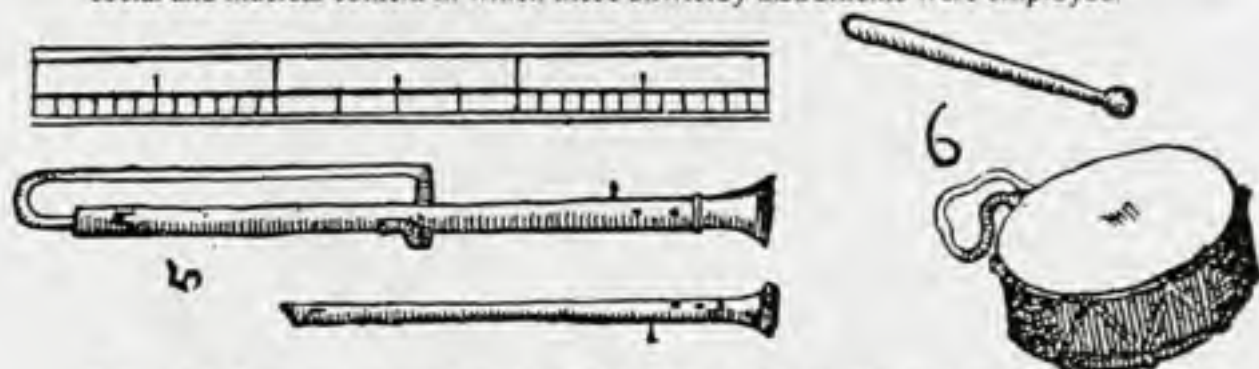
Type TTS pipes depend on T $\frac{1}{2}$ for playing in the key with one less # than the scale starting with the lowest note, thus a d pipe plays most easily in the keys of d and g. This fingering gives f and c natural on both kinds of pipe. Type TTT pipes play most conveniently in e and a, with no requirement for half-holing. "The Willow Tree" is quite easy in b major! The fingerings for this scale are; 2 T 0 2 T/3 0 2 $\frac{1}{2}$ 2 (The last two notes of the scale are not needed for the "The Willow Tree"). The fingering 2 gives d# and a# (and high d# on TTS pipes), while 0 $\frac{1}{2}$ gives both g naturals on TTT pipes, making them, in theory at least, fully chromatic. Shading the bell with the little finger (3 $\frac{1}{2}$) is a technique employed in the Basque tradition, and provides a low c#, and other notes which are already obtainable by simple fingerings on both the galoubet and Basque txistu.

Fork- or cross-fingerings are not very useful, there being so few holes to play with! Also the tone holes are large compared with the bore, and this reduces their flattening effect. An exception is T/3, which enhances the desired 4th harmonic, in the same way as for the third octave on flutes and recorders. There are other fingerings like this, and some players leak a tone hole, as with the thumb in recorder playing.

With the occasional half-holing, "The Willow Tree" can be played with reasonable facility in five keys! These are: e (with descending first interval), g (with 0 $\frac{1}{2}$ for g and 1 $\frac{1}{2}$ for c), a and b, the easy keys, and d (with 0 $\frac{1}{2}$ for the high g). It can even be played in high d and e! All this on a Type TTT (galoubet), and only three holes! Traditional players for the Morris were soloists and would avoid $\frac{1}{2}$ holing as much as possible. Medieval and renaissance pipers, or taborers as they were usually called, are frequently depicted in mixed ensembles and must have had pipes in various pitches and been able to use half-holing when really necessary.

The BIG Ones

Numerous depictions of the taborer's pipe from the 14th to the 16th centuries show very long pipes, though not to the total exclusion of short ones. If I had chosen a suitable statue or painting and made a conjectural copy, as indeed I did with the Beverley Minster bumberde ⁽¹⁾, I would have ended up with yet another rather awkward instrument. Neither it nor I would have been taken seriously by folk clubs or in early music circles! It would have been pointed out to me, quite rightly, that the big pipe in Brussels ⁽²⁾ and the one in the drawing in Praetorius ⁽³⁾ have a windcap and a long crook, so that the instrument rests comfortably on the player's shoulder. The discovery of the *Mary Rose* with its well-preserved hoard of objects changed all that ⁽⁴⁾. We can now see that all those sculptors and artists were right, and that it must have been possible to play a tabor pipe 83cm long with direct blowing ⁽⁵⁾. What we still don't know much about is the social and musical context in which these unwieldy instruments were employed.



The three pipes to emerge from the silt of the Solent are of lengths 829mm, c.740mm and 449mm. Various people have expressed their opinions as to their pitch and tuning system (even of overall length!) but it is beginning to look as if the set (if it is a set) comprises: ⁽⁶⁾

Treble (TTS)	Lowest note g'' ⁽⁷⁾	playing easily in keys of g & c
Tenor (TTT)	Lowest note b'	playing easily in key of c
Bass (?TST)	Lowest note g'	playing easily in key of f

One thing is clear: it is not easy to play on the larger two pipes the sort of fast dance tunes that are so effective on a smaller pipe. It looks as if the long pipes may have been mainly for harmony, with other types of instruments or even whole consort. However, Mersenne in *Harmonie Universelle* (nearly a century after the *Mary Rose* sank) says that they are not, and therefore that he is not giving a musical example as he does for other instruments ⁽⁸⁾. But if they *were* played together, they would uniquely constitute a consort at 2 ft pitch. If the two larger pipes have their lowest notes a minor third apart and if, as in the above table, they have the different tuning systems as shown, they would play naturally in keys of g, c & f. These are precisely how recorders were used at that time, each voice being a fifth apart from its neighbour. (In four-part music the alto and tenor lines are taken by equal tenor-size instruments.) Also these key notes are the starting notes of the hexachord system which formed the basis of late medieval and renaissance musical practice, and consequently gave us the clefs which we use today. If the big pipes were used in this way, there is no reason to suppose that the fundamental notes were never used. But wouldn't three or four tabors be a bit overpowering, and if so why weren't two-handed instruments used for the lower parts? Perhaps the taboring was complex and exciting, much as in traditional Japanese drumming. Also, in S.W. France txistu harmony duets are often accompanied by a side drum.

Another possibility is illustrated by the picture by Bos⁽⁹⁾ of a long pipe accompanying a fiddle. It is worth noting that the fiddle is exactly the same shape as the two fiddles found in the *Mary Rose*.



What were such large fragile instruments doing on board a warship along with fiddles and a 'still shawm' of quart-bass range at 8 ft pitch? There was every expectation of an exchange of fire with the French fleet, so it is likely that the musicians had an action station as Royal Marine bandsmen do in the Navy today. Perhaps they had worked up a set of tunes for playing when they next entered harbour, and that other ships of the same size had similarly equipped bands. It may be significant that the smallest pipe was found among the effects of some of the *Mary Rose* archers, while the two large pipes were stowed safely below decks. Archers used the English longbow, greatly feared by the opposition, and which could only be drawn by the tallest soldiers. It may well be that renaissance people were, on average, shorter than we are today, but tall youths would have been singled out for training in shooting the longbow. Who better to double on tabor-pipe? I am 6ft 2in (188cm) tall and am just about able to play a tune on a copy of the biggest *Mary Rose* pipe made recently by Keith Rogers.

It is strange that such long slender instruments were made in one piece. Manufacture and portability would have been much easier with a jointed construction, like the majority of the surviving bass flutes. However, the largest of these, in Vienna (88) is 105 cm long and is made from one piece of box or fruitwood, and as with pipes the player cannot adjust the blowing end for maximum comfort (or minimum discomfort!).

It may be significant that Mersenne's fingering chart starts in the bass clef, and includes the four fundamental notes which are not normally regarded as useful notes. In fact he says that others (who?) do not include them⁽¹⁰⁾. He then switches to a c clef at written middle c. Music for the bass flute, as with the bass recorder today, is usually in the bass clef. It is quite possible therefore that his chart is specifically for a bass pipe, in the convention of writing for a 4 ft instrument as if it were pitched at 8 ft. Unfortunately he gives no measurements, and his diagram is not a scale drawing. However, he does tell his readers that some pipers achieve a range of three octaves, even naming a renowned performer, Jean Price Anglois (John Price from England – or Wales?)⁽¹¹⁾. This compass could only have been possible if the pipes were quite long, and the fundamentals regarded as useful notes. Otherwise, a pipe pitched in g" such as the short one from the Mary Rose would reach a top note of g""", and would have significance only to a passing bat! Most of Mersenne's fingerings work well enough on the Keith Rogers copy. The original is clearly and elegantly marked with the maker's name LEGROS. No other instrument bearing this mark is known; is it then just a happy chance that it could be translated as "THE BIG ONE"?

- 1 Francis W. Galpin, *Old English Instruments of Music* ed T Dart 1965, p 122. See also pp 111, 112 on tabor pipes.
- 2 Brussels: length without wind-cap 739 mm
- 3 Michael Praetorius, *Syntagma Musicum II*, facsimile Barenreiter, 1958.
- 4 Margaret Rule, *The Mary Rose* revised edn 1983. See also Frances Palmer, *Musical instruments from the Mary Rose*, *Early Music*, Jan. 1983.
- 5 Copy of the largest pipe by Keith Rogers.
- 6 i.e. not counting the four fundamental notes.
- 7 Foot ends of the *Mary Rose* pipes showing positions of tone holes.

photos by Nicholas Perry



81A 1191



81A 5846

(includes 82A 1641,
a fragment found later)



81A 3901

- 8 ... c'est chose assurée que l'on peut faire toutes les parties de Musique avec plusieurs Flustes à trois trous, comme avec les autres, quoy que ces concerts ne soient pas en usage, c'est pourquoy ie n'en donne point d'exemples.



- 9 Cornelius Bos (1506 – 1556) Groningen. Another representation is seen in a Czech language Bible of 1570. The engraving, signed "F" shows Jephtha's daughter leading a ladies' orchestra out to meet her father, returning from the victory of Israel over the Ammonites. At this point in the story she is unaware of the vow he has made, that whatever first comes out of his house shall be sacrificed as a burnt offering (Judges 11). Detail.
- 10 ... où il faut remarquer que plusieurs ne mettent pas les quatre premières notes dans l'estendue de cette tablature, parce qu'elles n'ont pas suite par tous les degrez de l'Octave.
- 11 de sorte qu'il se recontre des hommes qui font l'estendue d'une Vingt-deuxiesme sur la Fluste à trois trous, don't l'ay veu l'experience en lean Price Anglois.

Irish Harp Tuning and The Sisters

In Bull. 95, Eph Segerman goes through recent work that he has undertaken in calculating string sizes for an instrument modelled on the 'Queen Mary' harp.

This might, therefore be an appropriate time to resurrect for discussion one peculiarity of Irish harp tuning recorded by Edward Bunting at the end of the 18th C. Bunting had the opportunity to interview the last of the Irish harpers trained in the old ways attempting to record for posterity as much as he could about early harp traditions, playing techniques and music.

The harps used at this time were the so called 'high headed' style, strung with brass and steel wire, as opposed to the 'earlier' 'low headed' style of which the 'Queen Mary' harp is an example.

For a typical 18th C. 'high headed' harp of 30 strings, Bunting gave the compass from low C, below the bass clef, to high D, above the treble clef tuned in the key of G but without an F sharp in the low bass. The compass was separated, treble from bass, at G below middle C by two strings, tuned in unison, called 'The Sisters'. In tuning the strings of a harp, 'The Sisters' were the starting point for a standardised sequence of steps from which the pitch of the remaining strings was established. (see Note 1)

Reference to 'The Sisters' goes back to at least the 14th C. in Ireland and, therefore, it is to be expected that such unison tuned strings might also have been a feature of the 'low headed' style of harp.

But what was the purpose of 'The Sisters'? European single strung harps did not incorporate this arrangement in their tuning.

Surely unison tuned strings were not essential for tuning purposes where a single string would suffice?

Robert Haddaway (EM Jan. 1983) noting that separation of treble and bass was a feature of double strung chromatic harps suggested that unison tuned strings may have been used on single strung, partially chromatic Irish harps for the same reason. I am not a harp player but imagine that a mid compass reference point ('The Sisters') might have had some value in assisting a harper to negotiate a variety of partially chromatic tunings in the course of a performance.

On the other hand the Irish harp tuning recorded by Praetorius - partially chromatic and with re-entrant tuned strings to complicate matters further - does not include a unison tuned pair of strings.

Another possibility is that the pair of strings might have been to provide a 'spare' string to facilitate retuning a harp to other scales or partial scales. Bunting mentions one little used harp scale that required the pitch of a single string to be raised (ie C to C sharp an octave above middle C)

Does anyone have other suggestions?

Note 1. Bunting also noted that individual strings were named according to their position relative to other strings (eg 'Servant of the Sisters' - the string next to 'The Sisters' a tone higher ie A), to their location or function on the harp (eg 'The LowestString'-ie C or 'The Highest String' - ie D) and so on.

Curiously, for harps that were traditionally supposed to be strung with brass and iron wire, the D string above middle C was named 'String of the Leading Sinews' or 'The Melody String', the D an octave below 'Response to the Leading Sinews' and the E above middle C 'Servant of the Leading Sinews'.

It is possible that the 'high headed' harps dating from the late 17th C and their later counterparts were developed by the Irish harp makers to be more suitable for the demands of the European repertoire than the traditional Irish harp may have been. These harps may have adopted European tuning scales and have been provided with strings of animal fibre - hence the longer bass strings. Such harps finding their way back into Irish society may then have been restrung with brass and steel wire in the old manner retaining the new European tunings for performance of the more modern harp compositions of the 18th C.

FoMRHI Comm. 1656

John Downing

Further to Comm. 1615

In Comm. 1615 I used the example of casting a trumpet mouthpiece blank to 'save a thousand words' and briefly illustrate the basic method involved in casting low melting point alloys using silicon rubber to make the molds. While I have made mouthpiece castings by this method, I did not intend that the above Comm. should be taken as an account of how to replicate mouthpieces.

Jeremy's comments in Bull. 95 point out some critical features of mouthpiece geometry which would, of course, need to be considered in order to replicate an original mouthpiece exactly to reproduce the same tuning and response of the original.

I imagine that to achieve the close tolerances required, the roughly bored mouthpiece blank would have the cup, grain and backbore finished to size with reamers ground precisely to the exact dimensions of the original - a costly job for a professional toolmaker.

Using the above casting method, however, provided shrinkage cavities in the vicinity of the grain could be avoided, it would be possible to exactly copy the cup and grain geometry leaving only the backbore to be step drilled and finished to size with a tapered reamer ground to the exact size required. This could be simply achieved by setting the temporary clay plug shown in fig. 4 of Comm. 1615 a couple of millimeters into the backbore instead of flush with the cup as shown.

I should mention that my requirements for cast mouthpieces was much less critical as I was looking for a low cost, quick and flexible method for making mouthpieces for experimental trumpets and horns made from tinplate. My mouthpiece blanks were simply step drilled and the backbore finished to size using an appropriate tapered reamer.

This method might be of interest to someone wishing to experiment with mouth-piece design - the cost per unit being low and all failures returned to the melting pot for recasting.

I no longer use cast mouthpieces for my tinplate horns as it is quicker for me to form these from tinplate, the conical cup being soldered directly into the tapered tubing of the horn which acts as a backbore. The crudeness of this arrangement, with a distinct step where the cup fabrication meets the horn tubing, is not only authentic but works quite well for this class of instrument.

Further on the Pitch Ranges of Gut Strings

Longest string stop for highest pitch

In Table 1 of Comm. 1545, for a range of string stops, I presented the highest pitches for low-twist gut strings at two pitch standards, Praetorius's Cammerthon standard and his Chorthon standard a tone lower. The highest pitch was calculated to have the same string stress as the highest found in Praetorius's bowed instruments, which was on the viola bastarda. In Comm. 1593, it was found that the highest string stress for gut, as represented as the highest fL product, was the same for Praetorius's plucked instruments as it was for his bowed instruments. This apparently means that players of bowed and plucked instruments had the same judgement about how short a life for a first string was still tolerable (we don't know what that life was, but we don't need to know this to know the highest pitch). This evidence is as good as we can hope to get for how high a gut string would have been tuned in this period. That frequency in Hz is 210 divided by the string stop measured in metres.

In Table A, the above information relating the longest acceptable string stop to the highest pitch is repeated, but for a greater variety of pitch standards. On the left is $a'=375$ Hz, the French pitch standard deduced from Mersenne's organ pipe dimensions. To the right of it is $a'=383$ Hz, the Chorthon of Catholic Germany a tone below $a'=430$, Praetorius's Cammerthon, deduced from his set of pitch pipes. The Italian choral and instrumental pitch standard most followed, called Corista, was around the same as the above Chorthon. Also included are $a'=440$, 415 and 392 Hz, which are modern pitch and one and two semitones below it.

Shortest string stop for lowest pitch

In Table 1 of Comm. 1545, the lowest pitches of bowed instruments were calculated from the highest pitches assuming that the maximum open string range was constant: - two octaves and a fourth for a roped gut lowest string and two octaves for a high-twist gut lowest string. Such a constant range for different string stops is a good first approximation, but one can do better. The dullness and lack of focus in the sound which stops musical usefulness at the bottom of the range is mainly due to inharmonicity. Inharmonicity when mild, makes higher harmonics slightly out of tune with the fundamental (this is a desired component of piano tone). When severe, the number of higher harmonics is reduced to very few, losing richness and focus in the sound.

In Comm. 632, I pointed out for constant inharmonicity on the lowest string, the frequency is proportional to the string diameter divided by the square of the vibrating length. If we consider families of instruments, the tension-length principle (where the tension is roughly proportional to the lengths of the strings), tends to be followed. Combining these relationships with the Mersenne-Taylor Law leads us to conclude that the frequency is proportional to the fourth-fifths power of the vibrating length.

Consequently, larger instruments will have an acceptable open-string pitch range that is greater than related smaller instruments having the same type of gut lowest strings. So since the open-string range of the viola bastarda was 2-octave plus a fourth, the largest range of all the viols, we can expect that larger viols at that time would have a larger acceptable open-string range and smaller viols a smaller acceptable open-string range. Listed in Table B is an extrapolation to other sizes (at the same variety of pitch standards as in Table A) of the relationship between the shortest string stop for the lowest acceptable pitch from the string stop and lowest pitch of the viola bastarda (listed as 0 column in the 'semitone shift' columns) as given by Praetorius. This should apply directly to all of the viols, assuming that their stringings are related to the viola bastarda by the tension-length principle.

For other families of instruments with different tension requirements, Table B applies, but the

$$\frac{f}{L^2} = \text{inharmonicity}$$

itches would need to be shifted up or down by some constant interval, approximated by the different pitch columns. To estimate what that interval might be for other families with different tension traditions and with octave-string reinforcement, we need to look at Table C. This Table results from applying the formulas that generated Tables A and B to all of the gut-string instruments depicted by Praetorius, as reported in Comms 1545 and 1593.

Praetorius's viols

Praetorius's pitch standard was a tone higher than the places in southern Germany and Italy where viols (and lutes) were made, and sizes were standardised. When most viol sizes contracted 20% late in the 16th century to make playing easier, many (like the English) used the smaller sizes to tune to a higher pitch (a fourth higher in nominal pitch). At the tone-higher pitch standard in Lutheran Germany, these pitches broke strings too readily, so the viols remained at their lower original nominal pitches. It was possible to use the smaller sizes because roped-gut bass strings extended the open-string range to more than the 2-octaves for a viol, and Praetorius's viols could stay close to the bottom of the range.

Praetorius's Klein Bass viol was a small example of its type, being in size between a Lyra and Division viol in the Talbot measurements, smaller than a proper Consort bass. So it is not surprising that the original *GG-g* tuning is 1.4 semitones too low for it. We therefore assume that this viol was tuned to the *BBb-a* alternative tuning given in Praetorius's table. Both are listed in Table C.

Gross Bass viol had 6 strings, and both of the 6-string tunings he gave are listed in Table C. The *DD-d* tuning just works, but the *EE-f* tuning would sound better, with its 2.5 semitones above the minimum being properly intermediate between the 5.3 of the Gross Contra Bas and the 1.6 of the Klein Bass.

The Tenor=Alt viol just makes it into the acceptable range, but the Cant viol goes 0.9 semitones too low. The latter can be explained by the Cant viol not using its lowest string melodically (those notes would be in the lower half of the bass clef), and when used in chords, notes on that string would be covered by better notes on lower viols.

It can be then concluded that the assumption that calculating the minimum pitch limit for viols from the lowest pitch of the viola bastarda, with the Semitones Shift column of 0 being relevant in Table B, is quite reasonable.

Praetorius's fiddles

The Bass depicted had 5 strings, while the two tunings given each had 4 strings. To make them 5-string tunings, the *F-d'* tuning can be extended downwards to *BBb*, or the *C-a* tuning can be extended upwards to *e'*. Both possibilities are shown in Table C. The latter can be eliminated for this instrument because the *e'* is 1.8 semitones too high for the string stop.

When discussing the violin, Mersenne indicated that as a fiddle, it had considerably higher tension than it would have as a viol. We can thus expect that with higher tensions for the same string stops, the lowest acceptable pitches of fiddles should be higher than of viols. Then the 5-string Bass fiddle would be at that pitch, 0.8 semitones higher than if it were a viol. Since the tension ratio should be equal to the frequency ratio to the fourth power, the fiddle tension calculates to 20% greater than viol tension. This seems to be rather less than Mersenne implied, but it is likely that German tension traditions for fiddles differed from French ones since the Germans mixed fiddles and viols in their string ensembles, but the French then didn't. The French lowered their fiddle string tensions later in the 17th century to let them mix.

Consequently, the numbers given in the 'semitones above minimum' column for fiddles in Table C should have 0.8 semitones subtracted from each of them to represent a more realistic minimum for their tensions. In Table B, this is approximated by using the Semitones Shift

column of 1 for fiddles in this period.

Application of this shift in the lowest acceptable pitch to the other fiddles doesn't create any problems, but it enhances the amount that the Tenor is below the acceptable minimum to 1.4 semitones. The size of the Tenor that Praetorius depicted would have been called a contralto in Italy. Instruments with this middle tuning in the fiddle band came in a variety of sizes, depending on which of the up to three different parts they played. So the small size of this particular one is readily explained by it generally being used to play a higher one of these parts, (probably in a C2 clef) and would very rarely have needed to use the lowest string.

Praetorius's plucked instruments

The ChorLaute, with an open-string range of 2 octaves and a fifth, obviously filled the acceptable range for its gut stringing. We would expect that the lowest string of a lute would have a lower tension than that of a viol at the same string stop, and that the octave string might make acceptable a note that is lower than the usual limit of acceptability, so a lowest pitch that is 2.6 semitones lower is no surprise. So in Table B, in between the Semitones Shift columns of -3 and -2 would be appropriate for lutes in this period. This is irrespective of uncertainties about possible differences in the acceptability of inharmonicity between the sound of plucked and bowed strings and the influence of an octave string in the lowest course.

Praetorius's illustration of a Quinterna (guitar) had 6 courses, while the two tunings he gave were for 4-course instruments: *c-d'* and *f-g'*. The 6-course tuning *G-g'* includes both of these, so that was the tuning listed in Table C. The instrument obviously had been a viola da mano pressed into service as a guitar. As a viola da mano, it was probably originally tuned a tone higher, with the highest string close to breaking, as the Mandoraen and the lute.

The Paduan Theorbo apparently attempted to be an improvement on the Roman one (Chitarron) by offering more resonance for lower strings with of a larger body, having two more courses on the fingerboard (giving fingered choices between *F* and *F#*, and *Eb* and *E*), two extra lowest notes (*DD* and *EE*), and a shorter overall length. Yet, it did not flourish, Praetorius offering the only evidence for it ever existing. Perhaps the preference for the Chitarron was because of the greater 'zing' in the bass strings, which involves lots of harmonics in the sound, resulting from being farther away from the minimum where inharmonicity chokes them off.

High-twist gut lowest basses

Renaissance instruments from before the general availability of roped gut bass strings had high-twist gut lowest strings. The bowed instrument from then with the largest open-string range was the lira da braccio with 28 semitones, and the next largest was the 6-string viol with 24 semitones. These are not as different as they seem. The lira had almost two semitones of extra length for the lowest (5th) course, the string sound was supported by a companion string an octave higher, and it probably had a lower string tension than viols, (making a lower pitch tolerable). So there is no reason to doubt that the maximum range for a single string on a single nut at viol tension would have been two octaves.

We have no information relating string stops with absolute pitches before Praetorius, so we need to fall back on the much less precise observation that when roped gut bass strings became available, the open-string ranges of lutes expanded from 26 to 31 semitones and the range of viols from 24 to 29 semitones (on the viola bastarda). It was 5 semitones in each case, so we can approximate the previous situation with high-twist gut basses by adding 5 to the Semitones Shift in Table B.

Conclusion

This study offers a theory relating string stops with pitch ranges in all-gut strung instruments of the 16th and 17th centuries. It seems to be consistent with the evidence we have.

TABLE A: Longest string stop
for highest pitch

pitch	Mers	Chort	mod-2	mod-1	Camm	mod
stand	375	383	392	415	430	440
-ard	Hz.	Hz.	Hz.	Hz.	Hz.	Hz.
pitch	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)

TABLE B: Shortest string stop for lowest pitch
pitch standard

Pitch										Mers	Chort	mod-2	mod-1	Camm	mod
Semitones Shift of lowest pitch										375	383	392	415	430	440
due to different tension style, string type										Hz.	Hz.	Hz.	Hz.	Hz.	Hz.
or octave-string reinforcement										Hz.	Hz.	Hz.	Hz.	Hz.	Hz.
-3	-2	-1	0	1	2	3	4	5	6	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)

c'''	24	23	23	21	21	20	a	b	c'	d'	e'	f'	23	23	23	22	21	21
b''	25	24	24	23	22	21	a	b	c'	d'	e'	f'	25	24	24	23	22	22
	26	26	25	24	23	23	g	a	b	c'	d'	e'	26	25	25	24	23	23
a''	28	27	27	25	24	24	g	a	b	c'	d'	e'	27	26	26	25	24	24
	30	29	28	27	26	25	f	g	a	b	c'	d'	28	28	27	26	25	25
g''	31	31	30	28	27	27	e	f	g	a	b	c'	30	29	29	27	26	26
	33	33	32	30	29	28	e	f	g	a	b	c'	31	30	30	29	28	27
f''	35	35	34	32	31	30	d	e	f	g	a	b	32	32	31	30	29	29
e''	37	37	36	34	33	32	d	e	f	g	a	b	34	33	33	31	30	30
	40	39	38	36	35	34	c	d	e	f	g	a	36	35	34	33	32	31
d''	42	41	40	38	37	36	B	c	d	e	f	g	37	37	36	34	33	33
	44	44	43	40	39	38	B	c	d	e	f	g	39	38	38	36	35	34
c''	47	46	45	43	41	40	A	B	c	d	e	f	41	40	39	38	37	36
b'	50	49	48	45	44	43	A	B	c	d	e	f	43	42	41	39	38	38
	53	52	51	48	46	45	G	A	B	c	d	e	45	44	43	41	40	39
a'	56	55	54	51	49	48	G	A	B	c	d	e	47	46	45	43	42	41
	59	58	57	54	52	51	F	G	A	B	c	d	49	48	47	45	44	43
g'	63	62	60	57	55	54	E	F	G	A	B	c	51	51	50	47	46	45
	67	65	64	60	58	57	E	F	G	A	B	c	54	53	52	50	48	47
f'	71	69	67	64	62	60	D	E	F	G	A	B	56	55	54	52	51	50
e'	75	73	72	68	65	64	D	E	F	G	A	B	59	58	57	54	53	52
	79	78	76	72	69	67	C	D	E	F	G	A	62	61	60	57	55	54
d'	84	82	80	76	73	72	BB	C	D	E	F	G	65	64	63	60	58	57
	89	87	85	80	78	76	BB	C	D	E	F	G	68	67	65	63	61	60
c'	94	92	90	85	82	80	AA	BB	C	D	E	F	71	70	69	66	64	63
b	100	98	95	90	87	85	AA	BB	C	D	E	F	74	73	72	69	67	65
	106	104	101	96	92	90	GG	AA	BB	C	D	E	78	77	75	72	70	69
a	112	110	107	101	98	95	GG	AA	BB	C	D	E	82	80	79	75	73	72
	119	116	114	107	103	101	FF	GG	AA	BB	C	D	86	84	83	79	77	75
g	126	123	120	114	110	107	EE	FF	GG	AA	BB	C	90	88	86	83	80	79
	133	130	127	120	116	114	EE	FF	GG	AA	BB	C	94	92	91	86	84	83
f	141	138	135	128	123	120	DD	EE	FF	GG	AA	BB	98	97	95	91	88	86
e	150	146	143	135	130	127	DD	EE	FF	GG	AA	BB	103	101	99	95	92	91
	158	155	152	143	138	135	CC	DD	EE	FF	GG	AA	108	106	104	99	97	95
d	168	164	161	152	146	143	CC	DD	EE	FF	GG	AA	113	111	109	104	101	99
	178	174	170	161	155	152	CC	DD	EE	FF	GG	AA	118	116	114	109	106	104
c	188	184	180	170	164	161	CC	DD	EE	FF	GG	AA	124	122	119	114	111	109
							CC	DD	EE	FF	GG	AA	130	127	125	120	116	114
							CC	DD	EE	FF	GG	AA	136	133	131	125	122	119
							CC	DD	EE	FF	GG	AA	142	140	137	131	127	125
							CC	DD	EE	FF	GG	AA	149	146	144	137	133	131
							CC	DD	EE	FF	GG	AA	156	153	150	144	140	137
							CC	DD	EE	FF	GG	AA	163	161	158	151	146	144

To extrapolate beyond the range given, there is a factor of 2 in the longest string stops in Table A for every 12 semitones, and in the shortest string stops in Table B for every 15 semitones.

The string stops in Table A are calculated from 21000 divided by the frequency.

The string stops in Table B (Semitones Shift = 0) are calculated from equal inharmonicity with the lowest string of the viola bastarda.

The approximation of equal temperament is used in these calculations.

TABLE C: PRAETORIUS'S GUT-STRUNG INSTRUMENTS

			HIGHEST STRING				LOWEST STRING			
Plate/ Num- ber	Name in Plate	Other Information	String Stop (cm)	Pitch at a'= 430 Hz	fL (m/sec)	Semitones below maximum	String Stop (cm)	Pitch at a'= 430 Hz	fL (m/sec)	Semitones above minimum
PLUCKED INSTRUMENTS										
16/3	ChorLaute	in Chorthon	61.8	f'	211	-0.1	61.8	BBb	35	-2.6
5/2	Lang Romanische	short strings	88.8	a	191	1.6	88.8	G	85	14.3
	Theorba: Chitarron	long strings	177.1	F	151	5.7	177.1	FF	76	15.2
16/1	Paduanische	short strings	97.2	a	209	0.1	97.2	E	78	13.2
	Theorba	long strings	130.2	D	93	14.0	130.2	DD	47	5.6
16/4	Quintera	viola da mano	48.9	g'	187	2.0	48.9	G	47	1.4
16/5	Mandoraen	in Chorthon	30.5	f''	208	0.2	30.5	bb	69	6.1
18/1	Gemeine Harff		19.9	a''	171	3.6	85.7	F	73	11.5
19	Gross Doppel Harff	left side right side	18.3 10.3	g#' c'''	74 105	18.0 12.0	89.6 63.7	C g	57 122	7.5 19.1
BOWED INSTRUMENTS										
16/8	Klein Geig Posch genant		17.7	b''	171	3.6	17.7	a'	76	5.4
21/1	Kleine Poschen		22.5	a''	194	1.4	22.5	g'	86	8.6
21/2	Kleine Poschen		26.8	e''	173	3.4	26.8	g	51	0.4
21/3	Discant-Geig		22.5	a''	194	1.4	22.5	c'	58	1.6
21/4	Rechte Discant-Geig		29.8	e''	192	1.5	29.8	g	57	2.7
21/5	Tenor-Geig		35.4	a'	152	5.6	35.4	c	45	-0.6
21/6	Bas-Geig de braccio		72.2	d'	207	0.2	72.2	BBb	41	0.8
				e'	233	-1.8		C	46	2.8
20/1	Violn de Gamba (Cant)		40.2	a'	173	3.4	40.2	A	43	-0.9
20/2	Violn de Gamba (Tenor=Alt)		58.1	d'	167	4.0	58.1	D	42	0.1
20/3	Violn de Gamba (Klein Bass)		75.0	a	161	4.6	75.0	BBb	43	1.6
				g	144	6.6		GG	36	-1.4
6/4	Violone (Gross Bass)		103.2	f	176	3.1	103.2	EE	42	2.5
				d	148	6.0		DD	37	0.5
5/1	Gross Contra-Bas-Geig		128.4	G	123	9.3	128.4	DD	46	5.3
20/4	Viola Bastarda		72.9	d'	209	0.1	72.9	AA	39	0.0
20/5	Italianische Lyra de braccio		37.5	d''	215	-0.4	37.5	d	54	2.6
17/4	Italianische Lyra de Gamba		68.2	e'	220	-0.8	68.2	Gb	62	7.6

Note: The minimum referred to in the 'Semitones below minimum' column is that for viols, derived from the range of the viola bastarda.

A bit more on early fiddle tunings and sizes

This is one of a series of Comms in this Q which applies a refinement in the theory relating string stops with pitch ranges. It interprets the lower pitch limit for a string as resulting from inharmonicity in the string's sound, and calculates how this limit varies with string stop from the theory of inharmonicity, the tension-length principle and the Mersenne-Taylor law. With roped-gut bass strings, generally available from the last quarter of the 16th century, the criteria for this limit for different instrument families have been derived from information given by Praetorius. The bottom of the range of fiddles is calculated assuming that the lowest string of the 5-string *Bas-Geig de braccio* Praetorius depicted was at that limit. The criteria for high-twist gut bass strings, used before roped-gut strings were available, have been estimated to be a fourth higher.

In the process of recalculating the limits for early fiddles, a few new insights arose, and that is the main purpose of this Comm. Table 1 displays the reported pre-baroque fiddle tunings. It includes a new interpretation of the other range for a *violino* given by Zacconi. That playing range was *c* to *a''*. We have to take that other range seriously (and can't consider it an error) because the lower end of it, not included in the usual *violino* range, is called for in the only surviving *violino* music before 1600, G. Gabrielli's *Sonata Pian e Forte*. All of the fiddle playing ranges given went up to the highest note that can be fingered in first position, so the tuning range would have been *c* to *d''*. That range could be filled by a 5-string instrument with three fifths and a fourth. A newly realised alternative is a 4-string tuning that used every finger position in first position for a different note: *c, a, f, d''*.

This tuning, which offers good opportunities for chords, would work on a standard *tenore viola da braccio*, but this unique tuning in 6ths would make it a different instrument. The only evidence for this tuning is that it neatly fits the range Zacconi reported. Players of *violini* then were an elite amongst musicians, highly innovative and not limited by tradition. The definition of a *violino* was whatever a *violino* player played, which was usually different from what anyone else played. The *violini piccioli* written for in Monteverdi's *Orfeo* would have been played by *violino* players. Banchieri's report of *violini* tuned like *tenore* and *basso viole da braccio* is unique, and this sortie into the territory of the *da braccio* players was not repeated.

Table 2 gives the calculated string-stop ranges for each tuning that was reported as proper pitches. These are given for the pitches given in the sources and an octave higher when suggested by the evidence. Then the changed ranges are given for those tuning pitches because of adopting roped-gut basses in the final quarter of the 16th century, followed by the ranges calculated for new tunings around 1600 in Italian fiddles. Finally, string-stop ranges for all-gut baroque tunings are listed. Table 3 gives typical string stops suggested by the calculated ranges.

All of the low range limits used here were calculated assuming that the low *C* string on the 5-string bass that Praetorius depicted was at the inharmonicity tolerance limit. This should be qualified to be the tolerance limit on an exposed note used melodically. The *c* string of his *Tenor-Geig* had worse inharmonicity, but we assume that it was acceptable because that string was not used melodically, and when used in chords, it was not exposed. Looking at the ranges in Table 2, we notice that this is also marginally true for Jambe de Fer's treble fiddle and more so with Zacconi's treble fiddle. It is also possible that this could have been true as well for most alto fiddles if they actually were smaller than the calculated ranges given, which could easily have been so.

I had not previously properly realised the implications of adding a low *C* string to the *basso da braccio*, as often happened in the 17th century. That necessitated making it much bigger, with a string stop of about 72 cm. Thus Talbot's small one cannot have had 5 strings. Praetorius's 5-string bass was too small to be an example of a French *basse de violon*, but was rather an example of the new large-sized *basso da braccio*. This has serious implications concerning the origin of the *violoncello*. That instrument was developed late in the 17th century to use a lowest string overspun with metal to rival the larger *violone* for playing the bass of a string band in the theatre and church. It now seems to have been a contracted large *basso da braccio* rather than an enlarged small one, with no French influence required.

The calculated ranges become less relevant getting into the 18th century because of overspun basses.

Table 1: Pre-baroque tunings of fiddles

When the pitches are in (), the source gave only relative pitches.
 When the pitches are in / , they are conjectural, only the range was given.

Author	Date	Bass	Tenor & Alto	Soprano	Name
M. Agricola	1528	<i>F, c, g</i>	<i>c, g, d'</i>	<i>g, d', a'</i>	<i>kleinen Geigen</i>
H. Gerle	1532	(<i>C, G, d, a</i>	<i>c, g, d'</i>	<i>g, d', a'</i>)	<i>Kleynen Geyglen</i>
G. M. Lanfranco	1533	(<i>BBb, F, c, g</i>	<i>c, g, d'</i>	<i>g, d', a'</i>)	<i>Violetta da Braccio</i>
M. Agricola	1545	<i>F, G, d, a</i>	<i>c, g, d'</i>	<i>g, d', a'</i>	<i>kleinen handgeiglein</i>
P. Jambe de Fer	1556	<i>BBb, F, c, g</i>	<i>c, g, d', a'</i>	<i>g, d', a', e''</i>	<i>Violons</i>
L. Zacconi	1592	<i>BBb, F, c, g</i>	<i>F, c, g, d'</i>	<i>c, g, d', a'</i>	<i>Viole da braccio</i>
P. Cerone	1613	(<i>BBb, F, c, g</i>	<i>c, g, d'</i>	<i>g, d', a'</i>)	<i>Vihuela de braço</i>
L. Zacconi	1592		<i>g, d', a', e''</i> <i>c, [a, f], d''</i>		<i>Violino</i>

Table 2: Calculated string-stop ranges for the pitch ranges

When a minimum size is greater than a maximum, it is shown in ().
 This indicates that the range was exceeded, and the maximum prevails.

At the reported pitches					
M. Agricola	1545	<i>F, G, d, a</i>	<i>c, g, d'</i>	<i>g, d', a'</i>	<i>kleinen handgeiglein</i>
at <i>a'</i> = 383 Hz		72 - 110 cm	52 - 82 cm	38 - 55 cm	
P. Jambe de Fer	1556	<i>BBb, F, c, g</i>	<i>c, g, d', a'</i>	<i>g, d', a', e''</i>	<i>Violons</i>
at <i>a'</i> = 375 Hz		101 - 126 cm	53 - 56 cm	(38) - 37 cm	
L. Zacconi	1592	<i>BBb, F, c, g</i>	<i>F, c, g, d'</i>	<i>c, g, d', a'</i>	<i>Viole da braccio</i>
at <i>a'</i> = 383 Hz		100 - 123 cm	73 - 82 cm	53 - 55 cm	
At the proposed octave					
M. Agricola	1545	<i>f, g, d', a'</i>	<i>c', g', d''</i>	<i>g', d'', a''</i>	<i>kleinen handgeiglein</i>
at <i>a'</i> = 383 Hz		41 - 55 cm	30 - 41 cm	22 - 27 cm	
P. Jambe de Fer	1556	<i>BBb, F, c, g</i>	<i>c, g, d', a'</i>	<i>g, d', a', e''</i>	<i>Violons</i>
at <i>a'</i> = 375 Hz		101 - 126 cm	53 - 56 cm	(38) - 37 cm	
L. Zacconi	1592	<i>Bb, f, c', g'</i>	<i>f, c', g', d''</i>	<i>c', g', d'', a''</i>	<i>Viole da braccio</i>
at <i>a'</i> = 383 Hz		57 - 62 cm	41 - 41 cm	(30) - 27 cm	
Increased tuning range using roped-gut (catlin) bass strings					
French	after 1575	<i>BBb, F, c, g</i>	<i>c, g, d', a'</i>	<i>g, d', a', e''</i>	<i>Violons</i>
at <i>a'</i> = 375 Hz		80 - 126 cm	42 - 56 cm	30 - 37 cm	
Italian	after 1600	<i>Bb, f, c', g'</i>	<i>f, c', g', d''</i>	<i>c', g', d'', a''</i>	<i>Viole da braccio</i>
at <i>a'</i> = 383 Hz		45 - 62 cm	33 - 41 cm	24 - 27 cm	

New Italian tunings for fiddles

	<i>basso da braccio</i>	<i>tenore, contralto</i>	<i>violino</i>	<i>violino</i>
late 16th century at $a' = 383$ Hz			$c, [a, f], d''$ 41 - 41	g, d', a', e'' 30 - 37
beginning 17th century at $a' = 383$ Hz	G, d, a, e' 52 - 73 cm	c, g, d', a' 41 - 55 cm		

Baroque tunings for fiddles

French 1575 to 18th c. at $a' = 375$ Hz	BBb, F, c, g 80 - 126 cm	c, g, d', a' 42 - 56 cm	g, d', a', e'' 30 - 37 cm	<i>Violons</i>
from late 17th c. at $a' = 398$ Hz	BBb, F, c, g 77 - 119 cm	c, g, d', a' 40 - 53 cm	g, d', a', e'' 29 - 35 cm	<i>Violons</i>
Italian 17th and 18th c. at $a' = 383$ Hz	G, d, a, e' 52 - 73 cm	c, g, d', a' 41 - 55 cm	g, d', a', e'' 30 - 37 cm	<i>Violino and</i> <i>Viole da braccio</i>
17th and 18th c. at $a' = 383$ Hz	C, G, d, a, e' 72 - 73 cm			<i>Basso da braccio</i> with 5-strings
18th century at $a' = 383$ Hz	C, G, d, a 72 - 110 cm			<i>Violoncello</i>
Praetorius's Germany at $a' = 430$ Hz	F, c, g, d' 52 - 73 cm	c, g, d', a' 38 - 49 cm	g, d', a', e'' 27 - 33 cm	<i>Geigen</i> with Italian bass
	C, G, d, a 66 - 98 cm			<i>Geigen</i> with French bass
	FF, C, G, d, a 91 - 98 cm			<i>Gross Quint Bass</i> with 5-strings

Table 3: Suggested Typical String Stops

French fiddles	<i>basse</i>	<i>taille</i>	<i>haute-contre</i>	<i>dessus</i>
to before 1550	up to 63 cm	41 cm	less than 41 cm	27 cm
before 1550 to c.1575	over 92 cm	55 cm	50 cm	35 cm
c.1575 to 18th century	over 80 cm	42 cm	less than 42 cm	32 cm

Italian fiddles	<i>basso da braccio</i>	<i>tenore v d b</i>	<i>contralto v d b</i>	<i>violino</i>	<i>soprano v d b</i>
16th century	up to 62 cm	41 cm	less than 41 cm		27 cm
late 16th, early 17th c.	up to 62 cm	41 cm	less than 41 cm	32 cm	27 cm
17th century	62 (4-str), 72 (5-str) cm	41 cm	less than 41 cm	32 cm	

TABLE 4: FIDDLE STRING STOP LIMITS FOR PITCHES

Roped gut BASSES							Low-twist gut TREBLES							High-twist gut BASSES						
5-string Bass 88b, 72 cm @ 430 Hz							String stop (cm) = 21000/freq. (Hz)							A 4th higher than roped-gut basses						
low- est pitch	shortest string stop (cm)						high- est pitch	longest string stop (cm)						low- est pitch	shortest string stop (cm)					
	375	383	392	415	430	440		375	383	392	415	430	440		375	383	392	415	430	440
	Hz.	Hz.	Hz.	Hz.	Hz.	Hz.		Hz.	Hz.	Hz.	Hz.	Hz.	Hz.		Hz.	Hz.	Hz.	Hz.	Hz.	Hz.
c'	24	24	23	22	22	21	c'''	24	23	23	21	21	20	c'	30	30	29	28	27	27
b	25	25	24	23	23	22	b''	25	24	24	23	22	21	b	32	31	31	29	29	28
	26	26	26	24	24	23		26	26	25	24	23	23		33	33	32	31	30	29
a	28	27	27	26	25	24	a''	28	27	27	25	24	24	a	35	34	34	32	31	31
	29	29	28	27	26	26		30	29	28	27	26	25		37	36	35	34	33	32
g	30	30	29	28	27	27	g''	31	31	30	28	27	27	g	38	38	37	35	34	34
	32	31	31	29	29	28		33	33	32	30	29	28		40	39	39	37	36	35
f	33	33	32	31	30	29	f''	35	35	34	32	31	30	f	42	41	41	39	38	37
e	35	34	34	32	31	31	e''	37	37	36	34	33	32	e	44	43	43	41	39	39
	37	36	35	34	33	32		40	39	38	36	35	34		46	45	45	43	41	41
d	38	38	37	35	34	34	d''	42	41	40	38	37	36	d	48	48	47	45	43	43
	40	39	39	37	36	35		44	44	43	40	39	38		51	50	49	47	45	45
c	42	41	41	39	38	37	c''	47	46	45	43	41	40	c	53	52	51	49	48	47
B	44	43	43	41	39	39	b'	50	49	48	45	44	43	B	56	55	54	51	50	49
	46	45	45	43	41	41		53	52	51	48	46	45		58	57	56	54	52	51
A	48	48	47	45	43	43	a'	56	55	54	51	49	48	A	61	60	59	56	55	54
	51	50	49	47	45	45		59	58	57	54	52	51		64	63	62	59	57	56
G	53	52	51	49	48	47	g'	63	62	60	57	55	54	G	67	66	64	62	60	59
	56	55	54	51	50	49		67	65	64	60	58	57		70	69	67	64	63	62
F	58	57	56	54	52	51	f'	71	69	67	64	62	60	F	73	72	71	68	66	64
E	61	60	59	56	55	54	e'	75	73	72	68	65	64	E	77	75	74	71	69	67
	64	63	62	59	57	56		79	78	76	72	69	67		80	79	78	74	72	71
D	67	66	64	62	60	59	d'	84	82	80	76	73	72	D	84	83	81	78	75	74
	70	69	67	64	63	62		89	87	85	80	78	76		88	87	85	81	79	78
C	73	72	71	68	66	64	c'	94	92	90	85	82	80	C	92	91	89	85	83	81
BB	77	75	74	71	69	67	b	100	98	95	90	87	85	BB	97	95	93	89	87	85
	80	79	78	74	72	71		106	104	101	96	92	90		101	100	98	93	91	89
AA	84	83	81	78	75	74	a	112	110	107	101	98	95	AA	106	104	102	98	95	93
	88	87	85	81	79	78		119	116	114	107	103	101		111	109	107	102	99	98
GG	92	91	89	85	83	81	g	126	123	120	114	110	107	GG	116	114	112	107	104	102
	97	95	93	89	87	85		133	130	127	120	116	114		122	120	118	112	109	107
FF	101	100	98	93	91	89	f	141	138	135	128	123	120	FF	128	125	123	118	114	112
EE	106	104	102	98	95	93	e	150	146	143	135	130	127	EE	134	131	129	123	120	118
	111	109	107	102	99	98		158	155	152	143	138	135		140	138	135	129	125	123
DD	116	114	112	107	104	102	d	168	164	161	152	146	143	DD	146	144	141	135	131	129
	122	120	118	112	109	107		178	174	170	161	155	152		153	151	148	141	137	135
CC	128	125	123	118	114	112	c	188	184	180	170	164	161	CC	161	158	155	148	144	141

Pitch standards: a'=375 Hz was French Ton de Chappelle, a'=383 Hz was Catholic German Chorthon and Italian Corista, a'=430 Hz was Lutheran German Cammerthon, a'=440 Hz is modern, a'=415 Hz is a semitone below modern and a'=392 Hz is a tone below modern.

To extrapolate beyond the range given, there is a factor of 2 in the longest string stops in the central table for every 12 semitones, and in the shortest string stops in the other tables for every 15 semitones.

The approximation of equal temperament is used in these calculations.

The Early Development of Sixteenth Century Viols

The beginnings

This is basically a retelling of the story of the early development of the viol in Spain and Italy, originally told by Ian Woodfield in his book *The Early History of the Viol* (1984, Cambridge University Press). It takes the evidence he collected rather more seriously, and presents a much more focussed picture of how the instrument developed, with explanations that make historical and technological sense of the evidence. The only reason why this has not been done before is that researchers have expected the evidence to indicate that early viols were played like late viols, and they have become confused by the evidence not agreeing with that expectation.

The viol was developed in 15th century Spain as a soloistic instrument, to be either plucked (or strummed) as a lute or bowed. As a bowed instrument, it could only produce the non-projecting humming sound resulting from bowing the strings at a distance from the bridge of about a quarter or a third of the string length between the bridge and the nut. This is because a low glued bridge made the strings lay so close to the soundboard that bowing was confined to the narrow part of the body at the waist cutout. This kind of bowed sound was acceptable in the 16th century, but not today. All eleven strings in five courses were bowed simultaneously. A long neck with almost an octave of frets allowed bowed chords to be able to move up and down the fingerboard with the melody.

Late in the 15th century, when players were willing to abandon the option of plucking the instrument like a lute, some design features convenient for bowers could revert to what they had been on fiddles. By replacing the glued bridge with a tailpiece and movable bridge (Woodfield plates 33, 35, 38, 40, 45 and 46), the height of the bridge could be varied. With a higher bridge, an added overhanging fingerboard could restore a reasonable action (Woodfield plates 38 and 46). If the bridge was high enough, the bowing position can be freed from being at the waist cutout (Woodfield plates 38, 45, 53 and 54). Varying the position of the bridge seems not to have been wanted, as demonstrated by a rose not far above the bridge often cut into the soundboard, preventing the bridge from being moved closer to the waist cutout (Woodfield plate 33). A curved bridge is shown in one picture (Woodfield plate 38), which could have represented an isolated use of a different fiddle characteristic, or it could represent a restorer's concept of what had originally been in the quite deteriorated painting.

To make playing easier, the number of strings could be reduced from the original 11 in five courses to 8 in four courses (Woodfield plates 40 and 44) or 6 in three courses (Woodfield plate 35 and perhaps 45). In 1493 there was a report of two Spanish players from Rome playing 'viols almost as large as myself'. These double-size viols are not seen in surviving Spanish pictures, so it is likely that they were developed in collaboration with Italian makers.

Further development was in Italy. Spanish influence there at the time can be associated with Spanish political domination of much of the country. As the viol spread in Italy, local makers only used movable bridges which were high enough so that the player could choose where on the strings to bow. For a short time around 1500, viols in Ferrara exploited this freedom to design body shapes without the waist cutout (Woodfield plates 53 and 54). All strings were still bowed simultaneously, paired, and with the bridges flat.

By 1505, an Urbino painter depicted a viol (Woodfield plate 52) with 6 single strings having two movable bridges, a flatter lower one just kept in place by the strings, and a working higher one that was more curved. Bowing was near the working bridge, giving a more modern projecting sound. Subsequent Italian viols had single strings and a choice of bridges with different top curvatures. A bridge with small curvature (as was used on the *lira da braccio*) was for chordal playing (as before), but now with a choice between three and more strings bowed (by varying bow pressure, or more usually by varying the distance of the bowing

position from the bridge) and a choice of which string will be the highest or lowest in the chord. The number of strings could be increased to 6, increased that choice, without increasing playing difficulty. A greater bridge curvature was to allow bowing single strings close to the bridge. The bridge was close enough to the waist cutout to allow strong playing on the end strings in this mode of playing. With such a curved bridge a chordal mode was also available, with a varying number of strings involved, when bowing was further from the bridge.

Up to after 1510, all viol pictures still showed the original proportion of body to neck length, with the curve of the upper part of the body approaching the neck perpendicular to it, as with most fiddles. By about 1510 (Woodfield plate 49 and 63, and plate 42 in Remnant's book *Musical Instruments of the West*, 1978, Batsford), there was a change in the curve of the upper part of the body approaching the neck. Near the neck, the curve changed from convex to concave so it became continuous with the sides of the heel of the neck. This design change, associated with a deeper body and the introduction of the upper-bout backfilled, stabilised the body-neck joint, especially needed for large lightly-made instruments.

By about 1515 (Woodfield plate 49), most Italian viols were produced with larger bodies which allowed only 7 or 8 frets tied on the neck. Enhancing resonance at lower pitches appears to be why the body was enlarged. The reduction in the number of tied frets was not a sacrifice since, with a choice between which string was at the top or bottom of the chord, higher position chords were less necessary. The higher notes were still available unfretted on the overhanging fingerboard.

Viols in different sizes

As mentioned above, a pair of double-size viols playing together was reported in 1493. This is the first surviving evidence of more than one viol playing together. Observing the above chronology, the strings were probably paired in 3, 4 or 5 courses, the body was small for the length, and the bridge was flat, resulting in all-chordal playing. A similar report of particularly large viols played by a pair of musicians from Naples (ruled then by Aragon) dates from 1505. By about 1510, a wall painting in a church in Ferrara (plate 42 in Remnant's book, as mentioned above) shows a pair of such large viols playing with a fiddle, a rebec and a *viola da mano*. By then, as expected, the bridge was higher up the soundboard (closer to the waist cutouts), and was somewhat curved. Nevertheless it was being played chordally, as evidenced by the high bow position, which was about a third of the string length away from the bridge, higher than the waist cutouts.

The above-mentioned 1493 report was sent to Isabella d'Este. By 1499, Alfonso d'Este ordered 5 viols from the maker Lorenzo da Pavia, and he played one in 1502 in the festivities associated with his marriage to Lucrezia Borgia. He played in a group of 6 viols. This is the first evidence of a set of more than two viols probably playing polyphony together. One would expect two to have been of original size, two of the double size, and two (newly invented) of intermediate sizes. It is much more probable that each viol was played chordally than that it was played melodically on single strings. This is because innovations usually happen one at a time, and there needs to have been a previous practice developed that was copied by the German sets of viols that were played only chordally, as illustrated by Agricola in 1529.

There was an explosion of the availability of a repertoire of vocal polyphony early in the 16th century because of the development of printing. Vocal polyphony became the lingua franca for the circulation of compositions at the time. The viols seem to have been the first instruments to exploit this availability for purely instrumental performance by sets of three or four sizes of the same instrumental type, and other instruments soon followed. Some players played this repertoire chordally, while others played it melodically. More advanced players probably either played it chordally or played it melodically in a highly ornamented way, or both. Beginners would play it melodically more simply. This situation seems to have continued through most of the 16th century.

The Tunings of Viols in Sets, and their Sizes

Tunings and playing the music

The growth of sets of the same type of instrument in different sizes early in the 16th century was generally for the purpose of playing repertoire that was available as parts for singing. The parts were usually written on 5-line clefs, where one of the lines had a symbol indicating that it represented the g' , c'' or f note. These clefs are now called G, C or F clefs respectively, followed by a number which indicates which line, from the lowest, on which the symbol is located. Thus G2 is the treble clef and F4 is the bass clef. The other clefs usually used then (with modern names) were C1 (soprano), C2 (mezzo soprano), C3 (alto), C4 (tenor) and F3 (baritone). Common clef combinations for vocal polyphony used then were C1, C3, C4 and F4, (later called *chiavi naturali*) and G2, C2, C3 and C4 or F3 (later called *chiavette*).

Because musicians then were comfortable with using this variety of clefs, if the music went beyond the range of a clef, it was easier for them to change clef than to learn to read the notes specified by ledger lines. The ranges of individual vocal parts rarely exceeded an octave and a fourth. That is the range of a clef (from space below to space above) without ledger lines.

When fingerings of viols were given, they were chromatic, i.e. a different finger was indicated for each adjacent fret (semitone position) on the same string. The fingering hand was not needed to support the instrument, so changes in hand position were common, especially between the index finger at the first fret and at the second fret. Viols usually had seven frets, so the upper limit of the range that could be played on the frets was a fifth higher than the pitch of the highest string. To play the full range of the G2 clef, the highest string of the treble viol had to be at least as high as a c'' , and to play the full range of the C1 clef, the highest string had to be at least as high as a' . To play the full range of the F4 clef, the lowest string on the bass viol had to be at least as low as F .

clef	F4	F3	C4	C3	C2	C1	G2
highest pitch	b	d'	f'	a'	c''	e''	g''
lowest viol string for highest pitch	e	g	b	d'	f'	a'	c''
lowest pitch	F	A	c	e	g	b	d'

Most of the tunings shown on the Tunings Tables allow the players of a set of viols to play all of the available music (from the F4 to G2 clefs). A few Italian and German tunings are the exceptions, where the highest string of the treble viol was a' , or even as low as g' . There must have been some reason for these exceptions. I suggest that the reason was that these viols had to conform to pitch standards which were different from the most convenient music-reading pitch level for their sizes. This need resulted in them having to go to some trouble to cope with the highest notes that could be encountered in the music.

One way that the early 16th century Germans coped was stated by Gerle. They transposed the music down a fourth by assuming that the strings of their instruments were tuned a fourth higher. These are the alternative tunings given for Gerle and Munich ms 718 in the Table. When making this assumption, to be able to read the F in the F4 clef, Gerle suggested that one could add a C (untransposed) 6th string to the bass viol. Another way was mentioned in the 1545 edition of Agricola. That was his alternative tuning with a d'' highest string. A different alternative he mentioned was to add a d'' 5th string to the original tuning. These possibilities would probably imply that the instrument would then be smaller. Others probably coped either by transposing the music down a fourth by clef substitution (see another Comm. on this in this Q) or by just playing past the frets on their fingerboards whenever necessary.

In the 1528 edition Agricola, provided a set of 5-string tunings, and a set of 4-string tunings for viol sets. Only 4-string viols are shown in the illustration, which depict instruments with low glued bridges that could only be played chordally, bowing all strings at once. We can presume that the 5-string tunings were for a different kind of viol, where one can choose individual strings either to bow alone, or with chordal accompaniment (as with the Italian *lira da braccio*). Agricola mentioned that the set of 4-string tunings applied to a larger and smaller set of viols, and so the set of the size not

illustrated could have been different. The same illustration of a set of 4-string viols, chordally played, was printed in the 1545 edition, but in the text, the bass viol had a 5-string tuning with and 4-string tunings given for the other viols. No other viol tunings were offered. Since the bass tuning does not correspond with the illustration in number of strings, and a 5-string viol is more difficult to play fully chordally, the design of the viol with this tuning could well have been different, and appropriate for a curved bridge. The same could be said for the alternative 5-string treble viol. Since the viol illustration by Gerle does not show the bridge, this omission might have been a general habit, so it is possible that a low curved bridge was inserted between the glued-on bridge and the rose when Agricola's other 4-string viols were played, making playing of the set rather more up to date.

Tunings, pitch standards and sizes in general

Conforming to pitch standards would be appropriate if the viols played with other types of instruments or vocal ensembles. In Germany, Gerle indicated that the viols played with voices. Viol fingerboard charts in Agricola's 1545 edition marked fret positions that lute and cittern strings would be in unison with. These bits of evidence support the hypothesis that these sets of viols had low tunings to play at the normal pitch standard. Praetorius extensively mixed voices with different kinds of instruments, and defined the pitch standard that they all had to perform at (*Cammerthon*), which was less than half a semitone below modern.

Rousseau wrote that the English reduced the sizes of their viols (from the large sizes of Jambe de Fer's time) before the French did. This implies that viol sizes always had been somewhat standardised, and that there was a change in these standard sizes. The Talbot ms gave English viol sizes in Rousseau's time, and these are the same as Praetorius's viol sizes. Therefore, Praetorius's viols were of the more modern reduced sizes. With a *d*'' string on the treble viol in England and France (and some sets in Italy), these sizes allowed all vocal clefs to be played directly (without special coping methods) at a pitch standard about a tone below Praetorius's standard (called *Consort pitch* in England and *Ton de Chappelle* in France). This also was the main stringed-instrument pitch standard in Italy (*Corista*) and southern Germany (*Chorthon*), which were the main centres of viol making, and apparently where standards of viol design and sizes were set.

The pitch standard in Praetorius's Lutheran Germany, being a tone higher, would break top strings at these convenient tunings, so lower tunings were used. These tunings were nearly as low as they could be for those sizes (see Comm. 1545). His report of English viols tuning lower when playing alone place them also near the bottom of the range available, a minor third lower than their usual actual pitches (with the bass 6th string down a tone in the alternative tuning). His tenor and bass tunings were the same as Banchieri gave, and Praetorius's treble viol was a tone higher. Banchieri indicated that his viols were at the *corista* pitch standard (a tone lower than Praetorius's standard). Banchieri's GG-D-G set would have been an FF-C-F set in Praetorius's standard. Since Praetorius's GG-D-A set was tuned as low as it could go for the strings available, we can thus conclude that Banchieri's set of viols were larger. It is highly likely that all of the late Italian sets of viols conformed to the *corista* standard. Thus the viols in all of the GG-D-G late Italian sets were larger than the viols in all of the D-A-d late Italian sets.

These two sets of viol sizes could well be what Rousseau was writing about, with the large set resembling the usual sizes from the beginning, and with the smaller sizes a later development to easily play all of the clefs at the usual pitch standard. Tunings that did this were used from the beginning in Italy and France, but the sounding pitches of the strings would then have been lower than they would have been for those pitches at the normal pitch standard.

Ganassi made it clear that his only concern with pitch level was that that it worked for the combination of viols available. He advised that Gombert's advice in setting the pitch level of a choir applied to a set of viols. First priority was to avoid strain at the top of the treble. It is better that the bottom of the bass was a tone too low than the top of the treble was a semitone too high. Viol adjustments were primarily by how high or low on the soundboard the bridge was placed. Regulo 3 was when the treble and bass could still not stretch to be an octave apart, so the tunings were all a fourth apart. This was also the case with the tunings of Alfonso della Viola and the alternative one of Lanfranco. Regulo 2 was when the middle sizes worked better a fourth above the bass than a fifth above it. The Ordines were the sets of pitches one assumed the strings of the viols were at when reading music, with the 1st when the key had no flats, the 2nd when it had one flat and the third when it had two flats. The 3rd

Ordine made the left-hand fingering the same as the 1st, presumably to make the patterns of chording, ornamentation and division more familiar and easier because of the use of open strings. Alfonso della Viola used essentially the same system. Ganassi's alternative Regulo 3 1st Ordine set of assumed string pitches were to avoid a treble tuning including a *b^b* when there were no flats in the key.

Ganassi's Regulo 4 was a set of tunings for 5-string viols that he said most viol players used. Why only 5 strings? A likely reason for preferring it was that the viols could then conform to the *corista* standard and play with other instruments. Paintings of the period often show lutes playing with viols. It seems that at a proper pitch standard, the viol sizes were not of appropriate size to get a decent sound on a 6th string within the possible range of shifting the bridge position.

Ortiz wrote that viols used the *D-A-d* set of tunings and also that they were tuned to the harpsichord. If viol sizes had not yet dropped, the harpsichord must have then been tuned something like a fourth low, as the one illustrated by Praetorius was. Lanfranco also reported the *D-A-d* set of viol tunings, saying that the tenor was tuned like the lute. He could well have just recorded the nominal pitches that players called their strings, and was unconcerned about absolute pitches. So when he gave only relative pitches for the strings of the fiddles and the *lira da braccio*, this could have only meant that the players of these instruments all played by ear, and though they had a name for each string, these names did not include pitch names.

We do not know when smaller viol sizes became common. One cannot rule out the possibility that the reports of sets of string pitches by Ortiz or by Lanfranco were at the normal pitch standard, and that small sets coexisted with large sets throughout the 16th century. All one can say is that there is no clear evidence that this was the case. One rarely sees pictures of sets of viols, so when we do see viols, we usually can't distinguish between viols for playing polyphony in sets and soloistic viols that normally played on their own, accompanied the voice, or played with other instruments in a context that is not a set of viols.

Soloistic and outsize viols

The *pardessus* was an 18th century soloistic viol, smaller than any viol that played in sets. That size of soloistic viol appeared briefly twice before. Pictures of its appearance early in the 16th century are shown in Woodfield's plates 50 and 86. The other appearance is as the *sopranino* viol used in the 1589 *Intermedii*. It was mentioned as a type of treble viol by Zacconi, with the name *violetta picciola*. Praetorius, not being sure about what Zacconi meant by *violetta*, listed the name as both a viol and a fiddle. A surviving example by Giovanni Maria of Brescia is in the Ashmolean Museum.

There was a soloistic 6- or 7-string alto viol mentioned in the mid-17th century German A. S. ms at Edinburgh. It probably inspired the later soloistic alto viol called *viola d'amore*. There were many soloistic bass viols. English examples were the *lyra viol* (which originally seems to have had metal sympathetic strings) and the *division viol* (which often had a *basso da braccio* body). These were smaller than bass viols in sets, as were many that were just called *viola da gamba* and were used primarily for vocal accompaniment. Some of the latter type of bass viols (called 'bass' because they performed that function musically) were about the same size as the tenor viol that played in sets. Italian examples of soloistic basses were the *viola bastarda* (which apparently transformed into the *violoncino* in the 17th century), the *lirone* (chord-playing viols that appeared soloistically in Florentine *Intermedii*, but was used in sets of all sizes in Venice) and the *lyra da gamba* (also called *archiviola da lyra* or *lirone perfetto*). A *lirone* could only be distinguished from other viols by the curvature of its bridge, but a *lyra da gamba* had a distinctly different tuning and overall design.

The bass of the original large set of sizes survived even when the set of small sizes was adopted. It was called *Gross Bass Viol da Gamba* by Praetorius, and sometimes was used instead of the normal bass in that set (e.g. the *great dooble bass* in England). Praetorius also mentioned that it was sometimes used when viols played in size-shifted sets (with the normal treble omitted, the normal tenor size playing the treble part, the normal bass size playing the tenor part, and such a large bass playing the bass part). Under the name *violone*, this large bass was a very important continuo instrument in the baroque, and it survives (with appropriate modernisations) as the double bass of today.

Early in the 17th century, a viol of even larger size was made that sometimes was used instead of the

normal bass of the large set. Praetorius called it *Gar gross Bass-Viol*, and Banchieri called it *contrabasso violone*. Banchieri mentioned that it was sometimes used in size-shifted sets. It also survived as a continuo instrument after sets of viols went out of fashion, and can be seen playing in the orchestra on paintings of 18th century French and Italian opera performances.

Tunings, pitch standards and sizes in particular

The only direct information that we have on the sizes of viols in sets are the measurements in the Talbot ms and the scaled drawings published by Praetorius. From Praetorius's nominal pitches of gut-strung instruments, the pitch standard that can be deduced from his set of pitch pipes, and the string stops measured from the scaled drawings, we can deduce that when the highest gut string was tuned as high as it could go, the string stop (in metres) multiplied by the frequency (in Hertz) was within a few percent of 210 (metres/sec). When discussing the bass viol, Playford indicated that the first string was as high as it could go. From the proportions in string stops given in Mace, and from the Talbot measurements, we know that this also pertained to the other sizes of English viols, and that the English pitch standard used by viols was a tone below that of Praetorius.

For the highest pitch limits of instruments, the above relationship between tuning frequency and string stop is remarkably simple because low-twist gut strings have a tensile strength that is independent of diameter, and there was a consensus amongst musicians about what was the maximum tolerable rate of breakage of their highest strings. The lowest pitch limits are a bit more complicated, depending on the maximum tolerable inharmonicity (which reduces the number of harmonics, and so focus is lost) in the sound of the lowest string. For the same inharmonicity limit on different instruments, the frequency is proportional to the string diameter divided to the square of the string stop. In a family of instruments, the tension tends to be proportional to string stop. Combining these relationships with the Mersenne-Taylor Law, we find that the frequency is proportional to the string stop to the 4/5 power. So if we can identify a lowest string on a member of a family that is at the limit of tolerable inharmonicity, from its frequency and string stop, we can calculate the minimum string stop of other members of the family from their lowest frequencies.

The viol depicted by Praetorius with the maximum open-string range, and thus with the worst but still acceptable inharmonicity on its lowest string, is the *viola bastarda*. From its string stop and the frequency of its lowest string, we can calculate that the minimum string stops from the viol lowest pitches for different family members.

At Praetorius's pitch standard, the relevant limits calculate to be:

highest pitch	<i>G</i>	<i>c</i>	<i>d</i>	<i>f</i>	<i>g</i>	<i>a</i>	<i>d'</i>	<i>g'</i>	<i>a'</i>	<i>c''</i>
maximum string stop (cm)	220	164	146	123	110	98	73	55	49	41
lowest pitch	<i>DD</i>	<i>EE</i>	<i>GG</i>	<i>AA</i>	<i>BB^b</i>	<i>D</i>	<i>G</i>	<i>A</i>	<i>d</i>	<i>f</i>
minimum string stop (cm)	101	92	80	73	70	58	46	42	33	29

At a pitch standard a tone lower than Praetorius, the relevant limits calculate to be:

highest pitch	<i>d</i>	<i>g</i>	<i>a</i>	<i>b</i>	<i>c'</i>	<i>d'</i>	<i>g'</i>	<i>a'</i>	<i>c''</i>	<i>d''</i>
maximum string stop (cm)	164	123	110	98	92	82	62	55	46	41
lowest pitch	<i>DD</i>	<i>GG</i>	<i>D</i>	<i>E</i>	<i>G</i>	<i>A</i>	<i>c</i>	<i>d</i>	<i>f#</i>	
minimum string stop (cm)	111	88	64	58	51	46	40	37	30	

These maximum string stops are for the same inharmonicity limits for the same kind of bass string that was available to Praetorius, which was roped gut. These strings became available in the final quarter of the 16th century. So these minimum string stop figures are only relevant for tunings from that period and later.

The limits of string stops of the small set of sizes, at the Italian, English and French pitch standard and tunings, were thus 64-82 cm for the *D-d'* bass, 51-62 cm for the *G-g'*, 46-55 cm for the *A-a'* and 40-46 cm for the *c-c''* middle sizes, and 37-41 cm for the *d-d''* treble. The English usually used the maximum string stops for their tunings, probably because viols were interchangeable with voices in performance, and the bass sound from a large bass viol better matched the brightness of a bass voice. It is likely that the Italians and French did the same. Thus for the small sets of viols, the standard

string stops (to the nearest 5 cm) were about 80 cm for the bass, 60, 55 and 45 cm for the middle sizes tuned in G, A and c respectively, and 40 cm for the treble.

Praetorius used his small-set viols differently. His viols had double purfling, a consistent characteristic of English viols, which were considered the best ones in his time. The bass that he depicted had a string stop of only 75 cm. It was probably an English soloistic bass, smaller than the usual set bass, being used as one. For that size, the pitch of the lowest string would have to have been at least as high as AA. Thus the BB^b -a tuning that he gave was most probably for viols of this size. In his discussion though, he indicated that a pitch of GG-g was normal. This would be acceptable for a viol with the normal small-set bass 82 cm string stop. The string stops of his *Tenor-Alt* and *Cant* were 58 and 40 cm respectively, within normal expected variation in the standard sizes. The *Tenor-Alt* just fits into the bottom of the range for its D-d' tuning, and the *Cant* tuning of A-a' extends almost a semitone below the acceptable range for its string stop. The latter does happen with treble and alto viols and fiddles in sets, and a reasonable explanation of this is that don't play their lowest strings melodically, and when they are played in chords, the note on the lowest string is not exposed.

The late Italian tunings for the large sets were GG-g, D-d' and G-g'. It is likely that the smaller viols of this set were tuned as high as they could go, as with the small set. So the middle and small members would have string stops of about 80 and 60 cm. The range of string stops for the GG-g tuning of the bass calculates to be 88-133 cm. Here, the size needs to be small enough to be readily playable, and a string stop of about 100 cm seems to be an appropriate compromise.

Before the last quarter of the 16th century, only high-twist gut bass strings were available for most viols. Inharmonicity is worse in high-twist than in roped gut strings, so the lower pitch limit for high-twist gut that gives the same just-acceptable inharmonicity would be higher. To determine this limit properly, we would try to identify the viol that reaches the limit. The maximum open-string range of viols in this period was two octaves, and all sizes had it. Since the pitch range between the upper and lower limits contracts with decreasing string stop, the treble viol would have the tightest fit. Therefore the 6-course treble viol could be the instrument that reaches the lower limit. Problems with this choice are that we have no evidence of its string stop, and that there is the possibility that the lowest string was lower than the range limit, used only in chords where it is not exposed.

It was previously argued that treble viols with a tuning that could not easily play all of the clefs endured this disadvantage because they were adhering to a pitch standard to play with non-viols. These were 5-string viols. In general, when roped gut bass strings became generally available, lutes expanded their open-string ranges by a fourth, and the viol that used an expanded range, the *viola bastarda*, also did that by a fourth. So we can estimate that before then, the acceptable range of viols should be about a fourth less than afterwards.

On this assumption, the string-stop ranges for the D-a bass calculate to be 80-110 cm, the G-d' middle sizes to 64-82 cm, and the d-a' treble to 46-55 cm. Thus a reasonable rough estimate of the string stops of the four sizes would be 100, 80, 70 and 50 cm. The larger open-string range of viols with 6 strings leave much less leeway. If they happened to be tuned (at the normal pitch standard) to BB^b , b^b , F f' and B^b b', a major third below their nominal pitches of D-d', A-a' and d-d'', they would have had string stops of about 100 (97-104), 70 (70-69), somewhat less than 70, and 50 (55-52) cm. What was usually the case then could not have been much different from this.

The sizes of the surviving Renaissance viols can readily be explained by this theory. A difficulty that modern viol players would have in accepting it is that, with modern viol sizes being about 70, 50 and 35 cm, they have been in the habit of calling the surviving Renaissance 70 and 50 cm sizes 'bass' and 'tenor', while this theory indicates that it would be more historically correct for them to be called 'tenor' and 'treble'. The modern size set was developed by Arnold Dolmetsch early in the 20th century. The treble and tenor sizes were scaled from 17th century solo bass viols that survived because they could be played later as cellos. The resulting sizes were what Dolmetsch wanted since his ideology was that early instruments offered unique sonorities which should play a full part in modern music, and so they had to conform to the modern pitch standard.

Italian Tunings of Viols in Sets

Date	Source	Basso	Tenore & Contralto	Soprano	for keys
1533	Lanfranco alternative bass	<i>D G c e a d'</i> <i>E A d f# b e'</i>	<i>A d g b e' a'</i>	<i>d g c' e' a' d''</i>	
1536	ms add Savanarola bk (Alfonso della Viola)	<i>E A d f# b e'</i> <i>D G c e a d'</i>	<i>A d g b e' a'</i> <i>G c f a d' g'</i>	<i>d g c' e' a' d''</i> <i>c f b b d' g' c''</i>	with no flats with flats
1542	Ganassi Reg 1 Ord 1, 2 Regulo 1, Ordine 3	<i>D G c e a d'</i> <i>C F B b d g c'</i>	<i>G c f a d' g'</i> <i>F B b e b g c' f</i>	<i>d g c' e' a' d''</i> <i>c f b b d' g' c''</i>	no & one flat two flats
	Regulo 2, Ordine 1, 2 Regulo 2, Ordine 3	<i>D G c e a d'</i> <i>C F B b d g c'</i>	<i>A d g b e' a'</i> <i>G c f a d' g'</i>	<i>d g c' e' a' d''</i> <i>c f b b d' g' c''</i>	no & one flat two flats
	Regulo 3, Ordine 1, 2 alternative Ordine 1	<i>D G c e a d'</i> <i>E A d f# b e'</i>	<i>G c f a d' g'</i> <i>A d g b e' a'</i>	<i>c f b b d' g' c''</i> <i>d g c' e' a' d''</i>	no & one flat no flats
	Regulo 3, Ordine 3	<i>C F B b d g c'</i>	<i>F B b e b g c' f</i>	<i>B b e b a b c' f b b'</i>	two flats Pitch std probably -2
	Regulo 4 (5 strings)	<i>D G B e a</i>	<i>G c f a d'</i>	<i>d g c' e' a'</i>	
	if only four strings left	<i>F A d g</i>	<i>c e a d'</i>	<i>g b e' a'</i>	
	if only three strings left	<i>F c g</i>	<i>c g d'</i>	<i>g d' a'</i>	
1553	Ortiz	<i>D G c e a d'</i>	<i>A d g b e' a'</i>	<i>d g c' e' a' d''</i>	
1587	Marinati	<i>D G c e a d'</i>	<i>A d g b e' a'</i>	<i>d g c' e' a' d''</i>	probably -2
1592	Zacconi	<i>GG C F A d g</i>	<i>D G c e a d'</i>	<i>G c f a d' g'</i>	probably -2
1601	Ceretto	<i>D G c e a d'</i>	<i>A d g b e' a'</i>	<i>d g c' e' a' d''</i>	probably -2
1609	Banchieri plus a <i>violone contrabasso</i>	<i>GG C F A d g</i> <i>DD GG C E A d</i>	<i>D G c e a d'</i>	<i>G c f a d' g'</i>	-2
1613	Cerone	<i>GG C F A d g</i>	<i>D G c e a d'</i>	<i>G c f a d' g'</i>	probably -2
1635	Mersenne's informant	<i>D G c e a d'</i>	<i>A d g b e' a'</i>	<i>d g c' e' a' d''</i>	probably -2

French Tunings of Viols in Sets

	<i>Bas</i>	<i>Taille & Hautecontre</i>	<i>Dessus</i>	<i>Pitch std</i>
1556 Jambe de Fer	<i>E A d g c'</i>	<i>B e a d' g'</i>	<i>e a d' g' c''</i>	
1589 Mareschall	<i>E A d g c'</i>	<i>B e a d' g'</i>	<i>f# b e' a' d''</i>	
1635 Mersenne	<i>D G c e a d'</i>	<i>G c f a d' g' c f b^b d' g' c''</i>	<i>d g c' e' a' d''</i>	probably -3
1687 Rousseau	<i>D G c e a d'</i>	<i>G c f a d' g' c f b^b d' g' c''</i>	<i>d g c' e' a' d''</i>	probably -2

German Tunings of Viols in Sets

	<i>Bassus</i>	<i>Tenor & Altus</i>	<i>Discantus</i>	<i>Pitch std</i>
1523 Munich ms 718 alternative	<i>D G B e a</i> <i>G c e a d'</i>	<i>G c e a d'</i> <i>c f a d' g'</i>	<i>d g b e' a'</i> <i>g c' e' a' d''</i>	probably -2 probably -7
1528 Agricola	<i>G c f a d' g'</i>	<i>c f a d' g'</i>	<i>f a d' g' c''</i>	
chordal playing only	<i>G c f a</i>	<i>c f a d'</i>	<i>g c' f a'</i>	
1532 Gerle	<i>D G B e a</i>	<i>G c e a d'</i>	<i>d g b e' a'</i>	probably -2
alternative	<i>G c e a d'</i>	<i>c f a d' g'</i>	<i>g c' e' a' d''</i>	probably -7
alternative bass (add C)	<i>F G c e a d'</i>			probably -7
1545 Agricola - 4-string viols probably mostly chordal alternatives	<i>F A d g b</i> <i>F G c e a</i>	<i>c e a d'</i>	<i>g b e' a'</i> <i>c' e' a' d''</i>	probably -2 probably -2
1619 Praetorius	<i>GG C F A d g</i>	<i>D G c e a d'</i>	<i>A d g b e' a'</i>	0
<i>Klein bass alternatives</i>	<i>GG C E A d g</i>			
	<i>BB^b D G B e a</i>			
<i>Gross bass</i>	<i>EE AA D G c</i>			
<i>alternatives</i>	<i>DD GG C E A d</i>			
	<i>EE AA D G c f</i>			
<i>Gar gross Bass</i>	<i>DD EE AA D G</i>			
c.1650 A.S. ms Edin. Univ.	<i>GG C F A d g</i>	<i>D G c e a d'</i>	<i>f b^b d' g' c''</i>	0
altern. bass, alt. disc	<i>AA D G B e a</i>	<i>G c f a d' g'</i>	<i>d g b e' a'</i>	

English Tunings of Viols in Sets

	<i>Bass</i>	<i>Tenor</i>	<i>Treble</i>	
1603 Robinson (viol tablature pitching singing)	<i>D G c e a d'</i>	---- <i>d' g'</i>	-- <i>c' e' a' -</i>	-2
1619 Praetorius - English viols when playing alone	<i>GG - - - - -</i>	<i>D - - - - -</i>	<i>A - - - - -</i>	0
1674 Playford	<i>D G c e a d'</i>	<i>G c f a d' g'</i>	<i>d g c' e' a' d''</i>	-2
alternative bass	<i>C G c e a d'</i>			
1676 Mace	<i>D G c e a d'</i>	<i>G c f a d' g'</i>	<i>d g c' e' a' d''</i>	-2
1694 Talbot ms - (probably copied from Mersenne)	<i>D G c e a d'</i>	<i>A d g b e' a'</i>	<i>d g c' e' a' d''</i>	-2

1999 FoMRHI List of Members — 1st Supplement as at 6 July 1999

in left hand margin = change of address or other change

A in the left-hand margin = apologies for omission!

- A Giuseppe Alfonso, Savignano 5, I-50049 Vaiano-Firenze, Italy; 0574-946173 (recrdr; M).
- # Ander Arroitauregi Aranburu, Ifar-Kale 4-3º, E-20600 Eibar, Spain; +34-943-202783; *arroitaja@jet.es* (gmb, lute, vih, vln; M,R).
- A Philippe Beltra, Pörlinghof 3, A-9311 Kraig, Austria.
Bodleian Library, Dept of Printed Books, Broad Street, Oxford, OX1 3BG, UK; 01865-244675.
- A Eckhard Böhringer, Straubinger Str. 11, D-94342 Strasskirchen, Germany; 09424/328 (tpt, crnett, soprano pos).
- A Peter Brook, 5 Grasmere Road, Beeston, Nottingham, NG9 3AQ, UK; 0115-925-3553 (bowd, plckd str instrs, esp Arabic rabab; P, M).
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- # Nick Clatworthy, 2 Henderson Close, Hastings, E.Sussex TN34 2DU, UK.
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- # Julian Goodacre, *goodacres@cwcom.net*
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- # Russell D Johnsen, +618-9386-6168; *russjohn@rph.health.wa.gov.au* (vln fam, early bowd str, M, P; hrdy-g, P).
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Pascual Vázquez Cruz, Ave Castilla-la Mancha 19-4ºA, E-16003 Cuenca, Spain; 969-234096 (hrp, lute, zithr; M, aficionado).
- A Timothy Woods, 17 Westbourne Road, Trowbridge, Wilts BA14 0AJ, UK; 01225-754384 (recrdr, bar trav, bar vla; M, P, coll).

I have had to change the sign for changes of address etc to # because of the besotted idiocy of this machine whenever a line starts with an *.