Quarterly No. 100, July 2000

FoMRHI Quarterly

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COMMUNICATIONS


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FELLOWSHIP OF MAKERS AND RESEARCHERS OF HISTORICAL INSTRUMENTS

Honorary Secretary:
Retiring: Jeremy Montagu, 171 Iffley Road, Oxford OX4 1EL, U.K., From next Quarterly: Lewis Jones, London Guildhall University, 41-71 Commercial Road, London E1 1LA, U.K.
Hon. Sec. & Hon. Ed.: Well, the election was rather a non-event in the end. There were two pairs of nominations, here in order of receipt: for Honorary Secretary, Jeremy Montagu and Lewis Jones; for Honorary Editor, Ephraim Segerman and David Armitage. Jeremy Montagu and Ephraim Segerman refused to stand for re-election (though appreciating and grateful for the compliment implied), and as a result Lewis Jones and David Armitage are automatically declared elected.

Both Lewis and Dave teach at London Guildhall University (for the benefit of those who’ve been out of touch, this now includes what used to be called the London College of Furniture, and it is still the best place in the UK to learn instrument making). Their addresses are Lewis Jones (FoMRHI), London Guildhall University, 41-71 Commercial Road, London E1 1LA, UK; 020-7320 1841; fx 020-7320 1830; ljones@lgu.ac.uk and David Armitage (FoMRHI) at the same address; 020-7320-2844; fx 020-7320 1830; armitage@lgu.ac.uk. There is a Comm from Lewis herewith setting out some of his ideas; from what I’ve already heard from him, FoMRHI will go from strength to strength with a new impetus from the next generation.

They will take over between this Q and the next, though it may be a slightly continuous process; I’ve offered to help, for instance, at the Early Instrument Exhibition at the RCM as usual (for which see below). In effect, however, they will be in post when you receive this Q so do please note the above addresses. And as far as I’m concerned, ‘no flowers by request’ – I have been flattered by remarks from some of you and grateful for them, but please don’t take this as the opportunity to write obituary-style notes!

Hon. Treas.: Barbara is still with us as Treasurer, and I do now have a new address for her: Barbara Stanley, 79 Stanley Avenue, St. Albans AL2 3AQ; 0172 7-832174; b.stanley@net.ncl.com – the same email seems still to be working.

Thank you to the large number of people who offered to accommodate the back Qs for her. Peter Bavington is housing them and is willing to send them out when requested. So order from him (Unit B 114, 8-10 Creekside, London SE8 3DX, UK; +44 (0)20 8694 1477; peterbav@nildram.co.uk) with cheque to FoMRHI which he’ll send on to Barbara.

The possibility of a CD-Rom for the first 100 Qs remains open and our successors can discuss that along with other projects. Certainly one of Lewis’s suggestions is absolutely right: our initial ideas of FoMRHI as ephemeral and a place for kite-flying, to be followed up by definitive publication in a more formal journal, has over the years gone by the board. There is an enormous amount of important material in our pages, and FoMRHI is now as much a journal of record as any of the others in our field. Therefore it is more than time that it was available in major libraries (something that I used to discourage) and other sources as well as on the shelf above the workbench. CD-Rom, the www and other such modern methods will assist in this. If, for example, we can scan 100 Qs and all their contents into a CD-Rom, then why not post them on the Web as well? I hope that our successors will have the skills (I certainly haven’t) as well as the enthusiasms needed for such projects.

List of Members: This year’s list comes with this Q. Sorry it’s a Q later than usual, but as I told you last time, there were then still many renewals to come in. As always, please send any corrections, additions etc, this time to Lewis, not to me. Entries are getting so long, what with fax and email, that I’ve saved a bit of space on some entries by not repeating all the details for fax num-
bers, but just putting in the figures after the last hyphen of the phone number. I think the result will be clear — I hope so, anyway.

In Memoriam: Peter Collins of Ware has died. He had been a member since 1977.

Lost Members: Ekhard Bohringer and Boleslaw Bielawski are still missing and so now is Göran Arnoldsson — any new address for him or the others will be gratefully received by Lewis. The mystery member noted last time has been identified — it was a non-member colleague paying on behalf of a friend.

Further to: David Smith’s Comm herewith: This is the best idea for archiving the Qs that I’ve seen, far better than my method, which was simply punching a pair of holes in the normal places and putting them in a suitably equipped binder.

Perhaps an example to be followed: A press release from the Malvern Hills College advertises Padraig Ó Dubhlaoidh’s courses on string instrument making (for information on which contact either him in our Members’ List or the College, Albert Road North, Malvern, Worcs WR14 2TW; 01684-363351; fx -361767; malvernhills@lineone.net) as ‘the only specialist accredited conservator of stringed instruments in the country’. This is presumably on the basis of his membership of UKIC (the United Kingdom Institute for Conservation of Historic and Artistic Works). Remembering the days when I used to be asked whom to recommend for a conservation job, more of you might consider UKIC accreditation. There are many small museums who cannot afford a permanent staff conservator but who need work done, and often they can only get grants for such jobs if they use an accredited conservator. If Paddy is the only one in this country for string instruments, it means that there is a dire need for more. I have never been able to agree with some of my museum colleagues that any trained conservator can cope with any task that comes up — it’s the same line as we used to hear about trained teachers: if you’re a trained teacher you can teach anything, and if you’re a trained conservator you can conserve anything, to which I’d reply that if so you can work on somebody else’s violin, lute, harpsichord, or sitar, not mine! I don’t think that I’m alone in believing that one does need to know something about an instrument and how it was made and put together before touching it, especially about its history so that one can recognise what was original work and what is later accretions, and which of those it may be important to preserve. But if there are no accredited conservators who are instrument specialists, then museums can only turn to the generalists because they cannot get grants for work done by those who are not accredited. Some of you may remember this coming up many years ago, when I was much abused for suggesting that we should go into the UKIC’s accreditation scheme. We didn’t, and as a result there is only one accredited conservator. All strength to him for going it alone and gaining the accreditation.

Consultation: The government is also pushing all sorts of things in that line. The most recent such document I’ve had was from the Office of Science and Technology on ‘Foresight – making the future work for you: We can make it – a consultation document’ put out by the Manufacturing 2020 Panel, copies of which are available from a fax number 020-7215 6715. It’s full of things like Redefining Manufacturing, Manufacturing to a Unit of One, The Impact of the Internet, and so on, but it is addressed to makers as individuals, rather than to the big firms, and it’s always possible that grants are or may become available. There was a long questionnaire, which they wanted back within the month of May but it may still be worth getting in touch and putting your own point of view. I sent them an email response, which you may like to see (and to which there has been no reply) (dti, by the way, is the Department of Trade & Industry):
To: kerry.mashford@dti.gsi.gov.uk; Subject: Foresight Manufacturing 2020; Mon, 8 May 2000.

Because we are a Fellowship of Makers & Researchers of Historical [Musical] Instruments, our members are essentially one-off, craftsman-making manufacturers. This is sufficiently foreign to your questionnaire that I hope you will forgive this unformatted response. It seems worth making because it, and similar products, offer hope to unemployed craftsmen and to those who do not fit easily into mass manufacturing. It is also a high-value trade with a very considerable export potential.

What is most needed is encouragement, through tax concessions, to revive the old practice of apprenticeship. There is very limited opportunity for training in the necessary skills now that all polytechnics have become universities -- the chap who wants to get down to the lathe, etc, cannot learn how to do so in such institutions unless he has the requisite A-levels to study the theory as well as the practice (I am myself an external examiner for one of them and see the resulting problems at first hand).

However, single-handed makers cannot afford at present to take apprentices -- they take time and attention, which means the loss of working time, and as soon as they begin to be useful, they vanish to open their own workshops. With tax relief for such work, it could become worth the maker's while to train such apprentices through their early years.

We all realise that this is only a very small economic area, but it is one in which we have a world-wide market lead in this country and it is one which can give great personal satisfaction to young people and which can alleviate an appreciable amount of unemployment.

Regarding the impact of the internet, the barrier which we all need to have addressed is the excessive cost of its use, i.e. the cost of telephone access.

**Things available:** A firm called Peterson Electro-Musical Products Inc wrote to me recently, saying that they had discovered our existence through the Internet and thought that we might be interested in their strobe tuners which are accurate to within 0.1 of a cent or better and which offer historical temperaments and also stretched octaves etc for use with keyboards. They enclosed a brochure which included some things so like the old StroboConn and StrobO-Tuner that I emailed them querying this. They did indeed purchase the Conn Strobe Tuner product line, and they will service and repair Conn machines. As I had guessed, their new machines are all transistorised and don’t need the 30 minute warm up period which was essential with the old Conn machines for precise accuracy. They aren’t cheap (the Strobe Center 5000, which equates with the old StroboConn, and will show the pitch of several notes simultaneously, costs $4,300), running from $825 up, but I can say from many years’ familiarity with the Conn machines that nothing beats a strobe tuner for accuracy and ease of use. If you’re interested they are at 11601 South Mayfield Avenue, Alsip, IL 60803-2476; *(1-(708)-388-3311; fx -3367; jsimpson@petersonemp.com – Joel Simpson is the man who replied to me; their general email is email@petersonemp.com. They do also do a non-strobe audible tuner (all the strobe ones are also said to be audible) at $480 but whether that’s as much better as that than the usual machines I couldn’t say! The advantage of the Strobe Center 5000 is that it has a strobe window for each note of the chromatic scale and thus you can not only see the pitch of the note you are tuning but how its overtones are doing, or you can ignore the fundamental and watch any of the overtones as you work. We used to use the StrobeConn a lot for pitch measurement on ethnographic material before the Mellograph took over some of that work (but that could only show one note at a time).

John Rawson has sent me details of a couple of books: "Marquetry pictures of instruments. Many people know the marquetry room in Urbino. In fact there were several of these at the time,

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and a remarkable one from Gubbio is now in the Met in New York. It was made in about 1480
and it portrays, amongst other things (such as armour and scientific instruments) a harp, portative
organs, a fiddle, a lute, a cornett, a rebec and bow, hunting horns, a pipe and tabour and a musical
score. A new book on it has been published by the Met: The Gubbio Studiolo and its Conserva-
tion, New York, Metropolitan Museum of Art, 1999. Two volumes in a slip case. Vol 1, by Olga
Raggio, Federico da Montefeltro’s Palace at Gubbio and its Studiolo; ISBN 0-87099-924-9,
pages 222. Vol 2, by Antoine M. Wilmering; Italian Renaissance Intarsia and the Conserva-
tion of the Gubbio Studiolo. ISBN 0-87099-925-7, pages 262. Vol 1 includes excellent pictures of
the marquetry, plus some of related works. Vol 2 is more technical – being about the restoration
work to the marquetry. The books are just under A4 size, exhaustive in approach, and the hundreds
of pics are excellent.”

The other is: “Music in the Age of Confucius, ed Jenny F. So, Freer Gallery of Art, Distrib.
by Univ. of Washington Press. ISBN 0-295-97953-4, 152 pages. It accompanies an exhibition of
the same name. It contains chapters as follows: Music in Late Bronze Age China by Major and
So; Percussion by Bagley; Strings by Lawergren; Winds by Guangsheng; The Zheng Hou Finds
in the History of Chinese Music by von Falkenhausen. Lots of photos, some drawings, glossary,
bibliography. It is about the musical instruments excavated in 1977 from the tomb of the Marquis
of Zheng. He was ruler of a small state on the Yangtze, and was buried with 21 women, a dog,
and ten and a half tons of bronze ritual vessels and weapons. Two of the four burial chambers
contained musical instruments, dated to 433BC, some of them in playing order. It is by far the
oldest and most important collection of instruments from anywhere in the world. Information on
the famous set of 65 bells – three octaves chromatic plus two octaves diatonic – has been pub-
lished here and there before [I reviewed von Falkenhausen’s book on them in GSJ 51, JM], but
this is a good up-to-date presentation. They are regarded as a Chinese State Treasure and have
only rarely been played, though they were played at the handover of Hong Kong. Recordings
exist. Each bell produces two notes, with inscriptions giving the pitches of them cast into the bell.
I am not so sure what publicity the other items have received in the past. There are sets of chime-
stones tuned to pentatonic scales, stringed instruments, flutes etc. The authors are all academics,
so they treat the history, background, and describe the items, well. There is some discussion of
scales, pitches and timbres. They do not know how to make instruments themselves, so from our
point of view one notices gaps.”

And a rather brash ‘Promotions and Marketing Coordinator’, who sends things out (addressed
‘Dear Jeremy’ though I don’t know him) but never responds to replies, would like me to draw
your attention to The Violin Book and Masterpieces of Italian Violin Making published by
Balafon Books (a balafon is a West African xylophone) at £50 and £75 respectively. There is no
evidence that either book shows any interest in original state and neither has come for review
despite my reply that this was the best way to publicise them to our members.

Museums: The Brussels Museum of Musical Instruments has reopened in its new home, the
old building of Old England, 2 Rue Montagne de la Cour [Hofberg 2 in Flemish], B-1000 Brus-
els; +32-2-545-01-30; fx -78 – I don’t have an email. The address in our List of Members is
probably the library, or it may be the admin office.

The Edinburgh University Collection of Historic Musical Instruments acquired a number of
important instruments last year including a couple of oboes (Floth and Meyer), published some
new catalogues (reviews elsewhere here), put more pictures on its www.music.ed.ac.uk/euchmi/
site, which now makes 117 images freely available.
Events: The London International Exhibition of Early Music takes place at the RCM 27-29 October. Their quote for our usual small corner was a good deal higher than in the past so I suggested to the Thames Valley Forum (who run a stand for all the Fora) that perhaps we might share with them, which they’re thinking about, and since then Lewis Jones has suggested that it would be logical to share with London Guildhall University, who will be exhibiting this year. He still has to clear that with his own authorities. So you’ll find us at one or other of these and will be able to renew and chat as usual. I intend to be there also and will be happy to see you and, if it works out that we are on the LGU stand, to introduce you to my and Eph’s successors. There may well still be stands available; if you’re interested, get on to the Early Music Shop, 38 Manningham Lane, Bradford, West Yorks BD1 3EA; +44 (0)1274-393753; fx -393516; sales@earlyms.demon.co.uk.

Overlapping with that will be the Baltic Psaltery (Kankle, Kaulis, Kantele, Gusli) meeting in Riga, October 25-29. If you’re interested get in touch with Valdis Mukupavels in our List of Members.

No use telling you about the Festival di Cremona because it took place last month (the same month as that in which I received the notice!) but the Cremona Lutaria runs from 29 September to 22 October with exhibitions, makers’ competitions, concerts, etc, etc. It’s difficult to sort out the relevant address etc, but try Piazza del Commune 5, I-26100 Cremona; +39-0372-21722; fx -534059; info.apt@rcr.cremona.it. Alternatively, try Carlo Chiesa, who is one of our members, and seems to be involved; he wrote the main article in their brochure.

Looking well ahead, the University of Maryland is organizing the First World Recorder Congress in cooperation with the American Recorder Society, with Michala Petri as President, August 22-25 2002. They’ll have a symposium, exhibitions, concerts, and so forth. Contact is George Moquin, vox (which I take to mean old-fashioned telephones you speak into) +1 (301) 405-8174; fx -5977; gmoquin@deans.umd.edu and 1115 Holzapfel Hall, College Park, MD 20742-5611, USA. Holzapfel Hall suggests an interest in makers and lathes, but, an email asking whether they were interested in historical recorders and performance has not been answered.

Other Journals: The American Recorder for May 2000 has a long and useful article by David Lasocki on ‘The Recorder in Print: 1998’, a very thorough survey of all the relevant books and articles that appeared that year.

The Galpin Society Journal 53 was a bumper issue with a lot of important material in it, including string instruments from the Mary Rose, the bandora’s influence on the baryton, and an Uganda tube fiddle; a Taskin, a Netherlands, a Florentine, and a South German harpsichord; Elizabethan virginals, and Dolmetsch clavichords; a Morton contrabassophone, Spanish dulcians, Talbot’s Hautboy reed, Quantz flutes, and South American panpipes; guild versus Stadt trumpeters; and various notes, queries, and correspondence, including disputes between Herbert Myers, Peter Forrester, and Eph. They have moved to a new printer and some copies have been a bit grotty, some with blank pages (shades of FoMRHI some years ago). If you have a dud copy, please send it back to Charles Mould for replacement. His address is inside their front cover and in our List.

Historic Brass Society Journal 11 for 1999 has also just appeared, also with good material, especially the announcement of the discovery of a 1442 trumpet from Limoges which has survived in almost pristine condition, mouthpiece and all, still playable.
There’ve been two *Lute News* since our last Q, but their contents are really only of interest to lute people, and if you are involved with lutes and don’t already belong to the *Lute Society*, you’re mad – the number of freebies included in every issue, music, information, catalogues and so on, all in addition to their annual journal and bi-monthly magazine, is worth far more than the cost of subscription.

I’ve heard nothing from Charles Stroom since the January Q, but I have *Bouwbrief* '96 and '97 to hand. '96 has articles on making a square-section recorder, similar in appearance to a Dalmation duct flute, with very detailed drawings, on equipment for making metal pipes, on measuring tools, as well as shorter notes. '97 has a long article on making classical guitars, with many drawings, one on marking-out tools, some more on the square recorder, one on a wheeled case for a gamba (it looks adaptable to pretty well any heavy case), and one on the small Dremel hand drill. They’ve managed to keep their nuts and bolts articles flowing much better than we have. Perhaps our new team of two very active makers, and teachers of makers, will help us to get back at least some of that side.

**Deadline for Next Q:** 1st October, as usual, but **remember to send material for the Bulletin to Lewis and Comms to Dave** (or both to Lewis – they do speak to each other!) **not to me**.

**Coda:** And that, for the moment, is the lot, though as usual I’ll hold this open while I do the List of Members.

It is indeed a Coda – the end of my hundredth and last Bulletin. Little did I know what I was letting myself in for when I succumbed to Eph’s and Djilda’s persuasions to take this on back in 1975. But on the whole I’ve enjoyed it, most of all the friendship and companionship that came with it. I’d like to thank you all for your contributions over the years, and to thank too (but how?) the thousand or so who have been members and colleagues in FoMRHI but are so no longer. Most of all, of course, those who have worked with me, Eph throughout, Djilda in the early days, Margaret Crowe, Maggie Lyndon-Jones, and Barbara who successively took on the Treasurership when I could no longer cope as both Treasurer and Secretary. Even more to my successor, who by being willing to be so releases me. I hope and believe that he also may have twenty-five years of the same pleasure and enjoyment that I have had.

We shall of course remain in touch. One reason for retiring is to have more time for writing, some of it (sorry if you thought you were getting rid of me) here. Some of the reviews that I write are of material which I and someone else exchange, and I shall still do that as well as anything I’m asked to review, and perhaps even the occasional Comm.

Time to stop maundering – thank you and farewell.

Jeremy Montagu
Honorary Secretary till this is posted
Ephraim Segerman

Our 100th Quarterly
With the arrival of the second quarter-century of our existence, as with the arrival of year numbers starting with a 2, there were no essential changes in what we do or in how we do it. Now that three-digit numbers for our Quarterly have arrived, there is no reason to expect any changes in what we do, but we do have reason to expect changes in the style of how we do it in the future. That is because both Jeremy and I have decided to pass on to others our roles of making sure that it all happens. The commitment each of us has to contributing to FoMRHI is undiminished, but as age progresses, the possibility of handing the hard work over to others becomes more attractive. I welcome Lewis Jones as our new Hon. Sec. and David Armatage as our new Hon Ed. Of course, we should expect that they will have somewhat different styles of fulfilling the roles we have previously played.

Reviews of old influential published papers
I have had some encouraging reactions to the reviews I published in the last two Q’s. More are in progress. Suggestions for such papers that are worth reviewing would be very welcome.

Further on Praetorius’s Pitch
As discussed in my Bulletin Supplement in Q 98, Koster has claimed that the voicing of the surviving Innsbruck organ might well represent the voicing Praetorius expected for his set of pitch pipes (he has withdrawn his arguments for Praetorius’s pitch being even higher). In that organ’s current restored state, the pipe mouth heights are about 0.45 (1/2.25) times the mouth widths, and the wind pressure is 90 mm. water column. The various published studies of Praetorius’s pitch pipes seem to have assumed that the pipe mouth heights were 0.25 (1/4) times the mouth widths and the wind pressure was about 65 mm water column.

From information given in Comm. 1701, I calculate that the Innsbruck pipe conditions would lead to Praetorius’s pitch standard being about 9 Hz higher as a result of the greater mouth heights, and about another 6 Hz higher as a result of the increased wind pressure. This accounts for the the difference in pitch standard of about 430 Hz in the various published studies and the Innsbruck value of 445 Hz.

To use the information on the effect of wind pressure given by Ingerslev and Frobenius, I fitted the two reported changes of relative pitch for different changes in wind pressure both by quadratic \((\Delta f/f = a(w-27)^2 + b)\) and exponential \(\Delta f/f = a(w-27)^b\) functions (where \(f\) is the frequency, \(\Delta f\) the frequency change, \(w\) the wind pressure and \(a\) and \(b\) constants fitted to the information given). As the interpolations for other wind pressures from the two functions were insignificantly different, I could make good estimates for pitch changes between 65 and 90 mm water column wind pressures.

I am now trying to find surviving evidence on the original voicing of early 17th century German organs. That evidence may not be as definitive as I had previously thought. We must remember that the issue is not whether a higher value for Praetorius’s pitch standard than previously determined is historically possible. That is always true of any theory when the amount of evidence on an historical question is not overwhelmingly in support of any one theory. Good history uses all of the relevant evidence available to deduce what is historical probable as objectively as possible.

Tensile strengths and highest fl. products
Tensile strength is defined as the breaking stress. The working stress in a string on an instrument must be smaller. The fl. product I have been using as a measure of stress is proportional to the square-root of the actual stress. The stress and fl. product are related by the following equation:

\[ S = 0.004 \rho (fL)^2, \]

where the stress (S) is measured in units of megapascals (MPa), the density (\(\rho\)) is measured in megagrams per cubic meter (the values are the same as the traditional gms per cubic cm), the fundamental frequency (\(f\)) is measured in Hz, and the vibrating length (L) is measured in metres. The 4 is accurately an integer, a consequence of the units used.

If we have either the breaking stress or the highest working stress and want to estimate the other, a rule of thumb (used at least by Cary Karp and me), reflecting the expected variation of the material's strength from string to string, and the variation in stress involved in playing, is that the breaking stress is greater than the highest working stress by one semitone (of f) for iron on harpsichords and fingerboard instruments, and two semitones for gut (plucked and bowed) and iron on clavichords.
We will, if you don’t mind, start with Part J, fascicle ii, the Drums, because this raises in the clearest way a problem which seems to pervade all the fascicles.

This is the order in which things appear and the division of sets.

It seems to me silly to catalogue separately as two distinct items a pair of timpani, for much of the information is common to both drums, which wastes a great deal of space. It is easy enough to distinguish between the two for all the details, such as dimensions, that do differ. The waste of space is particularly annoying when some essential details are omitted. For instance the Shaw Hellier kettledrums are described: ‘Vellum heads lapped directly onto hoops’ (‘onto’ as one word). Well, of course; how else on any European drums? But are they lapped on to a wooden hoop, as is usual in England, or on to the iron hoop which would otherwise be the counterhoop, as was then usual in Germany? This is particularly important when one remembers that the Shaw Hellier horns are by a German maker.

That separation, as I said, seems to be silly. What seems to me crazy, and is infuriating to the reader, is separating a pair of timpani with one or more other unrelated timpani intervening. I think the reason is that the drums are in diameter order, from smallest to largest, so that a 24-inch will come between a 22 and a 25, and so on, but this is no sensible reason for dividing what is musically a single instrument into two separated parts. The only composers to my knowledge who wrote for timpano were Heinrich Schütz and Jan Sibelius, and they only did it once each. Separating sets of timpani would be like cataloguing each key of a piano separately, or, if you think they are too joined up for comparison, each tube of a set of bells, or each bar of a xylophone.

Two other separated timps are the Leedy pedals 3810 & 3811, but the reason for mentioning them is that I think their date of mid-1920s is wrong; the central screw on the pedal for height adjustment I think is a feature of the second model of about 1930 – my pair, which is the first model, has a smooth pillar with a grub-screw control. What would be conclusive would be information about the stand (not given here). If two of the three legs are towards the player, with the pedal between the arms of the Y, this is the first model (like mine, where the pedal can travel enough to give an octave on each). If the two legs are at the back, so that the pedal comes over the stem of the Y, with sufficient travel only for about a fifth, then they’re the second model. And, incidentally, tipping the pedal forward does not ‘reduce the tension’ – it draws back the teeth of the comb from the ratchet and thus allows one to press the pedal down to sharpen, or let it come up, to flatten the pitch. It is the Ludwig ‘balanced pedal’ with which one tips the pedal forward or back to change pitch. The Premier pair (2381 and 2382 – the smaller Leedy comes between them, and the larger comes between the two Leedys, though both are 25 and 28 inch) presumably have the same ratchet pedal, though it is not mentioned, since Premier made pedals timps under licence from Leedy before the War.

These and the Shaw Hellier drums above are not the only ones with missing essential information. A long drum (early bass drum) is described as having ‘Nine buffs’ – from this, if one knows something about drums, one can conclude that it is a rope-tension drum, but the
text nowhere says so, although of the next two drums, the first is described as 'rope tensioning with leather buffing' and the second as 'Rope tensioned at 12 points' (which suggests 12 separate ropes!).

Nor is the first example above the only oddity about the Shaw Hellier drums. The two military side drums, 3330 & 3331, are described as labelled Henry Potter & Co and dated 1840, and then as 'Possibly one of the instruments acquired by Sir Samuel Hellier (1736-1784)....' etc.

Much of the percussion in the Collection came from James Blades and, if one knows the repertoire and how Jimmy played it, one could add that the bass drum 1653 with 'three detachable legs for horizontal use' must have been that which Jimmy used for L'Histoire du Soldat, for that requires a bass drum laid flat, and that was how Jimmy taught me to do it. One of mine also has three detachable legs!

The catalogue is, on the whole, useful, once one has accustomed oneself to the quirks noted above, which stricter editorial control could easily eliminate in a second edition, and I would only add that whatever 1186 may be (it's not easy to be sure from the description though my guess would be a shallow jazz tom-tom), it's not a tabor.

Fascicle iii, covering beaters, requires no detailed comment, save to note that it includes a few percussion effects, and accessories such as trap trays (always so called, rather than trap tables), and that it is useful to have proper attention paid to sticks. Reference to Percival Kirby The Kettledrums would elucidate the confusions in the description of 3651.

Fascicle i, covers all the idiophonic instruments in a normal percussion kit as well as those listed in its title. 2904, an orchestral whip, has a hole drilled in each board, but it is not true that these are 'not associated with function' — they are there to avoid any risk of air cushioning either slowing the impact or softening the crack of sound, which can happen if the blades meet too flatly. Turkish K. Zildjian cymbals (ie from Istanbul rather than Boston) are pre-war (early or first-half) rather than 'mid 20th century'. A glockenspiel (1208) with pitches of A 452 and sharper is surely Old Philharmonic (what used to be called High Pitch) and therefore likely to be older than 'mid 20th century', though military bands did stay up there till after the War. Certainly it could be useful to describe it and 1209 as high-pitch instruments because that puts them into a proper historical perspective.

Most of the technical descriptions are clear and adequate, with precise pitch details for relevant instruments and the first five to seven modes for bells. One that caught my eye as inadequate is the sleigh bells 1744: are they cast? or stamped? brass? plain or plated? or tinplate? If 'educational use' probably the latter, but it would be as well to know. And if the ratchet 2899 has lead weights embedded in the frame, it might well be earlier than mid 20th century. Unless this is something that Jimmy did to a modern ratchet?

It is with A iii that I have real problems. Many of the classifications are wrong (or else the given names are). An anklung, for example, (361) is not a concussion vessel; it's a sliding rattle. It's difficult to sort this one out because I cannot make any sense of the description, but as only one object is described it can't be a concussion vessel. There are several gongs, but four are described as 'suspension gong' — how do they differ from the others? One of them is described 'bronze (or iron?)' — a magnet would settle this one quick enough.

I don't see how a Chinese woodblock could be called a suspended bell, though there is an argument in favour of regarding slit drums as bells, rather than as percussion tubes. In which connexion, I wonder what happened to the Congo slit drum which Jimmy Blades got from Leon Goossens? It was a better one
than the one I got from Frans Brüggen, and I rather expected to see it here.

But it's some of the drums which cause most problems. If 1625 is a barrel-shaped drum, it's not a tabla (or vice versa), and the wooden blocks are not wedges for they are not wedge-shaped, tightening the thongs by being knocked further in. Nor has an hourglass drum (1519) a conical shell (or again vice versa), and neither it nor the next one is 'concial'.

@##@##

Despite the bits of nit-picking above, these EUCHMI catalogues are always useful and I wish all museums could provide us with as much information as Arnold Myers, who is the general editor of the series, has done over the years. I just wish that someone else (preferably as with books, someone who knows nothing about the subject) had gone over them and eliminated differences in descriptions between two similar objects; this would have covered almost all the lacunae above, for if one lamellaphone has lamellae of iron (Hugh Tracey pointed out that acoustically they were reeds), they would immediately ask (as I do!) what material are those of the others, and if another has 'eleven lamellae, some made from umbrella spokes' what were the others made from? And if another has 'no buzzing devices' (3263 - and why not, because these African Music Society kalimbas were always sold with a set?) do the others have buzzing devices or not, and if they do are they on the lamellae or on a separate wire holder, or shells or bottle-tops nailed to the board, and the other obvious questions that would follow.
This fourth issue continues where the third left off, as the second part of Nouveaux timbres, nouvelle sensibilité au XVIIIe siècle.

The first article is a long and interesting one by Jean Jeltsch and Denis Watel on mastership and apprenticeship among instrument makers in Paris. The production of a masterpiece was not the only way to acquire freedom or maîtrise: it could be based on adequate experience or even on discussion and deliberation by the community of masters. The whole question of masterpieces is one that we seldom discuss, and yet there are instruments around which could well be identified as such. I am thinking especially of such things as soprano bassoons, instruments of little practical use and yet identical in all respects with their big brothers and often so well made that one suspects that they were designed to show the mastery of the maker, often needing to be greater when making a miniature than with the full-scale article. It would be interesting to know whether any museums or collections have ever identified anything in their care as a masterpiece in this technical sense, or whether there are any records preserved anywhere which might identify any particular instrument as such. There are interesting tables here of who won their maîtrise when and how, but not as much as one might have hoped on who was apprenticed to whom and when and for how long.

Rob van Acht has an article on ‘Dutch wind instruments of the Baroque period, Scientific qualities and features’. Much overlaps what has appeared in other articles of his and in the great catalogues which have been so important a production of the Gemeente Museum in recent years, but some is new and other aspects have not been brought together before in the same source. Alas, we still await anything definitive on the purpose of the Duyste Schalmey and we can only hope that one day some information from the period will be found. In the meanwhile, Van Acht is quite specific that these are transitional between shawm and oboe, a reversion to the older theory which Cary Karp persuaded us to abandon some twenty years ago. There is a useful list of Dutch Baroque instruments preserved in museums and private collections worldwide, arranged under types and within each type of instrument under maker.

Jean-Christophe Maillard has an article on variations and innovations in musette making, but in the middle of the eighteenth century, when it is chiefly a matter of additional keys and increased elaboration, rather than a century earlier, when it was crucial to the invention of all the baroque woodwind (or so legend goes).

There are two articles on the harpsichord maker Joseph Collesse, one biographical and the other describing two specific instruments.

John Koster describes three pianos in the Florentine tradition, with detailed measurements and drawings of the Antunes in the Shrine to Music (Lisbon, 1767) and of the Louis Bas in the same museum (Villeneuve-les-Avignon, 1781), and finally of the Vincenzo Sodi in his own collection (Florence, 1789), ex-Metropolitan Museum (Mrs Crosby Brown was one of Franciolini’s customers, and indeed not everything she bought from him was a fake, but this is why it was Ed Ripin, then curator of instruments at the Met, who published that very useful book reproducing Franciolini’s catalogues). All three of these pianos are very well illustrated, both with photographs (including a beauty of the Sodi when it was advertised in Franciolini’s catalogue as a three-manual harpsichord), action drawings, soundboard plans, and so forth. A very much more useful article, even if few of us will ever come into contact with such instruments by the followers of Cristofori, than the previous one.
which was much more concerned with decoration and other superficial features.

Among the shorter notes, Florence has a good article on iconography of French seventeenth- and eighteenth-century bows, with fifteen illustrations most of them showing more instruments than the one associated with the bow, but most also, as only too often (for the painters cannot have been expected to realise that three centuries later we would want to know just how the bows were made) with either the point or the frog obscured or beyond the edge of the picture, or even both. Still, there is a lot of useful information for bow-makers and others here. As well as editing each issue, her own articles are always useful and informative, as befits the curator of instruments in the Musée des Arts et Traditions Populaires (and a FoMRHI member).

Bernard Pin has a detailed article on what may the earliest surviving serinette, from 1753, with transcriptions of the nine airs pinned on the barrel to teach birds to sing. Such survivals, with their built-in ornamentation, are invaluable guides to performance practice. He gives a drawing and detailed dimensions of the pipes also.

Nicole Lallement continues the invaluable inventory of paintings showing musical subjects in the Louvre, listing here paintings which are immured in the stores. A few are illustrated, some fanciful (pastoral themes etc) and others more important such as the portrait of Marin Marais fingering a chord on his viol and a guitarist clearly having a good deal of trouble tuning his guitar.

As with the previous issues, valuable, informative, well-illustrated, and, at 180 francs, very reasonably priced for 230 pages in what one might describe as sub-A4, the same width but about an inch shorter, which looks so much better for books and journals than a full A4.
Review: ‘Embellishment and urtext in the fifteenth-century song repertories’,
by David Fallows,
*Basler Jahrbuch für Historische Musikpraxis* XIV (1990), pp. 59-85

This paper has been the last word written on ornamentation in the 15th century. Its main value is in assembling much evidence of division and descanting (and a bit on gracing) at that time. The analysis is very intelligent and succeeds in maintaining a remarkable degree of objectivity in spite of embracing modern musicology's bias of focussing on the contribution to music by the composer at the expense of the contribution by the performer, and so denigrates the importance of decoration. This is not a popular concern, so a claim that it has been influential must be qualified to pertain to the few who are concerned with the history of performed music, rather than the more usual history of written music.

The paper begins by mentioning three statements against vocal decoration made before 1600. The earliest was Guillaume de Machaut's passing and ambiguous remark in the *Voir-Dit* that Peronne should appreciate one of his songs "just as it stands, without adding or subtracting". Then there is the famous anecdote about Josquin reported 40 years after his death by Johannes Manlius (1562): 'When Josquin was living in Cambrai and a singer tried to add to his music *colores* or *coloratures* that he had not composed, he went into the choir and scolded him severely with everybody listening: "You idiot: Why do you add embellishment? If I had wanted it I would have put it in myself. If you wish to improve completed compositions, make your own, but leave mine unimproved"'. The term *coloratures* probably meant extended division, and *colores* meant simple division and graces.

Fallows presents the hypothesis that 'there seems to be a good change' that the anecdote reached Manlius from Andrianus Petit Coclico via Philipp Melanchthon 'and reflects an actual event'. Coclico himself (1552) wrote about decoration. Donington, after a division shown in his Ex. 21 A, (of the first two of three semibreves into crotchets and a pair of quavers) quotes Coclico as writing: 'This is the first embellishment which Josquin taught his own pupils'. Fallows suggests that Coclico himself did not report the anecdote because he was not trying to discourage decoration. Whether or not it happened as stated, it must have been meaningful to its readers when it was published.

The third statement was by Gioseffe Zarlino (1558). He wrote 'Singers should therefore take care to sing only what is written according to the mind of the composer' after complaining about them making innumerable errors in applying musica ficta and in adding inappropriate divisions.

Then mentioned are two 16th century statements concerning limitation of decoration in instrumental performance. Francisco Guerrero's 1586 ordinance for the instrumentalists at Seville Cathedral stated that only one of the two players on the top line may embellish [producing heterophony], but when that line is resting, the player on the next line down may add all the glosses that he desires. Fallows presumes that the singers 'sang the notes unadorned'. This ignores the particularly likely possibility that all of the musicians respected the rule that the highest in the hierarchy performing at each point in the music was the only one allowed to add glosses, and that the ordinance was understood to reassure the instrumentalists that they would have their turn to do it too, probably when playing without the singers, but possibly also when performing together if the singers would temporarily relinquish their dominant status.

Fallows admits to his own prejudice that decoration added to that given by the composer generally does harm to the music, and that the more sophisticated the music is, the more harm is done. In a footnote, Fallows states that this 'view is relayed by Juan Bermudo' (1555) with respect to both vihuela and keyboard music. As Ward reads the vihuela passage, 'Bermudo, a most outspoken critic, considered "inopportune glosas as the greatest corruption and damage to music ... [found] amongst players"'. The word 'inopportune' distinguishes between Ward's reading and Fallows's implication.

There seems to be a apparent contradiction between the extensive evidence that decoration was taught in the 16th and (as will seen below) 15th centuries, and some of the above evidence seeming to imply that it should not be used. This apparent contradiction is eliminated if we consider that the taught decoration was division, which seriously can obscure melodic lines and so becomes subject to criticism. It has been used as an excellent vehicle for displaying the inventiveness of the performer and adds excitement for the listener if it does not induce too much confusion. When a melodic or
harmonic progression is well known (as in a plainsong tune, or in traditional jazz today), extensive division can be very effective. Problems arise when the division creates too much confusion in the listener, either because the division is excessive or the original is less familiar or too complex. Simpler decoration that leaves the melodic line relatively clear (such as gracing and short division, the simplest of which is adding passing notes) was rarely controversial.

With this view, let us look again at the above evidence. The Dufay and (presumably) Josquin quotes can be understood to express a preference by many composer/performers for their own decorations over those of others. (I imagine that they would usually not widely express that preference because being named as the composer when others performed one's works enhanced reputation, and a performance redecorated by another did that better than if such a performance didn't happen.) The Josquin anecdote makes sense if its readers understood that what Josquin composed included the notated music plus unnotated decoration that he decided on during rehearsal. Then what he objected to was the singer adding more decoration.

Zarlino preferred no decoration of the types that performers were incapable of performing tastefully. Bermudo essentially agreed. In those times, no composer would have imagined the almost mechanical reproduction of the notation of his works by performers that is usual today, and Zarlino's 'mind of the composer' would certainly have expected and accepted decoration that did not obscure the melodic and harmonic progressions.

Fallows reproduces and transcribes an important piece of early 15th century evidence of decoration practice. It is a single sheet (British Library Ms. Add. 70516, fol. 79) presenting eight sequences of notes, each starting with a pattern of two breves and a long, apparently representing notes from a tenor, followed by a pattern (usually the same one) of two semibreves followed by a breve, apparently representing an appropriate descant to perform with the tenor. The difference in speed is illusory since notation was changing, and the tenor was apparently in the old notation and the descant in the new. Following each descant is three other patterns, representing different divided versions of the two perfect semibreves of the descant, the first of these being mostly in minims, and the other two usually mostly in semiminims.

A recently discovered series of fragments at Bourges imparts the same information from the same period. In the 16th century, memorising different patterns of division was a performer's traditional path towards learning how to improvise them, and good performers could improvise descants at sight. The appearance of multiple division patterns in these 15th century sources makes it much more likely that they were performer exercises for learning improvisation rather than exercises in composer training. Instruction for creating descants from tenors was not uncommon (Fallows cites one from the 1320s) but it has been assumed that these were for composers. The training of performers in improvisation was also training in composition, so the distinction then was much less clear than it is today.

Most of the rest of this paper investigates decoration by comparing the differences between surviving versions of the same song. The songs analysed, with the variants displayed, are Jamais tant by Binchois and Le Serviteur and Par le regard by Dufay.

There are two versions of Jamais tant, differing almost exclusively in the discantus, where the later version has almost 50% more notes (fairly evenly distributed) than the one from about a decade earlier. The added notes are all in very simple division which could easily have been improvised. Yet Fallows writes 'the later version is no mere embellishment of the earlier, but in several respects actually [is] a recomposition. There are places where the florid line changes the essential shape of the melody and improves it substantially'. After explaining this with examples, he concludes 'this all suggests that the rewriter was almost certainly Binchois himself'. He believes that he can distinguish here between 'recomposition of the work's substance and the addition of florid elements'. He is a recognised expert on the former, but no-one is an expert on the latter in the style current then, and he could not become one unless he took it more seriously. So I have my doubts. Analysts of works of art often see more in them than their producers could ever have imagined. Of relevance here is his important point that 'in the course of a full rondeau performance the prima pars of the music will be heard five times. Most singers will introduce a certain amount of variety in any case'.

Fallows is concerned with to what extent the concept of Urtext (a faithful representation of the
composer's intentions) is relevant to 15th century music, when 'aural transmission was as important as written'. This is impossible in some cases, where radically different versions survive (and, of course, there are no autograph copies). When it is possible is illustrated by Le Serviteur, of which 14 sources survive. The variants are presented, and the differences are remarkably few, with very little added or altered division. From this Fallows concludes 'every detail of this astonishing work is important. To start embellishing it seems almost sacrilege'.

What this evidence shows is that one particular version of the music, including some divided decoration by Dufay, was so highly regarded that it was consistently preferred when scribes wrote the song down. It does not mean that altered or additional division was not used (alteration can be expected when different words needed to be expressed with the repeat of a part of the tune). Also, other types of decoration are far from excluded. Differences in accidentals and ligatures were there, but Fallows eliminated them from the comparison, as were 'mistakes'. Some noted 'wrong' notes could possibly rather have been indications of the starting notes of graces which then focussed on the 'right' notes.

Fallows next considers the contribution to understanding 15th century decoration of the Buxheim manuscript of keyboard tablature. He describes this source as containing 'many different kinds of entabulation. Some are entirely undecorated, merely transferring into tablature the notes of the staff-notation version. Others bury the original discantus line under a welter of brilliant runs and flurries that are relevant to the performance of these songs on a keyboard instrument ... but gives no information that is likely to be relevant to how the songs were performed by vocalists. But there is an important middle category, with relatively sparse embellishment. It may well contain some of the clues about vocal embellishment that are so signally lacking elsewhere.'

Par le regard is analysed as an example of this middle category. It appears in two somewhat different versions in the Buxheim ms and in twelve staff-notation sources. The comparison shows that the differences between all of the sources in the tenor and contra lines, and between the staff-notation sources in the discantus line, are almost as small as in Le Serviteur. So interest focuses on the Buxheim versions of the discantus, which have the expected added division plus many grace signs on longer notes. Though the added division 'could fairly easily be sung', Fallows judges that they 'are distinctively instrumental in nature, even digital.' A keyboard instrument cannot decorate notes in many ways that a voice can, and so can be expected to compensate by decorating more in the way that it can. Consequently, he suggests that what singers can learn from the intabulations is to try to reconstruct a vocal style with decoration other than division that reverses the compensation. He does not discuss whether graces that add notes, as appear in the intabulations, could also be part of that vocal style.

The final conclusion that Fallows comes to is that the evidence supports his initial prejudice about vocal performance. 'Particularly with a carefully crafted work, literal embellishment can only impede the communication of a song. Examination of the variants between staff-notation sources indicates that there was indeed a firm Urtext in many cases, that several of the differences between sources may stem from composers' second thoughts, and that for this repertory literal embellishment is to be avoided. That singers did often embellish may be seen as a consequence of a tradition in which they were trained, and which was part of their day-to-day practice, namely improvising counterpoints against a tenor. But there is little in the sources to justify actual interpolation in the written notes of the composed polyphonic repertory between about 1430 and the end of the century.'

He adds 'When a song was adapted for purely instrumental performance the generating power and interest of the words and the inherent flexibility of the voice were no longer there, and ... there was every opportunity for the musician to add - returning to Guerrero's words a century later - "all the glosses that he desires and knows so well how to execute on his instrument"'.

The competing hypothesis is that singers more widely used the decoration skills they were trained in. Fallows's conclusion makes good sense if the singers clearly enunciated the words at a poem-reading tempo, as implied by his modern transcription, mostly in crotchets and quavers. But my study of tempo history strongly indicates that each of those crotchets (originally semibreves) lasted 3 seconds. At such slow speeds, it is not easy to get the words across. Why should more than one line bother? Maybe tenors were so special because they used artifice to do it. We know very little about early singing styles, and assuming modern styles doesn't help in exploring music history.
Back in August 1997 when Marco Tiella spoke about Sievers' book at the Galpin Society conference in Edinburgh his enthusiasm was clearly evident. He told us about the very fine illustrations, and the unrivalled detail to be found in this unique publication, but though we listened with interest we were unable to form an opinion. Copies of Sievers' original – printed in Naples in 1868 – are very scarce. And for many of us the fact that it is in Italian is an additional barrier. With this excellent, painstaking initiative Marco Tiella has opened up Sievers' book as a primary source available to everyone.

Many books relating to musical instruments were published in the second half of the nineteenth century, some even giving detailed information on the how and why of instrument making. But few were written by professional instrument makers. So it is often difficult to tell whether the printed information is representative of the trade itself, or merely the layman's perception, often unreasonably coloured by the romantic view of an outsider. Edward Heron Allen's book comes to mind particularly. It appears to be a very well-informed treatise on how to make violins, giving copious instructions on various building methods and practices. But Heron Allen was a barrister, an amateur observer, an enthusiast, and his experience, such as it was, was garnered while he was still a youth, so I am always left wondering how far the real violin makers of those days would have endorsed his book or perhaps smiled with amusement to read some of his well-meaning advice.

With Sievers' book we are in different territory. Every page gives evidence of the man's personal involvement in piano making. He tells you what actions he favoured and why. With the first rate action drawings – more than 30 are reproduced here – Sievers offers perceptive evaluations that show, time and again, how he had personally worked with them, and knew very well which makers used them and in what periods. So for example he says of Wankel & Temler (Leipzig) *This action, notable for its simplicity, is difficult to adjust, due to the screw being covered by the arm of the escapement.* Of Stöcker (Berlin) he says: *This is a complicated action, but the most effective down-striking action that I know... adjustment is easy, the touch is light and comfortable, and the repetition first-rate.* Of Brinsmead he says: *[He] often modified his actions. I remember one which was not very effective shown in London in 1862. In the Exhibition in Paris in 1867 he exhibited a wonderful grand with this new, easily-adjustable action* [shown on that page] *Single keys can be taken out as they are not connected with the action; the keyboard is light so that it is nice to play on a Brinsmead instrument.*

This kind of frank, informative tone pervades the whole book. You perceive at once that Sievers had traveled widely, examined the pianos in international exhibitions, and generously praised the work of rivals, as well as naturally describing the benefits of his own innovations. [As a matter of interest he made pianos with both Viennese-style Prellmechanik designs – with the refinements one expects c. 1868 – and others with a sophisticated English-style grand action improved with his own modifications.] He offers solid advice on stringing, regulation,
soundboard construction, glues, leathers, tools, processes, and in fact all the main components of the piano-makers' art.

In a footnote to his introduction Marco Tiella quotes from Schmidi's *Dizionario universale dei musicisti*, vol II, Milano1929, which informs us that Ferdinando Sievers was born in Riga in 1810 and after training in Russia relocated in Naples about 1830. [No one seems to know why.] After building up a thriving factory he won prizes for his instruments at exhibitions in Naples in 1870 and Vienna in 1873. After his death in 1878 his estranged wife gained possession of all his assets except the factory, which he had thoughtfully transferred to his workers, headed by Pasquale Curci. But ultimately it was forced to close down.

Sievers' book though is a legacy of lasting value. It offers a uniquely penetrating insight into an industry that reached its greatest cultural significance in the period when its author was most active. Better still, his view is not restricted to Italy, or even southern Europe, but shows ample evidence of his familiarity with French, English, and even American pianos. Sievers is not a partisan advocate like the Erard family, or Henry Fowler Broadwood [1862], or Edgar Brinsmead [1878]. Consequently his book has all the more value.

Marco Tiella is to be congratulated on his enterprise. It is difficult enough to translate any technical book into a language that is not your own, but the problems here are compounded by the fact that many of the terms for tools or components of a piano cannot be found in even the most comprehensive dictionaries. Inevitably there are blunders, but this is a small price to pay for having this invaluable book made available to a wider public. If you are at all interested in musical instrument technology in the nineteenth century I would recommend this book.

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Comm: 1715

Michael Cole

TRUTE PIANOS.

Many thanks to those readers who kindly responded to Comm. in which I asked for information on the whereabouts of pianos by Charles Trute.

The upshot is that prior to 1780 Trute was making fairly conventional English square pianos very much like every other London-based maker. After he moved to America c.1790, and recommenced his activities in association with Wiedberg, he again reverted to a conventional product. It is the pianos in between, represented by the now lost example at the Henry Ford Museum in Deerborn Michigan, dated 1780, and two others dated 1781 that are so startling, for they incorporate design features that were extraordinarily prophetic. If anyone knows the location of any others I would be very grateful for the information.

To provide a small, portable instrument Trute confined his keyboard compass to a 54 note, C-f", a common enough compass in small German instruments but rare in London. To make the soundboard as compact as possible he moved the wrestpins to the back of the case, that is, at the left-hand end of each string. [As many readers may realise this completely invalidates J.S.Broadwood's claim that his father, John Broadwood, was the first to introduce this
Of course, having placed the wrestpins at the back Trute could not use the conventional lever overdampers used in most English squares of the period. Instead he reversed the orientation of the dampers [*intro* instead of *retro*], and in doing so creates a far superior arrangement. Here too he is anticipating other more famous makers for Erard afterwards incorporated dampers of this type in square pianos, and later they became the standard type used in most of the marvellous American squares made in the second half of the nineteenth century. But there is more. In a 1781 piano at Vassar College, Poughkeepsie NY, there seems to be clear evidence that Trute overcame the problem of having a very restricted area for his hitchpins [along the right-hand end of the case] by suspending a perforated metal hitchpin plate overhanging the soundboard. If this can be confirmed from another specimen – to eliminate the possibility that this hitchpin plate is a later addition – we will be able to credit Charles Trute with another innovation that afterwards was a vital feature of nineteenth-century piano technology.
The Design of an Early Italian Harpsichord at the RCM.

An Italian harpsichord no. 175 of the Donaldson Collection, Royal College of Music, London has, like many Italian harpsichords, undergone a number of changes. Although my analysis of the original compass (F, G-f\textsuperscript{3} instead of John Barnes' C/E-d\textsuperscript{3}, e\textsuperscript{3}) produces a satisfactory synthesis of the available evidence and explains the positioning marks behind the present bridge position, the scaling remains non-Pythagorean and is thus atypical of Italian instruments\textsuperscript{1}. This note examines the scaling further.

Following experience with deriving the original scaling by working back from the bentside curve in another instrument (W39 'Berti'-Cristofori), the scaling of this RCM harpsichord was investigated. A hypothesis was tested that the original bridge would have been parallel to the bentside. The reader should know that I found traces on the soundboard (as reported in my thesis) between the present bridge position and bentside which suggested that the bridge had previously been nearer the bentside.

Lines for the original c strings were constructed on the museum drawing parallel with the spine and various distances marked off at 90° from the bentside curve to cut these string lines. In this way it could be established that if the centre bridge line were 107 mm from the bentside then a Pythagorean scaling for the notes c\textsuperscript{-}c\textsuperscript{3} resulted when measuring from the bridge centre line to the plucking point of the original back 8'(plucking left, towards the spine). It is significant that this hypothetical bridge position coincides with the positioning marks I found on the soundboard, as reported (see note 1). Thus, this hypothetical position is nearer the bentside than the present bridge.

<table>
<thead>
<tr>
<th>bridge-plucking point</th>
<th>sounding string lengths (bridge-nut)</th>
</tr>
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<tbody>
<tr>
<td>F, G-f\textsuperscript{3} compass</td>
<td>C, D-c\textsuperscript{3}</td>
</tr>
<tr>
<td>f\textsuperscript{3}</td>
<td>96 mm</td>
</tr>
<tr>
<td>c\textsuperscript{3}</td>
<td>133</td>
</tr>
<tr>
<td>f\textsuperscript{2}</td>
<td>200</td>
</tr>
<tr>
<td>c\textsuperscript{2}</td>
<td>266</td>
</tr>
<tr>
<td>f\textsuperscript{1}</td>
<td>400</td>
</tr>
<tr>
<td>c\textsuperscript{1}</td>
<td>534</td>
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<tr>
<td>f</td>
<td>827</td>
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<tr>
<td>c</td>
<td>1140</td>
</tr>
<tr>
<td>F</td>
<td>1268</td>
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It could also be clearly established that a Pythagorean scaling would not result if the edge of the soundboard, the edge of the

\textsuperscript{1}See D. Wraight, 'The stringing of Italian keyboard instruments c.1500-c.1650', Ph.D. dissertation, The Queen's University of Belfast, 1997, Part 2, pp. 337–340 [order no. 9735109, UMI Dissertation services, http://www.umi.com]. The dissertation as a file written in WordPerfect 5.1 (mostly readable with Word) can be obtained from me by email: denzil@t-online.de
wrestplank (nearest the jacks), or the original nut position were taken as the end of the string nearest the keyboard. This shows how much information is contained simply in the shape of the bentside curve and its position relative to other parts of the instrument.

The deviation from a theoretical Pythagorean scale for the bridge to plucking point is remarkably small, especially considering manufacturing error, case distortion, and the possible errors which could have accumulated in making a drawing. Nevertheless, there is a significant error in the magnitude of f_3. Considering how well the string lengths for c^1-c^1 double, it seems appropriate to place all the error at f_3, which is only 3.75 mm and to assume an intended scale (for an F,G-f_3 compass) of c^2 = 266 mm or f^2 = 200 mm; this would make f^3 = 100 mm. This implies that the intended top string length might have been 155 mm instead of the present 151 mm. All calculations below have been made using the actual sounding length of 151 mm.

If a simulated bridge is laid out on the drawing and aligned with the correct spacing (i.e. 107 mm) from the bentside, it has the effect of moving the mitred tail section of bridge towards the tail so that it also is also about 107 mm from the case. The F string length was measured assuming this bridge position 107 mm from the tail.

Since the strings double accurately at the lower octave, it is evident that the c string is too long by about 70 mm. I cannot presently explain this except as the result of a layout error: the maker might have used the correct length for c, but placed it at the wrong note, i.e. at c|. It may be that there is some aspect of the scale design which has not yet been understood since the clavicytherium in the Donaldson Collection (mentioned below) also has a c which is longer than required by the Pythagorean scaling. Possibly we have to see this part of the register as the point where the scale has to be lengthened in order to compensate for the actual foreshortening.

The Scaling Design

Although the instrument was evidently designed using a Pythagorean scaling between the plucking point and bridge, the position of the original nut (marked on the baseboard, as noted by Barnes in his unpublished museum report) yields a complete, sounding string length which produces a non-Pythagorean scaling, as shown above. For whatever reason, the maker did not produce a Pythagorean scaling of the sounding lengths of strings.

This design is remarkable among surviving Italian harpsichords, which usually only yield a Pythagorean scaling for the complete sounding string. However, the early history of the harpsichord yields some parallels. The south German clavicytherium in the same collection has an approximate Pythagorean scaling, when one measures from the edge of the soundboard to the bridge. Furthermore, as John Koster informed me, Arnaut de Zwolle's
clavisimbalum also uses exactly the same procedure. In consequence, both instruments have a non-Pythagorean scaling for the sounding lengths of strings.

This curious scaling procedure can lead us in one of two directions: either we accept the string lengths as they are, or we re-define the nature of the instrument, as Kukelka has reportedly done. Kukelka suggested that this clavicytherium was "really" a clavichord, in wing form. In other words, the sounding string length was from the tangent to the bridge, with the portion from the tangent to the nut being damped. This suggestion does not quite agree with the instrument since the Pythagorean scaling is between the edge of the soundboard and the bridge, and clearly no tangent can strike the string at the soundboard edge. However, this hypothesis could apply to the RCM harpsichord.

Thus, following Kukelka, we could see the RCM harpsichord as a wing-shaped clavichord, at least in concept, if not in execution, where the Pythagorean scaling results only when the tangent strikes the string. One difficulty in accepting that this was intended to be an actual clavichord lies in the fact that it was originally single strung, and that all known early clavichords (albeit in rectangular form) are double strung. The construction is evidently suited to a harpsichord and no indication that it might have had a clavichord action survives. However, this does not require us to discard the insight about the scaling.

The original compass

In my earlier analysis I suggested that the original compass was F,G-f since this matched the probable number of original notes (48) and also placed the positioning marks at the c notes. Positioning pins in 16th-century Italian instruments were predominantly at the f notes when the compass reached to f\sup{3}, and at the c notes when the compass was reached to c\sup{3}. Instruments with orientation marks (including lines on the baseboard) at c and f notes are also known.

The positioning marks are at the g\# notes of the present C,D-d\sup{3} compass (not C,D,-c\sup{3},d\sup{3} as stated in error in my thesis). This rendered Barnes' hypothetical original compass of C/E-d\sup{3},e\sup{3}.

As drawn to my attention by John Koster's forthcoming article "Some Remarks on the Relationship Between Organ and Stringed-Keyboard Instrument Making", to appear in the Early Keyboard Journal. The analysis given here of no. 175 was inspired in a large part by a conversation John and I had in Vienna in October 1997, which also clarified another problem: Alfons Huber had told me on two occasions some years ago that, according to Peter Kukelka, the string lengths were Pythagorean from the bridge to the plucking point. My measurements from the drawing in 1988 showed that this is not exactly correct but the serendipitous discussion with John soon revealed for me the correct facts: they are more nearly Pythagorean when measured to the edge of the soundboard, as stated by John.

In his lectures on musical instruments in Vienna. Personal communication from Alfons Huber.

A general discussion of the nature and origin of these early instruments was given by John Koster, 'Toward a History of the Earliest Harpsichords' at the October 1997 congress in Vienna on the Austrian harpsichord, forthcoming in published form.
unlikely, since it would require that the positioning marks occur at the $b^\#$ notes, which is highly unlikely.

In my thesis I rejected the alternative hypothesis for a 48-note compass, the compass $C,D-c^3$, since the original keyplates would be incompatible with it. This expression was imprecise, another idea having not been explicitly expressed: the original keyplates of $F-b^2$ are compatible with either hypothesis, but if the original compass reached to $C$ then it is not clear why it should have been necessary to make new covers for $C$, $D$ and $E$. The compass starting on $F$ explains why new $C$, $D$ and $E$ plates would have been necessary. The $F,G-f^3$ compass fits some of the available evidence better than a $C,D-c^3$ compass. Furthermore, $C,D-c^3$ is also rare as an original compass.

The Scaling and Pitch

If we see the RCM harpsichord as a conventionally-strung, plucked instrument then the pitch must be low: Given a compass of $F,G-f^3$, and calculating from the most highly stressed top string, $c^2$ has the equivalent length of 403 mm, which is exceptionally long for an instrument with such a short case, although it is found in such instruments as the 1574 Baffo harpsichord in its original form. In fact the RCM harpsichord resembles a virginal from the point of view of the foreshortened scaling.

An attraction of the $C,D-c^3$ hypothetical compass is that the scale becomes virtually 'normal': referred to $c^2$ it is 302 mm when calculated from the longest string, $c^3$. Even for this pitch the bass strings are relatively short. A disadvantage of the $C,D-c^3$ hypothetical compass is that it requires us to suppose that the positioning marks I found, if they are original, occur at the $g$ notes. W351, a harpsichord in Fenton house (origin unknown, but possibly from the Milan-Brescia area), has construction marks for the $c$ and $g$ notes, so the procedure is not unknown.

There are few clues in the construction of the instrument which might help sway the balance between these two hypothetical compasses ($F,G-f^3$ and $C,D-c^3$), but one is the tail bridge section: it has 6 original bridge pins, which would cover $C-F#$ of the $C,D-c^3$ compass, or $F-B$ (i.e. the whole bass octave) of the $F,G-f^3$ compass. This latter arrangement offers a more convincing scale design logic, where the compass $c-c^3$ is Pythagorean for the bridge to plucking point measurements, and only the bass octave strings are foreshortened.

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3Only two examples of possibly original compasses are known: the "1694 De Quoco" (Smithsonian Institution, Washington) and no. 77 (Musikinstrumenten-Museum, University of Leipzig).


5See my thesis (op. cit. note 1), Part 2, pp. 332–333.
The F string (sounding length) of the C, D-c\textsuperscript{3} compass would be 1333 mm and the following F/f\textsuperscript{2} and Fnorm values can be calculated using the top string as the indication of the highest pitch:\textsuperscript{8}

C, D-c\textsuperscript{3} \( f^{2} = 226.5 \text{ mm} \) \( F/f^{2} = 0.736 \) \( F_{\text{norm}} = 1502 \text{ mm iron wire.} \)

F, G-f\textsuperscript{3} \( f^{2} = 302 \text{ mm } \) \( F/f^{2} = 0.585 \) \( F_{\text{norm}} = 1189 \text{ mm iron wire.} \)

These calculations show that the C, D-c\textsuperscript{3} design results in an instrument with bass strings longer in proportion to the treble strings (as would be expected). Were there no foreshortening then the F/f\textsuperscript{2} ratio would be 1. The calculations also show that the F, G-f\textsuperscript{3} scale design resembles a virginal, slightly above the Antegnati instruments on List 2\textsuperscript{9}. Thus, if the scale design in the F, G-f\textsuperscript{3} compass is understood as comparable to a virginal, it is not out of the ordinary. The harpsichord part of the 1639 Valentin Zeiß clavorganum has a scale design which is even more foreshortened than that given by the F, G-f\textsuperscript{3} hypothetical compass\textsuperscript{10}.

An Older Tradition

There is another way of approaching this scale design, which can only be mentioned briefly here. The strings of Arnaut de Zwolle's clavisimbalum design are identical with the clavichord, if one measures from the edge of the clavisimbalum soundboard to the bridge\textsuperscript{11}. In this sense there is another Neapolitan instrument which is identical with the RCM harpsichord, and it is the clavichord no. 3 which has a corrected c\textsuperscript{2} of 199 mm\textsuperscript{12}. Thus, if we propose that the string on the RCM harpsichord of the same length is c\textsuperscript{2}, then the instruments are "nominally" the same, although the sounding string length of the harpsichord is longer. The compass of the RCM harpsichord would then be C, D-c\textsuperscript{3}. What this means for the actual pitch of the RCM harpsichord (and the clavisimbalum) I will discuss on another occasion.

\textsuperscript{*}F/f\textsuperscript{2} is a ratio of the scale of the instrument at F and f, not of the actual string lengths. For example the scale of F if the string length is 1334 mm is 1334 + 8, in order to relate F to the pitch of f, which is eight times higher. F_{\text{norm}} is an expression showing the length of F normalised with respect to a pitch given by $\hat{f} = 255$ mm. For example, the $F_{\text{norm}}$ when $F = 1413$ mm is: $302 \text{ mm} + 255 \text{ mm} \times 1413 \text{ mm} = 1193 \text{ mm}$. These terms are explained in detail in my thesis (op. cit., note 1), Part 1, pp. 166–167.

\textsuperscript{9}See my thesis (op. cit. note 1), Part 1, p. 169.


\textsuperscript{11}As observed by John Koster, see note 2, who has also noted that Herbert Heyde was apparently the first to publish this observation in Musikinstrumentenbau (Wiesbaden, 1986), p. 160.

Conclusions on the Scaling and Compass

The only secure conclusion from this recent analysis is that the scale design is Pythagorean for the string length between the plucking point and bridge. The original compass is still unknown, both F, G-f$^3$ and C, D-c$^3$ are possible.

Modifications to the instrument

As Grant O'Brien has already suggested, the moulding of the later nut shows that the instrument could have been modified by Cristofori or Ferrini. Comparison of the arcade (by photographic means) shows that it is closest to arcades found on a harpsichord I now attribute to Ferrini. Thus, it appears that Ferrini may have executed the modifications described by Barnes as State 2.

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13 Private communication, 1983. More recently he has argued that the slides were made using the Florentine foot. See Grant O'Brien, The use of simple geometry and the local unit of measurement in the design of Italian stringed keyboard instruments: an aid to attribution and to organological analysis, The Galpin Society Journal LII (1999), pp. 146–148.

14 No. 89 in the Musikinstrumenten-Museum, University of Leipzig. At the time of writing my thesis I was not able to prise a distinction between Ferrini’s and Cristofori’s contributions, until in 1997 with David Sutherland’s assistance, we were able to confirm his hypothesis that the Stearns no. 1332, Ann Arbor, Michigan, was made by Ferrini, and thereby establish other Ferrini attributions.
Arnaut's clavisimbalum Mechanisms

Introduction

Despite the fact that a facsimilie edition of Arnaut's treatise, with a translation of the Latin into French, has been available since 1932, there is relatively little literature on the four types of action which Arnaut describes as suitable for inclusion in the clavisimbalum. It is the second mechanism which has attracted least attention, but has been discussed by Clutton, Lester, Pollens, and Kaufmann. I believe that Lester has described correctly all the essential details of actions 1, 3, and 4 (with photos of models of the action types), but as he says himself, action no. 2 is difficult to interpret. Clutton, Lester, and Le Cerf and Labande did not incorporate the spring in their description of the second action, so their solutions are incomplete. Pollens, whose book was devoted to the piano, concentrated his attention on the fourth mechanism (which is evidently of the striking type), thus his description, which correctly lists all the features of the second action, is extremely brief. There is, therefore, a useful purpose to be served in considering the second action in further detail.

The text

Lester, and more recently Pollens, have translated the Latin into English, but I shall start with a fresh translation since there are several points of difficulty. I have intentionally used a literal translation to preserve the "telegraphic" style of the original and to avoid conveying a possibly misleading impression of a clear, unambiguous text. Thus, my text will be found to be vaguer in places than Le Cerf and Labande, Lester, and Pollens. Some of Arnaut's Latin is grammatically wrong and one must interpret his intended meaning from the context, but these faults are not serious enough to warrant detailed consideration here.

On fol 128r Arnaut gives a drawing of the four types of action and describes them in notes alongside the sketches. My translation of the Latin text is as follows:

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3 fol 128 r is reproduced full size as plate VI in Le Cerf and Labande. The Latin text appears on pp. 3-5.
Modus iste forpicum est cum cornu formato quasi ad formam trianguli, et in cauda habet duo foramina quorum superius habet peciam unam latonis rigidam sibi affixam per modum parve cathene, ad deprimendum e converso caput forpicis post ictum. Foramen vero inferius habet quamdcm cathenam affixam clavi per quam clavis, ipsum forpicem trahens, percutit cordam; et in isto modo oportet quod claves sint longe et quod extandantur quasi usque ad A, et tunc etiam oportet quod claves bituminentur simul, sicut fit in portativis, propter eorum longitudinem.

There is another section (following the description of the fourth action) where some additional detail is given about parts of the second and third actions, as follows:

Nota quod isti ultimi duo modi forpicum situantur fixe in quodam assere secundum latitudinem ipsius penu, ita quod quando deponitur asser, cum ipso immobiliter deponuntur isti for-pices, et in secundo modo forpicum resiliens est sursum per modum stricte lamine; sed in tertio modo resiliens fit de filo ferreo vel latonico, et ejus pes figitur in assere prope pedem forpicis, et ejus cauda transit retro caudam sub illa du-plicitate in qua est foramen, ut e converso deprimat caput forpicis.

Note that these last two sorts of forpex [i.e. the second and third types] are fixed firmly in a lathe which has the width of the entire action so that when one presses down this lathe [i.e. installs it] then at the same time the forpex is depressed [installed]. And in the second type of forpex the spring is above in the form of a narrow leaf spring, however in the third system the spring is made of iron wire or brass wire and that foot [of the spring] is fixed in the lathe beside the foot of the forpex and that end goes backwards through to the end [of the forpex] under the duplicitate [vertical fork] in which there is a hole, and turns around the head of the forpex, depressing it.

The Mechanism

Thus, the basic elements of the action can be understood (refer to the drawing below): playing the key pulls the player's end of the forpex down, thereby causes the "head" of the forpex to rise, which carries the "horn" [cornu] and sets the string in motion, probably by plucking it.

The word Arnaut uses to describe the first three mechanisms is forpex which is a corruption of forfex, meaning fire tongs; perhaps the pivoting part of the three mechanisms may have suggested fire tongs, more in an analogous way of thinking rather than in any literal sense. Forpicum is the genitive plural; forpicres, nominative plural. It could be misleading to translate forpex as "jack" since this has a special connotation for us, knowing as we do about the 16th-century and later forms of plucking mechanisms, and "mechanism" is too vague. "Pivoting lever" would be the nearest correct translation for forpex, but
plucking mechanisms, and "mechanism" is too vague. "Pivoting lever" would be the nearest correct translation for forpex, but I have left it untranslated.

The second and third actions share one basic feature: a horizontal part is free to swing on an axle, which axle is held in a vertical forked part, the construction of which is apparently identical for both of these actions. Arnaut's sketches show this quite clearly, and the vertical part is made apparently with a sort of pointed "foot" which can be anchored. The Latin word for this vertical piece is duplicitate, literally "doubled"; this name, and the sketch, strongly suggest that this piece is made of sheet metal and folded over so as to hold the swinging part between its two sides. Pollens notes the resemblance of the Kapsel of Viennese piano actions to this part.

Arnaut's sketches of the four actions

FIRST

SECOND

THIRD

FOURTH

Interpretation of Arnaut's second action

It is clear that there is a chain connected from the keylever to the "end [cauda] of the forpex [i.e. of the pivoting part]". It is also clear that at the same end there is another chain connecting the "end of the forpex" to a brass rod. It is apparent that the front of the keylever must pull the "end [nearest the player] of the forpex" down for any motion to be imparted. Given this, it follows that the vertical forked part [duplicitate] which holds the mechanism must be fixed to something immovable. This would have to be a rail attached to the case, and is only described by Arnaut in the second piece of text. The duplicitate cannot be fixed to the moving keylever, as Clutton has drawn it. We learn (in the second piece of text) that all the duplicitate are mounted on this lathe so that the pivoting forpices can all be removed in one operation. This description of the simple removal of the forpices neglects to mention that they are connected by chains to both the keylevens and the pieces of rigid brass/spring assembly. Thus, removal would require disconnection of all these parts from each other.

Arnaut tells us in the second piece of text translated above that the spring in the second system is mounted above the action. It is a significant omission that in their realisations of the action neither Clutton's diagram nor Lester's photo incorporate this spring. Le Cerf and Labande do not describe what the spring did in their action, if indeed it was incorporated.

However, the spring which is mentioned by Arnaut is above the action, and since it was a leaf spring it would either have borne down on the "head" of the mechanism in order to return the action
It appears from the sketch as if the non-chain end of the "piece of rigid brass" is furnished with some sort of axle. Given this clue we can see that the brass rod or lever was probably intended to swing up and down. The leaf spring would have to have borne upwards on this lever (at the chain end) to return it to its rest position, and thereby have pulled the keylever up.

It is possible, perhaps even probable, that the rigid piece of brass Arnaut has sketched is in fact the flat brass spring since there is no necessity to have a moving brass lever returned by a spring when the chain could be attached directly to the brass spring and achieve exactly the same result more simply. That the spring for the third action has been shown on the sketch might be confirmation of this interpretation, but my sketch of the action above shows a rigid piece of brass and the spring.

A box-like structure above the wrestplank, just as is apparently shown in some of the surviving representations, would be necessary to provide a point of anchorage for the pivoting end of the brass rod/lever and/or for anchoring the leaf spring. It is interesting to note that of the mechanisms described by Arnaut, only the second type requires any sort of rail above the plucking mechanism. I have shown a housing for the rigid piece of brass and spring. The action could be stopped by a pad between the rigid piece of brass and the housing, or by a pad between the keylever and lathe. For simplicity I have omitted the wrestplank.

It now seems clear enough that this second system involves a rocking member [the forpex] similar to system three. The spring is essential to returning the system to rest, and it is evident that the player has to overcome the resistance of the spring in order that the action be put into motion. There would also be the additional resistance of exciting the string; as a result, this system appears to have a fairly heavy action. One wonders why clanking chains were preferred to the rigid rods of a (potentially quieter) tracker action.

One detail Arnaut provides us with is obscure: it is said that it is advantageous if the keys are long, and the point A is suggested. The line A-Y is level with the cheek-bentside corner and parallel to the case front. There is no advantage to having the keylevers this long if they merely pivot in the fashion of a normal harpsichord. The conclusion adopted by all the commentators that the keylevers are hinged at the far end (in the manner of portatives) seems correct; this view takes Arnaut's suggestion of "claves bituminentur" to mean that leather or parchment hinges are glued at the far end of the keylever.

The excitation of the string

Arnaut does not distinguish in his descriptions of the actions whether the string is struck or plucked. He only describes the

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setting in motion of the string for the second and third actions, and then he uses the verb "percuito", intending the sense of striking, even though the third action evidently has a plucking mechanism, similar to a modern tongue-mounted plectrum. Thus, Arnaut is unspecific or vague about the type of string excitation and his verbs of excitation cannot provide a reliable clue as to the nature of the action.

Nevertheless it is fairly clear that the second action involves plucking. It is not clear how we should understand cornu: either it was a triangular piece made of horn (as Kaufmann thought), or "horn" indicates the shape which was used.

Since the description of the action gives few clues about the exact plucking operation, the sketch is open to interpretation. Actions 1-3 depicted by Arnaut are all viewed from the side: in effect from the bass end of the keyboard. Although they appear mostly like a cross section through the action, a certain amount of perspective has been included which clearly depicts the plectra in actions 1 and 3 and reveals the construction of the fork-like *duplicitate*. It would appear as if the cornu has been given the same perspective treatment as actions 1 and 3. If this is so, then the cornu (looking down the string towards the player, before plucking) would appear like this:

![Sketch of cornu and string](image)

The form of the *cornu* as depicted by Arnaut enables it to pluck the string and then slide back past it after plucking, just as Le Cerf and Labande have already noted, and as my practical experiment confirms. This is the most straightforward interpretation and it is the view of all commentators that this is a plucking action.

Even though the description of the *cornu* may be a little vague, Arnaut's sketch is well detailed: not only does the underside of the *cornu* have a sloping angle which is necessary for the return, but the upper surface has slight curve which ensures that the string slides off sideways and is not simply pulled upwards and hangs on the *cornu*. This attention to detail suggests that Arnaut was drawing something he had observed, or at least, something the function of which had understood.

Apparently as a result of not seeing the perspective in Arnaut's sketch Lester understood the *cornu* to be pointing away from the player, with the result that he had to postulate a string running

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7Kaufmann op. cit.
8Le Cerf and Labande, p. 4, note 2.
at 90° to the keylever, leading to consequent layout difficulties when a number of keys are incorporated. This hypothesis does not appear correct when we consider that Arnaut envisages that this second action can be fitted in the *clavisimbalum*, which has its strings running in the same direction as the keys.

Kaufmann suggested that the plectrum would pass by the string on account of its flexibility, which implies that it would pluck as strongly on the return stroke as on the initial, upward movement. He appears to have understood the triangle in a different plane, rotated through 90°, and this view does not appear correct⁷.

Clutton thought there was a means of avoiding a second pluck on the returning stroke, but his description of the *forpex* can be discarded since it is not consistent with all of Arnaut’s information and neglects to incorporate the spring.

There is something drawn behind the *cornu* which looks a little like a tongue, but there is no axle, such as is drawn clearly in actions 1 and 3. Le Cerf and Labande’s suggestion that this piece contains a damper is not entirely implausible, but it cannot be seen from the sketch how this would work. Le Cerf and Labande describe having constructed this mechanism, although their realisation is neither described in detail nor drawn. It is the only unresolved detail of this action that we cannot explain the purpose of the piece behind the *cornu*. Perhaps it was merely part of the mounting of the *cornu*?

It should not be overlooked that if this mechanism did have a damper, then it would be the only one of those described by Arnaut which did: it is a characteristic of the first three actions that after plucking the string was allowed to sound undamped.

Indeed, as practical experiment reveals, the subjective effect of a plectrum of the first or third type of action striking a still vibrating string is much louder than of the plectrum striking a non-vibrating string. In other words, it sounds much like a second pluck although in fact it is not. A plectrum of the second type of action produces a more substantial sound on the return stroke although it is more of the form of a “zing” which is produced (rather than a normal pluck) as the sloping underside of the plectrum rubs the string on passing it. Thus, this second action, if undamped, produces a more substantial sound on the return stroke than actions 1 and 3.

We can see that the advantage of the first or third type of action with a plectrum in a pivoting tongue lies in the speed of repetition and the reduction of action weight which is possible. The second action must be heavier since there is fair amount of friction which must be overcome when the *cornu* slides past the string. In addition the second action would have been heavy since the spring pressure which returns the action to rest has to be overcome by the player before even plucking the string.

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⁷Kaufmann, op. cit.
Summary of the four actions described by Arnaut

Following the interpretation that the second action incorporates a plucking mechanism, we have two different types of action described by Arnaut: actions 1-3 are plucking mechanisms, action 4 is a striking mechanism.

Actions 1 and 3: are plucking mechanisms with a plectrum held in a pivoting tongue. The plectrum material is not specified, but could have been, at least occasionally, metal. Metal plectra were found in the 1619 Johann Mayer harpsichord and Kaufmann writes that metal plectra were used (at some time) in the Royal College of Music clavicytherium\(^\text{10}\).

Action 2: describes a plectrum action with a distinctly audible sound on the return stroke. The sound of the upward pluck using a rigid horn plectrum is slightly rounder (more like a leather plectrum) than that given by bird quill.

Action 4: is evidently a hammered dulcimer action without check or damping of the string. A metal peg (like a clavichord tangent) strikes the string.

It is characteristic of all these actions that there is no damping, which has obvious consequences for performance style.

\(^{10}\)Carolinum Augusteum, Salzburg. Private communication from Kurt Wittmayer. Kaufmann op. cit. p. 11, note 4.
How were the earliest viols played?

Since writing Comm, 1709, I have been experimenting on an instrument which is a reproduction of the vihuela depicted in the ‘Madonna and Child with angel musicians’ painting in Colegiata, Játiva, illustrated as Plate 20 (p. 43) in Ian Woodfield’s *Early History of the Viol* (1984). There it is stated that the painting is of the Valencian school, and it is dated to be from the mid/late 15th century. The vihuela in this picture is plucked, but it is assumed here that there was no essential design difference between vihuelas that were plucked and bowed. In our reproduction, the maximum body widths at the upper and lower bouts are 19.0 and 20.0 cm, and the minimum width at the waist cut-out is 9.6 cm. The body length is 35.5 cm, and the string stop is 51.5 cm. The belly and back are flat, and the body depth is 4.0 cm. There are 9 strings in 5 courses, with the string band (between end strings) 3.0 cm wide at the nut and 4.0 cm wide at the bridge. The pegbox and glued bridge are of typical lute design, with the strings about 6 mm above the belly both at the bridge and at the waist. The vihuela is strung with low-twist and high-twist gut, at a uniform 3 Kg per string.

I have been playing it with a bow similar to those seen in the pictures, without a frog or differentiated tip. The stick is 68 cm long along its curve, and is of round cross-section yew (heartwood) of diameter 10 mm at the hand end tapering to 8 mm at the tip. It has about 100 hairs, with hair length 58 cm (between the permanent attachments to the stick on each end), and the maximum distance between the hair and the stick is 5.5 cm at 29 cm from the tip. This bow is about 20 years old, and the hair tension has not been released since it was made. If we were now to make a bow that we expect to be more typical, we would make it somewhat shorter, with fewer hairs and more of a taper in bow diameter (so that the point of maximum distance between between hair and stick would be closer to the tip).

When plucked, the vihuela has a lovely sound, as one would expect from a cross between a treble lute and a Renaissance guitar. When bowed, there are three good reasons to expect little of the power of sound we are used to from bowed instruments. The first is that strings vibrate in the plane of bow movement, and with such a low bridge, its small height can convert a very small fraction of this string motion (which is confined to being near parallel to the soundboard) into the bridge rocking that moves the soundboard up and down, which makes the sound we hear. The second is that sound volume depends on string tension, and with 9 strings attached to a glued bridge, string tension is seriously limited (this vihuela has languished for many years in a cupboard since the bridge was pulled off in a previous experiment). The third is that bowing at the waist, as all of the bowed pictures show, does not give the incisive sound produced when one bows nearer the bridge, as is universal today (the German version depicted by Virdung in 1511 had a long waist to have a full choice of bowing position). As expected, the bowed sound on the reproduction vihuela is very quiet and thin.

There can be no doubt that a soft ethereal bowed sound was a desired feature of this instrument at its inception. It is very easy to imagine that its intention was for contemplative expression, possibly of a religious nature, without the range of sound intensity that can convince by Renaissance rhetoric.

If I increase bow pressure (the force with which the bow hair presses on the strings) to much more than the bare minimum to get a bowed sound, all that it accomplishes is to mask the bowed sound by a scraping noise. At the string tension of 3 Kg per string, the light bowing indicated above hardly depresses the strings at all. Consequently, the contribution of any individual string to the total sound is greater than the others if it physically sticks out above the other strings, and it is less if it dips below the others. This makes it necessarily to carefully adjust the heights of the strings where they are tied onto the bridge (which the movable bridge some had avoids). This also makes a second or third course pressed against the fingerboard by fingering disappear from the sound unless the higher-pitched strings are also fingered at frets nearby. Reducing the string tension (by tuning down a fourth) doesn’t change this situation since, to avoid the scraping noise, bow pressure has to be much lighter.

Back to 3 Kg, at the low bow pressures indicated, it is possible to bow the strings on the ends of the string band without sounding any others. With careful bow control, this could even be done when bowing at places on the string other than at the waist. The function of the waist is to allow a greater range of bowing angle, and what that seems to accomplish is to allow easier choice of how many of the strings to sound.
the strings other than the end string will sound with it. Also, the end string has a somewhat fuller sound when bowed at the somewhat steeper angles allowed by the waist.

These observations differ somewhat from the speculations made about bowing this instrument in Comm. 1709 and previous Comms discussing it. I had not expected such a severe limitation of working bow pressures.

This vihuela was developed in 15th-century Spain apparently as an amalgam of the fiddle and the lute, with the bowing position coming from the rebab. The waist cut-out of its design was copied by the vast majority of subsequent fiddles. All viols descended from it, and without the waist cut-out, so were the vast majority of subsequent guitars.

The 16th century descendent of this vihuela that faithfully retained its size and shape (except for the waist cutout) was the Renaissance guitar. It had 4 courses, one less than the original vihuela. Mudarra, referring to the guitar in 1546, wrote "bordon en la quarta", indicating that the fourth course had a low octave, implying that that course could have been tuned with a unison pair at the high octave. It is possible that this ambiguity (between the lowest course being tuned as an octave pair, as with the lute, or tuned as a unison pair at the high octave) was also descendent from the original vihuela. If this is true, the original vihuela was at least sometimes tuned so that it could be played like the rebab. The rebab had two strings tuned a fifth apart. The vihuela, with 5 courses in lute tuning and with the 5th course at the high octave, also has the interval of a fifth between the end string that played the melody. When fingering allowed and when musically appropriate, all of the 5 courses could be bowed simultaneously. A less obvious, more difficult and less likely accompaniment possibility is to use a spare left-hand finger to pluck or strum courses that were not being bowed.

If the fifth course had a low-octave string (and was heard to be at the low octave), the courses at that end of the string band would probably usually be involved only with accompaniment, while courses at the other end would provide the melody. If the melody was bowed, any number of adjacent courses would also be bowed in accompaniment. Alternatively, the melody could be plucked or hammered on the strings with left-hand fingers, while the accompaniment could be bowed on the lower strings. Left-hand plucking requires one finger to pluck and usually another finger to stop the course, leaving two fingers for stopping accompaniment courses. Using the left thumb for stopping the lowest course seems more awkward in the vertical viol-playing position than in shoulder-held fiddle position or cross-ways lute position. If one didn't want the sound of higher courses than a bowed melody one, they could be damped, as so could accompaniment courses that were awkward to stop in the appropriate harmony at the time. Damping would be by rolling over a stopping finger.

A possible variant in tuning could have been with the third between the 2nd and 3rd course, like a guitar, instead of between the 3rd and 4th. This makes fingering bowed chords in some keys rather easier. If this tuning was used, then the occasional earlier 16th century references to 5-course guitars could just be to a continuation of this vihuela. The proper baroque guitar, developed late in the century, could well just have been a further continuation in an enlarged (and especially deepened) format. Tuning requirements for multiple-string bowing are similar to those for strumming.

The simultaneous playing of a melody with accompanying notes dates at least from the beginning of bowing. The tuning of accompaniment strings in fifths and octaves was appropriate when these were the only consonant intervals. In the 15th century, the third began to be generally considered to be consonant as well, so the acceptability of accompaniment chords including thirds made lute tuning (in fourths with a third) practical for this solo style of playing. This vihuela explored this acceptability in Spain, as the bowing of lutes did outside.
On Francesco Antonio Sgargi's book:

[...]

La viola da sei, o sette corde, in Bologna 1747 per Tommaso Colli a S. Tommaso d'Acquino.

After a dedication to the Count Cornelio Pepoli Musotti there follows a foreword in which the author excuses himself for having dared to apply "to a very expert player [Count Pepoli]". Sgargi reminds "the very noble Sir" [Count Pepoli] his recent work: an organ in which he built a flute stop of astonishingly realistic sound. The success gained in the construction of the organ led him to try to improve the playability of the viola da spalla, also named viol d'amour and/or Viola Angelica: Sgargi is referring to "professore" Gio[vanni] Girolamo Laurenti's playing of the viola d'amore. It was clear that the "professore" has been compelled to retune the viol according to the tonality of the music played. Sgargi was surprised in stating that the scores for this kind of viola are written in the form of a tablature: "the notes are not legible according to the clef position". It is evident that Sgargi was not yet aware of the use of tablatures: to give an example, he writes that the notes traced on the middle line [string] corresponds to the Bemi on a Violino all'Italiana, to the Gesolreut for a soprano, to Gesolfaut for an alto, to Alamire for a tenore and to Delasolre for a Basso. He writes also that on these instruments (namely, the viola d'amore and/or angelica) the same note is played pressing with the forefinger on the middle string as it were Bemi, even if the instruments "will emit another sound and another note". Moreover, he points out that one has to bear in mind the change of clefs and other advice, exceptional as to the usual musical practice. Therefore Sgargi stresses that such instruments were not useful for professional use.

He writes that after a long period of studying he got a single tuning fit for every tone [mode] and giving a sufficient number of consonances "on every tone and semitone", i.e. notes referring to the pitch of the instruments tuned to the usual pitch for Bologna. This way the viola d'amore could be played in every kind of concert and even in large sections of violin part as solo or accompanied in the alto part or in the bass part. In Sgargi's opinion it could be possible that his findings were not original although he was not informed that another "professore" did come to the same solution.

"The viola has some strings played by the bow and others resonant strings on an inferior level. The upper strings are like those of the violin: the cantino is much thinner, the intermediates progressively thicker, but the thickest is considerably thicker than the mezzana of the cello but thinner, I think, that the tenore of an

1 Being the Italian text very redundant, it seems convenient for the English readers to have an abridged version in English.
ordinary cello. The three thinnest strings are not wound with copper wire. On the contrary, the other four are thicker and wound with copper wire. From the nut to the tailpiece there is a distance of 14 1/3 once bolognesi; from the tail to the bridge the distance is of 1 1/3 o. The bridge is 1 1/6 high on its borders and it is considerably higher in the middle like that of a violin. The other strings tighten under the keyboard and the tailpiece are of brass. The thickest ones are of \( N.5 \) and the other progressively come to the \( N.8 \). The lower strings pass through their holes in the bridge, 3/4 o. below the upper strings. On the nut the distance between the thickest and the thinnest string is of 1 1/4 o."

"On the keyboard there are wound 7 frets, made by a thin cantino. The frets are spaced every half tone and even if they are not necessary, their presence is very comfortable for the player. Anyway, they can be cut away according to player's will. The bow is like that of a violin but longer and less arched.

The instrument is played placing it on the shoulder, as it is usual for violin playing. The same advice is valid for the viola d'amore with six strings, that is for the viola d'amore without the thickest string."

Then follows Sgargi's tuning: the thickest string was tuned in Gesolreut, at the unison with the low Gesolreut of a cello and with that of 7 feet of the organ. The second string was tuned in Csolfaut a fourth higher. The third was Elami, a third higher. The others were tuned by fourths: Alamirè, Delasolre, Gesolreut and Cesolfaut at the unison with the note indicated by a digit 2, that is the note pressed with the second finger on the middle string ('mezzana') of the violine. All these were the strings played with the bow. "I leave my viola tuned in this way, without release the 'cantino', as the strings last some months and do not break provided that they are worn out by the finger or the bow".

The lower brass strings were tuned by semitones, starting from Ffaut and ending in Elami. The order in which these strings were tightened and tuned had no bearing. What is important this was that the strings were tuned exactly.

"I noticed, very noble Sir, an astonishing fact, even applied to a philosopher for help. Every given lower string vibrates not only in unison with the upper string of the same pitch but also with those one octave or two octaves higher. I did not find any explanation of this physical fact, giving up further investigation".

Sgargi writes that the noble Sir can easily recognize from the picture of the tuning the two examples of tuning that he propose to him:

"the natural one ('per B quadro') and the 'per B molle' one. On the first stave one sees how to write music by the natural tone ('modo naturale')."
"The lines represent the seven strings of the viola d'amore to be played with the bow. The digit N.1 shows the thickest string and the N.7 the thinnest one ('cantino'). Other digits written on the lines indicate the frets and the words written along the lines, the fingers. The first word indicates the forefinger, the second the middle finger, the third the ring finger, the fourth the little finger. O signifies 'open string'.

It may be noted that by 'smanicatura' on the 'cantino' one can go on to the Cesolfaut 'sopracuto' as well as to higher notes. Thus, I think that it is not necessary to reach such notes as 'sopracute', for the player would 'go out' of the viola d'amore compass and would 'go in' the violin compass.

"From such examples is evident that in playing 'per B quadro' it seems that the hand has to be positioned far from the nut, compared to its position when playing 'per B molle'. In the first way the player never presses on the first fret except when playing on the second string - if one wants to get the Ffaut. Whereas in the second way one presses all the strings on the first fret (except the 'cantino') and if there is no 'B molle', also the 'cantino', in which case one needs to press on the first fret. This way the playing is more comfortable if chords have to be played ('raddoppiare le note ... con quegli accompagamenti che si possono avere').

"I add the 'scala per Diesis, which I show as follows."
Anyway, from these examples there could arise one doubt, if one has to choose between the different 'portamenti' shown on the scales. Different fingerings may be more convenient for a player who is in the position of choosing his preferred fingering. For instance, I put the 'B molle' in 'Alamirè acuto' on the first fret of the sixth string for the forefinger and put the 'Gesolreut Diesis', which is the same note, on the sixth fret of the fifth string for the ring finger.

I hope to have demonstrated how to play this instrument. Thus, when played in this simple way, the viola d'amore emits the same tone colour ('la stessa armonia') of a tiny violoncello or a usual viol with 4 strings or whichever old kind of instrument used long since. Never will our instrument sound like a viola d'amore or angelica unless the player adds to every tone or semitone the consonances of third, fifth, octave (at least that of fifth and octave) or some dissonant chords. In other cases one has to press two strings on the same fret, as it occurs playing the violin, the lute, the archlute, the mandoline and so on. To play consonant or dissonant chords, one has to choose with which string to emit the needed notes; this will be learned by experience. Surely, it is more difficult to reach the notes on frets very far from the nut (by the 'smanicatura').

With regard to what I wrote about the viola with only 6 strings - that is without the thickest string - the compass of the viola d'amore will start from the Cesolfaut (under the Ffaut) going on as previously said.

I do not need to explain how to correctly use the bow, to emit louder sounds ('crescere') without creak ('stridere'), how to articulate the sound and the hand, how firmly press with the fingers, how to trill neatly, how to play smartly whichever music, as the very praised Sir Giovanni Girolamo Laurenti would have explained us.

Sgargi concludes telling again the "very noble Sir" that his unique desire is to offer to him an easy and useful manual for playing on the viola d'amore any 'cantilena' on every tone according to the local pitch. He hoped to be able to show all that in public concerts.
Some old Italian units of measurement

With reference to the "oncia bolognese" quoted by F. A. SGARGI in his booklet [...] sopra LA VIOLA da sei, o sette corde [...], Bologna 1747, and the ones published by G. O'Bryan (according to whom the average value of the "oncia Bolognese" was of about 3.16 cm) it may be of interest to know other old Italian units of measurement published by L. MAZZOCCHI, Memoriale Tecnico, Raccolta di Formule Tabelle e Regole Pratiche ..., XIII Edizione, Milano, C. F. Manini, 1919, p. 115-116. Referring to this manual the length of the "oncia Bolognese" was of 5.3333 cm.

Measures of length (in meters)

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W. Rottleuthner published a list of hundreds of units of length, used in the Italian and Austrian Tyrol until the end of the 18th century, in his book Alte lokale und nichtmetrische Gewichte und Maße [...], Innsbruck, Universitätsverlag Wagner [1882].
Some Brief Thoughts about the Future of FoMRHI

I would like to take this earliest opportunity to air a few ideas, and to consult you about them. No sudden changes are planned (these notes are not intended as a new manifesto for the future of FoMRHI), and David Armitage and I will aim to maintain the informality, openness and prompt, regular publication which have characterised FoMRHI for a quarter of a century. Printing and publication will continue essentially as before for the time being, but with the centre of production and distribution moving from Manchester to London.

Restoration and repair: FoMRHI's objects ('Rules', Bulletin 6, January 1977) are 'the promotion of co-operation and mutual assistance between members in the interests of authenticity in the manufacture, design, reconstruction, restoration, repair [my italics] and use of historical musical instruments of all types and periods'. Of these six spheres of activity, 'restoration' was explicitly replaced in the Fellowship's title by 'research' in the nineteen-eighties, and repair also was perhaps, by extension, implicitly demoted at the same time. The reasons for this were discussed at the time, but it is clear that there remains a tension between FoMRHI's objects and title. Historical instruments continue to be repaired and restored, some of them by FoMRHI members, but little material on restoration has appeared recently in the Quarterly. There is a danger that this will become an underground activity, whose techniques and ethics are not properly accounted for or debated in print, and it is consistent with FoMRHI's objects that we should strive to avoid this. Interventions of these kinds affect the stock of historical instruments, and should therefore concern us in any case; they may also reveal information otherwise unavailable to researchers. Restoration reports and comms. proposing or enquiring about restoration practice will be welcome, as will suggestions as to FoMRHI's future orientation in this area. It is, of course preferable that interventions should be fully discussed before the work is done, so I would like to invite case studies, possibly setting out alternative courses of action (and inaction) for consideration.

Nuts and bolts: There have been relatively few comms. in recent issues on practical techniques. Often these are best written up not by established masters addressing beginners, but by those who have just learned something new, even if they are not completely confident of it. If we do this, others may eventually chip in with their own improvements or alternative methods. Please write.

Book reviews: We will try to maintain a good flow of publications for review. If anyone is able to help in this, either through personal connections or simply by drawing attention to items we might request, or would like to propose themselves as potential reviewers of publications in a particular field, please let me know.

Reviews of articles: Most scholarly writing reviews previous published work to some extent. Eph's recent pair of review articles concentrates on particular, influential papers in a way that I found useful, but in a rather confrontational manner - I think avoidably so. I would welcome opinions as to the value of such reviews.

Record reviews: Such reviews have appeared occasionally, but never consistently enough to be one of FoMRHI's mainstream activities. Some years ago I suggested that FoMRHI might concentrate on reviewing recordings primarily from the viewpoint of their value as documents of the sounds of important historic instruments or important reconstructions thereof. What are members' views?

Instrument acoustics: There has been a growth recently of research into the acoustics of historical instruments, both the mechanics of the instruments themselves and analysis of the sounds they produce. I would like to encourage such work here, and feel certain that many members could contribute observations of value.
Seminars and Conferences: In the nineteen-seventies and -eighties FoMRHI occasionally mounted seminars in Manchester, London and Oxford. I don’t think anything of this sort happened in the nineties, and I am interested to know what members would like. More recently, I have run a Music and Technology Research Seminar at London Guildhall University (more than half of whose sessions have been historical), to which FoMRHI members able to attend on Tuesday evenings have been invited. (This didn’t run in 1999-2000, but is due to resume in October.) If another time or arrangement suited a significant number of members better, we could consider a change. Whole-day meetings, with several contributors, are presumably better for the majority of members, who would have to travel from afar. I am, incidentally, planning a conference on Fifteenth-Century Instruments and Instrumental Music, to be held in London in July 2001, and anyone interested in taking part in this is invited to make contact. Further details will appear in the October issue.

Membership and Subscriptions: There has been a slight falling-off in numbers of members. Please do all you can to promote membership (especially active membership) of FoMRHI. I would like to see more institutional subscriptions, not only because they increase access to and awareness of FoMRHI’s work, but because, in spite of the original intentions of its founders, FoMRHI has in part become a document of record of (to its members, at least) an important sphere of activity. Anyone who has tried to trace ephemeral materials of the past through the major reference libraries is likely to sympathise with this aim. Would members who might be able to assist in this please let me know?

Register of Historical Instrument Research: With its aim of publishing research in progress swiftly, the FoMRHI Quarterly is in one sense a good indicator of current research, but many of us have more work on the go than we can publish immediately, or long-term projects which can take years before anything appears in print (I am as guilty as anyone in this regard). If it was thought to be of value, and if members (and others, perhaps?) would contribute to it, FoMRHI could maintain a register of research currently in progress into historical instruments and, perhaps, associated instrumental music and performance practices. At the very least this could serve to put interested parties in touch with one another, and help to avoid duplication of effort. Depending on the scale of interest, this could appear simply as a brief section of the quarterly Bulletin, or it a regular update at the rear of the Quarterly; or it could be unified as a separate supplement, issued perhaps annually; or the whole could be maintained and constantly updated on an expanded FoMRHI web page. There would be a fair amount of work involved in setting it up and maintaining it, and I’m only inclined to proceed with this if it is wanted, so please let me know what you think.

News and requests for information from researchers and makers: These will continue to be very welcome, and will appear in the Bulletin, or as Comms., irrespective of whether we eventually go ahead with the register idea.

Internet discussion: Would members welcome, in parallel with the paper Quarterly, an opportunity to discuss FoMRHI business more immediately through an internet discussion list which they could join? I have recently been involved in setting one up for anyone interested in new musical instruments, and could do so for FoMRHI too, if it was thought useful.
FoMRHI Quarterly 100! Congratulations to all who have created and maintained it so far over its well-worthwhile career.

While others may be looking forward to its next century, I'd like to look back and ask members how often they need to refer back as I do to earlier articles and information, and how accessibly and tidily stored they keep their Quarterlies.

Jeremy has often requested more "nuts and bolts" comms. This one doesn't involve nuts and bolts, just small pieces of wire. Nor does it involve Scholarship, or even dear old Occam and his razor - may they be allowed to rest in peace.

Following is what to me seems the best way of storing Quarterlies for safety and ease of access. For each issue, make up two small pieces of wire as shown life-size to the left. A small jig to assist uniformity can easily be made with a centre pin of 6.5 to 7mm in diameter and two small nails as shown.

The wire can be anything between 1.0 and 1.5mm - I use copper telephone wire (not the stranded type). Open out the Quarterly at the centre, and with a \( \frac{3}{8} \)" or 12mm chisel cut two vertical slits through the fold with the standard ring-binder distance of 75 or 80mm between centres. Push a wire loop through each slit, and then you will have two loops of wire projecting through the spine of the Quarterly. These fit over the rings of a normal ring-binder, or better still, a lever arch file A5 size. This keeps the Qs flat and in order, and can also be used for the membership lists and indexes. The metal loop slides easily on the rings, and if necessary a Q. can easily be removed. A normal ring binder accepts a year of thick Qs, while a lever arch file is better in that it caters for 3 years.

If you start now, and add them as they arrive, your next century of Qs will make a handsome, useful and accessible addition to your reference library.
Our Editor has now explained (Comm.1710) that when he makes a positive categorical statement we should preface it with 'Perhaps...'. I think he is unwise. It is the mode of argument of Disgusted of Tunbridge Wells, and of gurus such as Newman (Comm.1695) who arrive at conclusions by some kind of inner light. The editor or referee of a reputable scientific journal, offered such a statement which is neither generally accepted knowledge nor supported by evidence, will return the paper to the author for reconsideration. Authors in less formal publications such as FoMRHIQ would do well to exercise a comparable self-discipline. If we had been told in 1976 that perhaps there was a rope used by sailors called the catline it would have warned us to investigate a little for ourselves instead of accepting it (as I did at the time) as a well-founded factual statement from an expert, and would have saved nearly a quarter of a century of (to put it tactfully) misunderstandings.

It is good idiomatic English to associate a superlative adjective such as 'lowest' with a plural noun. The best things in life are free. I was able to find quickly a score of examples from English authors of standing, starting with Psalm 139.15 - 'the lowest parts of the earth' in the Authorised Version of 1611, down to the present day.

Pitch of Electrical Appliances – Comment on Comm.1706

Despite his professed ignorance of things electrical, no doubt Alec Loretto remembers that mains electricity 'alternates' at a frequency of 50Hz (Europe) or 60Hz (US). Some appliances with moving parts produce tones related to the mains frequency, and others produce tones which are unrelated. Sometimes the parts are not really intended to move, such as transformer parts which often hum quite strongly. When the tone is related, it is usually 100hz, the second harmonic of the fundamental. The nearest equal tempered note to this is G2 at 98Hz, a difference of 2Hz, or about 35 cents. I was going to propose this as the reason for the FLATNESS of his razor, until he spoilt it all by saying that it was battery powered. Batteries of course produce so-called direct current which has no frequency component, meaning that the razor's pitch must be intrinsic to its mechanism, except in so far as flatness of the battery may cause flatness of pitch, as he so rightly points out. In the US the frequency of the main supply results in the nearest related equal tempered note standing almost exactly midway between A #2 and B2. One of the lathes in my workshop used to produce 100Hz quite strongly. It was difficult if not impossible to tune bagpipes in G, where the bass drone is 98Hz, when my assistant was using the lathe. Now I have fitted it with a variable speed drive, an electronic box which operates by changing the frequency as well as the voltage, and does not seem to transmit any musical tones to the motor.
Decoration and its current use

Donington (1963) defined 'embellishment' ('decoration' is an equivalent term) as 'everything in the music which can be changed without affecting the basic [melodic and harmonic] progressions'. It is also applied to the active making of such changes. What is considered basic (or not) can vary considerably with the type of repertoire and with when it is interpreted. 'Ornamentation' usually refers to the types of decoration which are rare in modern performance, and usually involves far-from-subtle changes of note pitches (usually adding more) and times. Musicians before the middle of the 18th century normally improvised ornamentation throughout the music they played.

We could categorise the various types of decoration that have been used according to whether the main function is to decorate an individual note, to decorate a stretch of melody (in polyphony as well as monophony), or to decorate the mix of notes sounding at the same time (i.e. the harmony in Renaissance and baroque music, and the relationship with the tenor in medieval music).

The pitch, loudness, sound quality or duration of an individual note can be altered. The altering of pitch can be to a different one (i.e. accidentals) or to various pitches during the time of the note (i.e. graces). A grace can be a pattern of discrete pitches or it can use in-between pitches. Graces using discrete pitches can be long or short, and there are long and short as well as upper and lower versions of appoggiaturas and shakes. Other such graces are relishes, mordents and turns. Graces that use in-between pitches are vibrato and slides (i.e. portamento). The trillo (now called tremolo) is also considered a grace though it only involves repeating a single pitch. Articulation involves how sound quality, loudness and duration of a note are varied. This term is often more narrowly applied to how much aural separation there is of a note from its neighbours. In this meaning, decoration by slurring involves no articulation. The notes of graces are usually slurred except at cadences, where the graces are usually long and articulated.

In stretches of melody, phrasing is varying the loudness, sound quality or tempo. Modern rubato is just a local slowing of tempo, but in early rubato the time was made up elsewhere, so that the tempo at main beats was unaltered. There are many other ways of decorating by lengthening some notes while shortening others, including dotted rhythms. Replacing the notes by other notes has been a very common way of decorating a stretch of melody. Sometimes it is just a bit of recomposition (often necessary to effectively fit different verses to a tune). Other times it just adds passing notes or is an articulated grace. Often it is more serious division, which replaces a note by a group of shorter notes. Descanting replaces notes by others placed differently in the harmony, and it is often used to add a new melodic line instead of replacing the old one. A descant can be divided just as the melody, or a melody can be divided by bouncing around various descant note possibilities.

The last way of dividing a melody mentioned above also decorates the harmony. The harmony is also decorated by starting dissonant notes of graces or by introducing anticipations or suspensions into the melody. It can also be decorated by adding or replacing chords with other chords, or by breaking simultaneity with arpeggiation or strum patterns.

There are various ways in which ornamentation is in conflict with modern musical philosophy and aesthetics, leading to its minimal use. Current philosophy in various arts rejects Victorian values which seem overbearing, and prefers minimalist modern values ('less is more'). Decoration is considered superficial, and avoiding it seems more profound and honest, and so more respectable. Philosophy also values the composer's contribution to the music much more than that of the performer. This makes ornamentation not notated by the composer to appear to be contrary to the composer's intentions. There is an element of recomposition in much decoration, and that is seen as usurping the composer's authority. Also seen as usurping that authority is the effect on clarity of ornamentation. The composer is considered to be the only one that has the right to vary clarity for musical expression.

A source of conflict between modern musical aesthetics and ornamentation is the considerable lengthening of the musical phrase in the 19th and 20th centuries. The shaping of music at all time scales (from that of an individual note to that of an evening's music-making) has always been of concern to musicians, but the shaping of the musical phrase has always been predominant. When
vocal music dominated, the musical phrase followed the verbal phrase, with the shaping amplified by the expected rhetorical public-speaking style of delivery. Then the emphasising of important words could be helped (especially when dynamic range was limited) by gracing the relevant note or notes. With the much longer modern phrasing, the emphasis given to individual notes by gracing conflicts with the smooth shaping of the phrase. This smoothness is also violated by dotted or other rhythmic alterations.

Related to the lengthening of the musical phrase is the quickening of tempi. Since the Renaissance, there were always musicians who had reputations for being able to play fast, which they indulged in by playing divisions in smaller note values than others. With later composers tending to write more in smaller note values and the related development of 'velocity-school' music teaching in the 19th century, being able to play very fast then became a necessary component of good technique. With tempo standards highly eroded, musicians (especially those trying to project a youthful, spirited and a professional image) have been choosing tempi which display that 'velocity' technique. Faster tempi and minimising ornamentation promote each other. At faster tempi, ornamentation seems more superfluous, and it becomes more difficult (and sometimes impossible) to do.

Also conflicting with some early ornamentation practices is the modern fetish of insisting on spot-on intonation throughout each note. Thus gracing (other than a subtle vibrato) that uses pitches outside of normal scales is considered unmusical or incompetent. Portamento is considered a 'Romantic' excess. Slides are often responded to as light-hearted humour because of association with their use in jazz.

The advent of the recording industry has greatly raised standards of apparent perfection in performances, stifling risk-taking. Improvised decoration is thus discouraged. The fetish of recording engineers to hear tone with a minimum of extraneous noise has excluded some of the range of originally-used sound qualities of notes.

The musicologists and musicians specialising in early music are very much immersed in our current serious-music culture. The musicologists, in their other role as music critics, have been instrumental in developing and upholding these modern attitudes to performance. Anyone immersed within a culture has difficulty in being objective about differences between that culture and a related culture. This is particularly true with the view musicologists have about early music cultures. They believe that they have tuned in to the musical aesthetics of the time, and have convinced themselves that ornamentation is not an essential part of it. Thus they even have no difficulty accepting the omission of some of the ornamentation notated by the composer. The editions of early music that they research and prepare are intended to be performed and enjoyed in our modern music culture, so they have had no interest in researching aspects of original performance practices that might reduce success in modern performance. Evidence for such aspects is usually scattered, and so is easily ignored (the evidence indicating that early tempo standards were slower than modern interpretations is very conclusive, yet it is still ignored). The early musicians, of course, are happy to agree.

Consequently, the evidence on original practices of ornamentation has very rarely been interpreted in attempts at fully reconstructing possible historical performances. These attempts have mainly only imitated ornamentation that is fully notated elsewhere. The published historical guidance is generally inadequate and often misleading, but it is rarely consulted. Most early musicians are not concerned with historical guidance, believing that the relevant historical performance practices had been worked out way back in the 1950's and 60's, and their training has included all they needed to know about it.

This is unfortunate, since some of the momentum in the public success of the early music movement has been spent, and there is need for something new to pick that momentum up again. It is quite possible that the revival of some of the historical ornamentation practices will be found to be remarkably attractive. All that is required is knowledge, imagination and courage. This approach has the added value of giving audiences more of the historical accuracy that it naively is expecting from early music performances. There are ways other than adding jazz-saxophone descants or making elaborate orchestrations using early instruments.
Why want to hear what it sounds like?

Most want to hear it because of curiosity. With my cat and me, curiosity is an exploration in the hope of finding something that is emotionally satisfying, or at least that is interesting. That is fine to attract visitors into instrument museums (that offer such a service), or to get ticket buyers for concerts, or to induce music historians to investigate, but it has been a hindrance to music history scholarship.

Musicologists who are preparing editions or are trying to identify composers immerse themselves into the relevant musical styles and develop aural judgement from that immersion. This works for them and is much easier than the alternative, which is to analyse objectively what makes a musical style what it is, and to use logic and the statistics resulting from the analysis to come to their conclusions. It is likely that in very few generations, musicologists trained in information technology will routinely be using the latter method. The problem with their dependence on aural judgement is that they can't avoid getting aesthetically locked into currently popular assumptions about performance practices that are different from what should be relevant to their study. These include assumptions about tempo, note shaping (in pitch as well as tone colour and loudness), phrasing and embellishment. Objectivity is not served, as they think, by just performing the notes, as written, at a tempo chosen supposedly 'for convenience', (but actually for optimum enjoyment). They are so dependent on these assumptions in their work that they are very reluctant to question them, and research in these areas is avoided and even suppressed. Their conclusions will clearly be affected by the distortion of making judgements about the music while performing it in a way that is bound to be different from the original way.

Any listening to historical music is listening to a sequence of notes plus a set of assumptions about how they were produced and interpreted. The popular performance assumptions by early musicians and musicologists is to adopt performance practices that are the most respectable in modern music-making, except of course, for differences that are accepted as particularly characteristic of the historical period. The criteria for acceptability of the different historical characteristics include that they are aesthetically satisfying to our modern ears. The implicit assumption made by music history specialists of today is that they have learned to appreciate early music in as close a way as possible to the way that the early musicians did. Evidence contradicting this is ignored and confined to the dustbin of 'mysteries'. The objectivity demanded of good scholarship is not well served here.

If a surviving original instrument is of a type that modern audiences will pay to hear (and so players want to play), there is considerable pressure to make it playable and to play on it. Players generally prefer to play on a 'restored' original instrument than a 'copy', and will acquire one if they can. It is a good investment since apparently competent restoration considerably increases its financial value. If the instrument is in a collection, not available for players to own, its value to its keepers (in their relationship with the public) is usually much increased if it is playable. Audiences want to hear it. Makers want to play it to decide whether it is a 'good' example to attempt to copy. Players are inspired by playing it, convincing themselves that it teaches them things about playing authentically. These are clear socially useful reasons for restoration, but we should also be clear about the positive and negative contributions to instrument history scholarship made by restoration.

There is no question that evidence valuable to instrument scholarship can emerge from the careful examination of an original instrument, the work done on it during a restoration and a comprehensive published restoration report. The amount and types of evidence collected and reported are usually severely limited by the available time the restorer has, and by his or her research training, interests, equipment and communication skills. Other evidence of potentially equal or greater value is not collected. As a result of the restoration, some of that evidence is lost forever, and much of it becomes considerably less available for collection. A dismembered instrument is much more valuable for scholarship than one in playable condition (unless its keepers cannot be trusted to competently take care of its components).

The value to instrument scholarship of measurements of the sound spectra produced by a restored instrument is very limited. There may be questions about the historical accuracy of how its sound is produced (especially with wind instruments) and about how the ageing of its materials over hundreds of years has changed its sound (especially with wooden instruments). Neglecting these questions, such measurements would be interesting if they can be associated with different schools of making, or
if they can be related to details of design and construction. Very little research of this nature has emerged so far.

As a result, we must admit that the desire to hear how historical music or instruments sound cannot be seriously justified in terms of increasing our objective knowledge of music history. That desire is mainly confined to developing a subjective relationship with that history.

In early times, music performers were the least respectable of music professionals. The most respectable were music theoreticians who explored the universality of the musical intervals in all aspects of our physical and spiritual existence. No-one thought of actually trying to hear what the music of the spheres sounded like. They were not concerned with themselves enjoying the sounds, but they enjoyed the idea that music was a unifying factor in understanding the world and the universe.

We can enjoy our objective knowledge of music history without being influenced by enjoying or not enjoying hearing what it really sounded like. Good history books don't include CDs. What is on offer from the modern early-music movement is not what it really sounded like, but interpretations thoroughly infused with modern professional performance practices, adapted for the enjoyment of modern audiences. It is rather like tourism, and makes the same compromises with authenticity.

What the music really sounded like is a very legitimate subject for music scholarship. The practitioners have so far been much more interested in having an impact on the musical public than in pursuing this subject objectively. Thus they make the practical compromise of assuming that modern performance aesthetics is essentially the same as that aesthetics centuries ago, deliberately ignoring clear evidence otherwise. Perhaps future generations will be more devoted to uncompromised historical scholarship than to perform a service to the contemporary public, and so will be able to study this subject properly. Till then, it seems to be appropriate to avoid the issue and just enjoy hearing the sounds we like and ignoring those we don't, and be careful about claiming that discovering what the original music sounded like is the purpose of our scholarship.