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1134 by A. Meyers; Violin Fraud: Deception, Forgery, Theft and the Law, by B. Harvey.

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FELLOWSHIP OF MAKERS AND RESEARCHERS OF HISTORICAL INSTRUMENTS
Hon. Sec.: J. Montagu, c/o Faculty of Music, St. Aldate's
Oxford OX1 1DB, U. K.
FELLOWSHIP of MAKERS and RESEARCHERS of HISTORICAL INSTRUMENTS

Bulletin 70

A somewhat gloomy New Year at present. Not only is the weather somewhat depressing (apparently the lowest barometric readings for decades or longer), but renewals are fairly sparse, well down on this stage last year, not many of you have sent us any Comms, and only one member has sent anything in for the Bulletin.

Are we running down? Are we running out of material? Are we running out of the need for FoMRHI? We have lasted a great deal longer than anyone expected way back in 1975, but I think that there is still a need for us. There is a continual intake of new members, people coming into the field, but what we seem to lack at present is people willing to pass their knowledge on to them. We were very lucky in the early days. We had a number of members who were willing both to reveal their knowledge and to take the time to do so. I find it difficult to believe that our membership now is more inclined to be secretive, or even that they have so much less time for writing. To some extent, among the more recent members, it may be shyness, feeling that they are joining a society of experts and had better keep their mouths shut until they are expert in a few decades. My friends, it ain't like that! What we know, we all learned on the fly, and a good deal of it we learned from each other. The only way that we can acknowledge our debt to those from whom we learned, is to pass on what we know to others. And we all know something, and however obvious what we know may seem to us, you may be surprised to how many people it's a new idea. So, more recent members, don't be shy.

To older members who've not written notes for the Bulletin or Comms, I'd say, why not? Surely you know something that other people don't know. It's difficult to believe that anybody who spends time in a workshop hasn't thought of at least one better way to do something, at least one gadget that's useful when you need three hands and you don't want to take your boots off, and so on. If you have, write it up.

And to those who've been with a few years and who have written things in the past, have a look through your old Qs, remember that anything earlier than Q 44 (July '86) is out of print except for Qs 30, 33, and 38. See whether anything you wrote earlier than that might not be worth reprinting, or perhaps better updating, and let me or Eph know. Some years ago we thought about reprinting key articles, but a number of people were reluctant to give us a free hand to choose articles because they felt that they might not still have the same ideas. Neither Eph nor I have the time to chase through back issues and then try to track down authors who may have left us to get permission to reprint. It might be a good idea, though. Would anyone like to volunteer as a reprint editor/selector? And would authors who are still members look through and say what they would like to see available again? And check to see what they don't want reissued – one can well understand that ideas change and God forbid that anybody bring that awful idea of mine up again.

If by chance any of you are upset (as I often am) by the lateness of our Q's appearance (and what with the beginning of term etc, I'm badly behind and doubtless Eph will be further, and the printer further still), let me console you a little. CIMCIM, the musical instrument museums curators group of the International Council of Museums, has for years published an annual Newsletter. The latest issue arrived three days ago. It is no.14, and it is for the year 1989. We've never done you quite as badly as that, so have faith in us. There are, incidentally, several important articles in it, two of them relevant to reviews herewith. One is the schema for Arnold Myers's Edinburgh catalogues and the other Karel Moens's paper which casts very considerable
doubt on the authenticity of a number of sixteenth-century instruments, among them the Vienna Linarol violin, those long narrow viols by Ciciliano and others, and the Nürnberg Vogel bass.

It has all appeared before, in *Musica Antiqua*, but that was in Flemish, and this is the only appearance that I know of in English of this very important material.

**FURTHER TO:** Bulls 66, 68, & 69 – Vegetable ivory, Julian Goodacre writes:

**TAGUA NUTS.**

These are available in the UK from Jean Burhouse Furniture, The Old Sawmill, Inver Dunkeld, Perth, PH 8 0JR. (0350 727723. FAX 0350 727261) Price £5.25 per kilo. They also stock a large range of imported and local woods. Good supplies of ebony and African blackwood. They have a comprehensive catalogue of tools, woods and wood finishes. They run a postal service and are helpful and friendly to deal with.

Julian also sent an advertisement headed ‘The Hanging Gardens of Britain’ for plantpot holders with a nice misprint – ‘Transform those ugly dronepipes into stunning floral displays’.

**Comm.1117:** I didn’t comment (save to apologise to him) in Q69 because we’ve had an agreement for a long time that those of us who could get in on the same issue don’t do it (which is why, although I’m supervising him, I’ve not shown Paul White any of the Comms referring to his in Q69). But I would like to ask Cary why he supposes the RILM office asked us for free copies of the Q a few years ago, and why I agreed to put them on the free list. We don’t ask authors to prepare abstracts; I’ve been against it for many years, long before FoMRHI was ever thought of. For those journals that insist on it, I do it under protest. To my mind, a title should be self-explanatory, for example ‘Why have abstracts?’, the abstract for which would read ‘the article discusses whether one should have abstracts or not’. To my mind, if someone wants to publish abstracts, OK fine, he or she’s welcome, but let them do the work. Apart from anything else, they’ll spot what interests them better, usually, than the author, who sees best what interests him or her. The point of my concern was, here they were publishing abstracts, here we’d been providing the material free, none of it was being used, and, as a corollary, is it worth going on sending free copies to RILM? Eph’s the editor, I’ll let him decide that one; he can cut them off the list if he likes. But I’m glad that it wasn’t any agin’ us reason on Cary’s part. I may be bad at keeping in touch with old friends, but I don’t like to think I’ve lost them.

**RECORDINGS:** Martin Souter has recorded the first five Handel harpsichord suites on the William Smith harpsichord which may have belonged to Handel (see the February *Early Music* forthcoming). These are available on CD, Isis CD003 (*Handel’s 1720 Harpsichord – Handel Suites 1-5 – Martin Souter – Bate Collection, Oxford*), rrp £12.25 but because I agree that CDs are grossly overpriced in this country, £10.50 + £1.00 p&p from the Bate. It’s also available as a cassette, Isis MC003, at £7.95.

**COURSES:** We have another Bow-Rehairing course fixed for May 29/30. These book up so fast that we have a waiting list every time and therefore fix another session; the demand seems insatiable. So if you want to come, book quick; places are strictly limited to 15, so advance booking is essential. It’s the usual £20 (£15 to Friends of the Bate).

**CODA:** It’s now a few days since I started this Bulletin (too many and I apologise for the resultant lateness of this Q, but as so often there have been a variety of crises that took me away...
from FoMRHI to run the museum), and the weather is better, which has cheered me up, and more renewals have come in, which has also encouraged me, though we are still below 50% renewed for 1993. So Happy New Year to less than half of you; the rest will wait till April for a greeting.

DEADLINE FOR NEXT Q: April 1st for the next deadline, please. Your views on the first part of this Bulletin would be appreciated.

FINE: That's the lot. Nobody else has told me anything about anything, and what they don't tell me, I can't tell you.

Have a good year.

Jeremy Montagu
Hon Sec FoMRHI

BULLETIN SUPPLEMENT

FoMRHI Quarterly is a platform for members to share what is in and on their minds with other members. The only grounds on which we have rejected any Comm are that it is not relevant to historical instruments, that it could harm them (by encouraging dangerous practices) and that it is incomprehensible. There have been several cases of members questioning the value of our Quarterly because they are upset by what other members write in it (e.g. Bruce Haynes in Q36 and M. Lyndon-Jones in this Q). This is an understandable emotional response, but when they calm down, they usually return to appreciating the overall value of the Quarterly. After a heated exchange on our pages, Ardal Powell unfortunately did not renew membership in 1992. I therefore particularly welcome his renewing contact by sending us a press release, which includes the following news and request for information:

Contact: Ardal Powell, Phone: (518) 828 9779, Fax: (518) 822 1416
RD 3, Box 56, Hudson, N.Y. 12534, U.S.A.

Ardal Powell has been awarded a 1993-4 Fellowship for Independent Scholars by the National Endowment for the Humanities. The project funded by the Fellowship is entitled "The Keyed Flute: Technology and Musical Style in the Late 18th Century"

The work will include a complete translation and study of Über die Floten mit mehrern Klappen, Johann George Tromlitz's 1800 early tutor for the eight-keyed flute. This work is the second volume of Tromlitz's massive 1791 flute tutor, published by Cambridge University Press to critical acclaim in 1991 as The Virtuoso Flute-Player in Ardal's edition.

As background to the text, several shorter documents relating to the impact of the new flute on music and musicians will be presented. Among topics to be documented will be its gradual appearance and acceptance, grudging to enthusiastic, by makers, players and composers, and the impact it had on musical style in various musical centers in the late 18th century and the first few years of the 19th. This will include a technical study of the flutes Tromlitz himself made, and comparisons with those by others. For this study, information about early (i.e. pre-1830) keyed flutes in private hands would be most welcome.
I have had two complaints from a member (and old friend) about my Comms. The first is that I often use 'he' when referring to a person in general, and this is old-fashioned sexist language. I will try to avoid this, but reserve the right to still use it when it gets too awkward not to, or whenever the ambiguity between 'male' and 'person' can perform some constructive function. The other complaint is that I seem to object to researchers and early-musicians having the right to choose what they like and ignore what they don't like.

My main complaint about early musicians is that they copy each other (and 'serious' musicians) too much and don't use their imaginations to explore other possible ways of interpreting the music, leading to a rather boring uniformity in style which never was the case in music performance until recent times. The professionals can say, with some justification, that for survival they need to give to their customers that which will lead to most satisfaction, and the customers that pay are in the 'standards'-obsessed individuality-stifling 'serious' music world. (For most probable satisfaction I recommend 'early-music standard' strings to my customers, but at least I mention that there is a more historical alternative). The amateurs do not have the disadvantage of depending on performance for their livelihood, so they are more of a disappointment.

The only other objection I have about early musicians concerns their 'economy with the truth' by knowingly allowing their listeners to believe that what they offer is as historically accurate as can be, while actually it is only as historically accurate as they are happy with. It is not easy to get out of this dilemma since being open about the difference invariably leads to disappointment as the listeners prefer their illusions to truth. Some try to get out of it by taking the position (which they may or may not believe themselves) that there is little known about historical accuracy, and that which is fashionable in early music circles is the best that can be done. To maintain this position, any research finding that implies otherwise is ignored, and if it can't be ignored it is rejected as 'unproven' by raising their standards of 'proof' or of being 'convincing' as high as is necessary. Objectivity is perhaps too much to ask from people without special training in it. With my own audiences I try to share the excitement of ongoing historical research and of our exploring its application in performance. In this way I try to convert their expectations of getting a sample of music as it really was into witnessing an investigation into it.

Everyone is a researcher, collecting information of interest and using it in some way or another. There are some professional researchers. Many are in the employ of the media, and they dig up and present much information together with their interpretations. We accept or reject these interpretations according to our own views. Usually these researchers have not made extensive objective studies of the subjects involved. That would be scholarship. We can similarly accept or reject the results of scholarship, but we must remember that scholarship is the best way we know of to approach universal truth rather than the different truths of individuals, cults and fashions.

What I (and all scholars) object to is a research analysis which does not follow the rules designed to make it as objective as possible, and yet which claims the authority of scholarship. A comprehensive collection of information or discovering brand new information can be very useful research, but without objectivity in the analysis, it is not scholarship. Everyone has the freedom to investigate whatever he or she wants, but for it to be scholarship, it requires the appropriate discipline in the analysis. The amount of analysis can vary from little more than presenting the information collected, up to an edifice of speculation based on very little evidence. Being objective means avoiding the effect of bias by being scrupulously logical, honest and fair. One has to be fair to all the evidence as well as to alternative analyses which may possibly also be fair to the evidence. Being logical, honest and fair certainly does restrict freedom. These values, when applied to disputes between people, are basic in our concept of justice. In scholarship we apply them to disputes between ideas to build knowledge.
I wrote a 'Not a Review' of this in the last Q, not a review because I'd only had it for a few days, not long enough to do much more than skim bits of it. So now let's start again, and let's do so by repeating what I said last time:

This is a tour de force, the work of a master.

However much you know about instruments, about any instrument, you will learn more here. Also, it's a pleasure to read; unlike the authors of many such books, Tony Baines can write English even when he is having to write short to keep to space. He can also explain and describe with exemplary clarity. About the only article that isn't wholly clear is that on decibels; 12½ lines is too short for clarity on so difficult a subject.

Again, as I said last time, there are a few misprints, not surprising in a work of such magnitude. I said that details of any important ones would be forthcoming next time; there are very few. On p.39, col.2, types of bow, the second (b) should be an (a). p.41, the euphonium is Bb, not Eb. On p.71 the tangent of a clavichord is said to be 13 cm (5") tall; surely this is a misprint for 1.3 cm (0.5"). This shows the problems of dual standards; half-an-inch is a reasonable approximation, some are more and some are less, but it's a good average. 1.3 cm is much too precise however. So what does one do? If you say 1.5 cm (0.5"), everybody who knows 25.4 writes a rude letter. How can we find round figures in two different systems? There are problems with the line drawings of flutes on p.118; / is not a ring flute; g is; I don't know what d is. Unless the Bate Collection Shudi harpsichord is a funny, surely on p.159 the swell should be operated by the right foot (not the left) and the machine stop by the left (not the right)? On the hichiriki drawing the reed is much too short.

Again, as I said last time, there aren't enough pictures, especially of the less familiar instruments. These are what need illustrating most; but of course what every publisher wants is nice pictures of the best known instruments. On the whole, what we have here is a reasonable compromise and, when one considers that the book only costs £25, a pretty generous number.

Another point that I made last time was the lack of foreign accents. I was unfair here. There are many more than I had spotted, and in many more languages. I still think it a mistake to be selective, to say that one can omit accents on words that are well known in English without them; perhaps in that connexion it was interesting to see, side by side in the history of the valve, Stoezel and Blühmel; why not Stolzel and Bluhmel? or Stözel and Blüml? But the argument is much more with words like vina, which is the example cited in the Introduction. OK, a line above both i and a and a dot below the n (I can't do it in WordPerfect; I can do i and å, but while I can do an undertone , I can't put it under a letter, which seems to me damn silly) are a flaming nuisance and make proofreading difficult because the average English typesetter ignores them all, but they do affect the pronunciation. More important, as I said last time, using them does show an equal respect for other languages and other cultures as for our own, and that's the real crux.

Now to detail. I have the habit, doubtless pernicious, of reviewing my books in the margin. Anything of this sort would normally be littered with exclamation marks and worse (you should see my New Grove Dictionary of Musical Instruments; one day I'll have time and will get back to that). What you'd see here is a very faint scatter of ? representing 'are you sure?' and about half a dozen NO, where I'm certain the text is wrong.

Let's take some ? first. Did Boehm invent the alto flute? There seems some confusion in the number of bells in a carillon, 'up to 70 or more' in line 1 and '45 in larger carillons' in line 8. The chalumeau 'is a wind instrument of the first part of the 18th century', but 'the name is first met in 1687'. That the Tibetan
The human thigh-bone trumpet is 'traditionally from an executed man'—a matter of what tradition you believe, and this is one deriving from missionaries who regarded Tantric Buddhism as devil-worship. I know that all the books, and all the theories, agree that the bulb bell of the cor angulus only affects the bottom few notes, but is it true? My ear says not, but one's ear is easily fooled. All the same, I suspect that this is one of those areas where the musician's ear is more sensitive than the acoustician's machinery. I think it a pity not to mention the Mary Rose shawm under doucaine (see Herbert Myers in Early Music, July 1983, and Bull. 34, p. 7). One of the most important aspects of a drone, which isn't mentioned, is that it provides a pitch referent; because the drone is there, intonation is often more precise (I used to find it the best way to teach kids to play in tune, by providing a drone), and, in Indian music at least, it is the presence of a drone that produces the tension in the music. Fakes and Forgeries might have been a little less complacent about false labels if Brian Harvey's book (reviewed elsewhere here) had been available earlier; this a much more serious matter in law than we often think, and while we don't want to get paranoid, we don't want to find ourselves in court either; 'customs of the trade' are less acceptable as an excuse than they were. It's quite true that the fingerboard and bridge of the Hardanger fiddle are flatter than on a modern violin; it might have been worth pointing out that they are still in baroque form. African bow harps (here called arched harps, though strictly they are only arched if the arm curves over the soundbox like the Burmese) don't often have the soundbox integral with the arm; it's usually jointed. Paxman's make a B♭ altissimo piccolo horn, which might have been worth a mention (it usually sounds like the fuggelnhorn that it is). And surely the difference between the Inventions horn and the cor solo is that the former may have a full set of crooks, being an orchestral instrument, whereas the latter only has the five crooks that soloists use, G down to D. Both, of course, crook in the tuning slide. I meant to look this up at home, but my memory is that the pipes of the Roman organ at Aquincum are rolled bronze sheet, with an overlap, rather than cast. I suppose that the sheet must have been cast, but to say that the pipes are 'cast in bronze' suggests that they were cast in tubular shape and, subject to checking in Melinda Kaba's book, I don't think they were. While sometimes naqqāra are 'lashed together', more commonly they are separate and simply used in pairs. Rozhok also refers to a single-reed instrument with a horn bell; I've been told by some of our Russian colleagues that this is the only type that exists nowadays. It's a little dangerous to be too precise in descriptions of sārangi and sārindā; the descriptions here are clear and correct, but only too often the instruments aren't, and there is a great tendency for the one to conflate with the other, particularly for the sārindā to take elements such as the sympathetic strings from the sārangi. The semittrion is not only used in the Greek Orthodox churches; the Armenians use it, and pretty well every church you go into in Jerusalem, whether Catholic, Orthodox, Armenian, or any other of any age, has one or more of these bell-substitutes because the Turks prohibited the use of bells before we threw them out in 1917. Side drums didn't shrink quite as fast as suggested here; the one in the Tower of London, which was a trophy from the Marlborough wars, while not as large as Arbeau suggests (30" each way) is still a great deal bigger than the modern marching drum; see Blades & JM Early Percussion Instruments and, for some of the dimensions, my Making Early Percussion Instruments. I've never seen split idiophones which were wedged apart at the base; my Philippine instruments, like those from Sulawesi (see Kaudem, Musical Instruments from Celebes) are simply split, and my Chinese one is forged iron, and the Hawaiian and Tongan ones are just slit bamboo tubes. The alghaita of Nigeria etc is a fundamentally different instrument from the surma; I'd be inclined to guess that the surma was the origin of the alghaita, but if so, it was before the surma acquired its cylinder bore with the fork (see Comm. 304 in Q 21) which makes it acoustically conical; as a result, although both are shawms they are now shawms of two very different types. As stated here, the Latin-American vihuela is very different from the instrument in the Musée Jacque-mart-André, but has it not been suggested that this is because that instrument seems very different from everything we know about the renaissance vihuela from all other sources? By chance, a couple...
of days ago the CIMCIM Bulletin for 1989 arrived, and this has in it Karel Moens's paper, as far as I know the only version in English, on the dendrochronology and other authenticity problems of the Linarol and Ciciliano pattern viols. His articles were published in *Musica Antiqua*, but there they are in Flemish. His work has cast very considerable doubt on the authenticity of these instruments. Margaret Downie produced fairly convincing evidence, I thought, in *Early Music* a few years ago (forgive me, please, for not chasing the reference) that the violino piccolo was smaller than a three-quarter size violin (which, like Baines, is what I'd always said, too); that issue arrived the day before I was lecturing to first years here on Baroque Instruments, and she convinced me sufficiently that I had to change my text quick. Did violone 'throughout the Baroque period in Germany ... signify a double bass'? If so, why do the autographs of Brandenburgs 1 and 3 specify basso, 4, 5, and 6 specify violone, and 2 contrast violone *in ripieno* with *basso per il cembalo*? Bach was a pretty careful writer, and I would think that he would only use different terms like that if they meant different things. It might have been worth noting that the American for Wagner tuba is tuben as the singular, with tubens as the plural; there is thus no confusion with other sizes. Water drums turn up in Papua New Guinea, too, as an hourglass-shaped stamping tube open at both ends, which is stamped into the water; the sound is made by the air being driven into the narrow waist. As a drummer, I'd say we always distinguish between the whip as the two-handed job and the slapstick as the single-handed one. The tubular shaped wood blocks were made, originally in the 1920s or so, as substitutes for the temple blocks; they were especially popular as tick-tocks in novelty numbers.

As for some NO, the whistle used by boatswain's is a boatswain's (or bo'sun's) call; what he blows on the call is a pipe. It may sound silly, but there it is; in naval parlance the pipe is the 'tune', not the whistle. Folded iron cowbells are almost always riveted on the sides as well as soldered. Damaru isn't just the Tibetan drum made of two human crania; it is also the common Indian small hourglass drum made of turned wood, often used by animal trainers. Australian aborigines have, as well as the didjeridu, the bull-roarer and, in strictly limited areas, paired rattles (in the Kimberleys mainly) and a drum made of rolled bark. The line drawings of drums are not as accurate as might be desired; the goblet drum is quite wrong, as is the hourglass drum, and the New Guinea drum could be better as could the Uganda drum, and *(f)* looks to me more like Sri Lanka than Ancient Egypt. I hate the term 'medieval viol' for a fiddle held downwards; it's so misleading because it falsely suggests a connexion. And it's not really true to say that 'historians call it'; that's one historian, and I still say she's wrong. It's not true that 'a free reed gives its one note only', and in fact at the other end of the book there is a brief mention under reed pipes of those which have a free reed instead of a single or double reed. They are, I think, a little more common than suggested here. When playing gamelan instruments, one does not damp the sound before playing the next note, but precisely as one does so; a gap between sounds is thought to be as bad as an overlap. The so-called spinning rattle is actually a friction instrument (Laurence Picken refers to it as a whirligig), and it is the rubbing of the stick on the gourds, or the gourds rubbing against each other, that make the sound (see *Folk Musical Instruments of Turkey*, p.45ff; Picken compares the Turkish ones with the Hawaiian one cited here; I have an example from Jamaica as well as the one that Picken very kindly gave me).

Well, it's a long time since I've written a review like this, picking up every little detail, and it's a tribute to the splendour of this book that I've done so. What I haven't said (I did last time) is how much I've learned from it, but this is because I don't see why I should reveal to you how ignorant I was of so many things before I read it.

It's a tremendous book. It's an enormous achievement. It's a book that we can all learn from; however much you think you know (and I thought I knew a lot), there's a vast amount here that you don't know. It's incredibly cheap. I hope it sells like hot cakes. I hope that some of these comments will be useful to you (and to Tony Baines). My heartfelt congratulations to him and to OUP.

This is the latest in the Early Music Series, number 15 to be exact. All are still in print except my two (which narks me since there's nothing else available on early percussion and people are always asking me for them; I still have a number of *Making Early Percussion* but the more generally useful one by Jimmy Blades and me, on their history and use, has long vanished).

Why do I find this one less interesting than some of the others? I think it's purely irrational, simply the fact that we all know rather more about the early flute than we do about, for example, *The Early Mandolin*, *The Art of the Trumpet-Maker*, or even *The Baroque Clarinet*. Thus less is new to one in what is, in fact, a well and clearly written book full of useful information.

If you are a flute maker or dealer, it's a book that would be worth stocking to sell to your customers, and one that it would be sensible to read, for your customers will have read it and be likely to be following its advice on how and where to buy a flute and what to look for. There's good advice, too, on performance and on the sources for information, which aren't confined to the flute.

There is some anglophone bias, and certainly some American bias. European makers do get mentioned, but not as many as American. There is more resistance there to foreign language texts, and therefore there is much more emphasis on the early texts that have been translated into English than on those that haven't. Since on the whole, the more important ones have been, and since all the main other ones are mentioned, this isn't too serious, or at least it wouldn't be if it weren't that only one translation has a warning attached. Since it's not a text I know, I can't comment on the one that Solum does warn against using, but there are two others which I do know are fundamentally unsound and which the readers should also have been warned against.

There is a separate chapter by Anne Smith on the Renaissance Flute, and this has a very useful compendium of fingering charts, taking each pitch, one by one, and giving the fingerings from each edition of Agricola, Jambe de Fer, Virgiliano, and Mersenne. Presumably anything comparable for the baroque and later flute would have been too unwieldy, but it would have been a useful idea.

Both sections have a repertoire list and both take the trouble to list recommended editions. The Bibliography is good and comprehensive. The most serious omission is Tony Baines's *Woodwind Instruments and their History*, which was where most of my generation started, and whose excellently fingering charts are always a first port of call. The lists of makers and dealers does tend to be invidious, as suggested above, but some is better than none. The one thing that I do miss is the addresses of the various flute societies, which might have been useful to the neophyte, and, equally useful, of the publishers such as Knuf and Minkoff who have very specialised, and very comprehensive lists of flute music, flute texts, and flute tutors.
I noted these briefly last time, for they only arrived the day that I was finishing off the Bulletin. Since a number of points that I want to make are common to all three of Volume 2, and since all three of these cross-refer to Volume 1, it is more convenient, if you can bear with me, to take them as a single unit.

All four are A4 in size. Volume 1 is case bound and printed on gloss paper. All the photographs are by Antonia Reeve, and they were taken between 1985 and 1989; this is the immediate answer to one question of why the apparently very important lute by Buchenburg is not illustrated; it was acquired in 1992. There are practical advantages in keeping all the illustrations in one volume. It means that one can use suitable paper, that one can get a grant to help the publishing costs for one's most expensive volume (the Radcliffe Trust), and so on. There are compensating disadvantages, not least this one of important acquisitions appearing in the interim, especially when there is as long a gap as this between finishing the photography and publishing the first text fascicles. It means, too, that text authors cannot change their minds about what most merits illustration as they work on the text.

This first volume also contains the general introduction and the rationale of the catalogue system. The one thing that doesn't seem to be explained anywhere is the ordering of items within each fascicle or within each section thereof, and in places this seems odd. It is neither numerical by catalogue number nor alphabetical by maker; it may be thought to be chronological, but with makers with a working span of several decades, and often inde-terminate dates at each end, this isn't a particularly useful system if it is what was chosen.

The fascicles of Volume 2 are saddle stitched and covered in stout blue paper, the text printed, like this, in two columns. Each has its own bibliography of relevant material; each has its own introduction explaining any cataloguing details peculiar to its own field; each has an index of makers' names; each has an index of catalogue numbers; each has a table of contents giving the page numbers for each section. Thus the Lute fascicle has sections for lutes and arch-lutes, early mandolins, later ditto, citterns, small guitars, guitars, and large guitars. It is within these sections that the order appears, to the untutored eye, to be random, and while this seems improbable, for Arnold Myers is normally highly organised, I have been unable to crack the system in any of these three fascicles.

Each fascicle has its own system of catalogue detail. All give overall size, as one would expect. The Lute fascicle has Body length, width (at several points with guitars), depth, and string length. The general system is to give catalogue number, instrument name, number of strings, maker, place, date, dimensions. Then a Technical description. Then the text of the label if any. Then any details of accessories, condition, etc. Then references. And finally the Current ownership and the source. I must confess that I have been trying to remember whether Anne Macaulay gave her collection to the University or whether it is on loan; curiously, it is the only source in all three fascicles which doesn't specify the ownership.
The other fascicles show both the generosity of the Curator (a very large proportion of the brass and a fair amount of the flutes is lent by Arnold Myers) and the precariousness of the Collection as a whole, for he is by no means the only lender, a problem with which I am all too familiar. It is wonderful to have things on loan, but there is a nail-biting side to it, too, with one hoping that the loans are never rescinded. We have just had to raise money in a hurry to buy a flute which has been on loan for many years and which I wanted to keep when the lender needed some money, and we are about to have to find a good deal of money to keep a clavichord which has been here from time immemorial.

I have one very definite problem with the brass fascicle and this is that the mouthpieces are catalogued separately from the instruments. Where a mouthpiece is associated, it is mentioned here, but even when it is thought to be original, it has a different number and presumably will appear in more detail in a different fascicle. This I think is wrong. Any object which is associated with an instrument should be numbered with it (whether by / or whatever other convenient system). Agreed that mouthpieces aren’t often original to an instrument. I was brought up as a horn player, I’ve got seven or more horns, and not one of them has its original mouthpiece. But each one has a mouthpiece that I’ve used with it, that I’ve found suits it and therefore, to my mind, that belongs with it. Anyway, with the horns here, crooks are catalogued as belonging to the instruments, and crooks are no more certainly associated with an instrument than mouthpieces are. So this isn’t logical. There are, in this fascicle, many more detailed dimensions, considerably more than in either of the others. I am not complaining at having too many, just pointing out that there seems to have been some difference in policy.

The main problem in the flute fascicle is terminology, the old, old problem of what’s a flute in. Most here have two pitches. A name is given, eg F flute, Nominal pitch: Eb. In other words the English name plus the German/American system by the note produced by the C-foot if it has one, which it usually hasn’t. The ordinary flutes have a Nominal pitch of C, which I’m not happy with either, especially as the List of Contents refers to D flutes in C. Maybe one-key flutes are D flutes, but are they in C? The ‘natural scale’ is that of D major, though they aren’t ‘in D’ in the way a trumpet is in B♭. But Boehm flutes aren’t D flutes; they are in C and there’s nothing D-ish about them. This whole flute thing is a real can of worms, and my own very strong inclination is to forget all about note names for the concert flute, at least, and just call them flutes, giving within the details the lowest note. Equally the smaller instruments, personally I’d use the old English names, but I’d be happy with a clumsier but more logical alternative of saying Flute, six-finger note B♭ (or 6-fh B♭).

An additional item in this and the horn fascicles is to give Usable pitch. This is more useful for the flutes, since horns have hands and tuning slides, but it’s a good idea with both. Valve types and so forth are given with the horns, and key systems with the flutes, and also shapes and types of keys and of their mounts. All the simpler flutes have specifications for which finger does what, and such details are added for anything unusual with the Boehm and other more elaborate systems.

So these are very detailed, very comprehensive catalogues. Also very reasonably priced, at least for the text fascicles. I suppose Volume 1 is in fact quite reasonable, too. My hesitation is really due to the standard of reproduction of the plates. Some are OK, but a lot are fairly dark, some are a bit blurred, and a number are in what, in the past, I’ve called reprint quality. I’m put off, too, by having some of the flutes the usual way, embouchure to the left, ie from the player’s view, and then suddenly turning the page and finding them reversed. It doesn’t seem logical. I do appreciate the problems of photographing ophicleides and other heavy brass. The obvious way is to stand them on their bell. Fine. But it looks horrible, to my eye, if you then print the photo the other way up, because the shadows make what you’ve done obvious, and the things seem about to fall off the page!

Still, don’t let these remarks put you off. The Edinburgh Collection, and Arnold especially, have done a remarkable job, especially when you consider that it’s a part-time job for him.
In fact I'd like to know where he finds the other hours and days, because the amount of work he gets through seems to need 30-hour days and 10-day weeks.

He has sent me one disk as a sample. It is labelled Transverse Flutes but what it has on it is the introduction to the Lutes, and the text for the Flutes. I'm not wholly certain how useful this is (I mean the idea of publishing on disk). Admittedly I sit at this machine a good deal of the time, but all the same reading print on paper is really easier, especially as I'm most likely to want to check something in the catalogue when I've got something else on the screen here. Admittedly, too, I've published my own catalogue on disk, but this was for three reasons, one that I couldn't face the time it took to print it out, two that I can't afford to photocopy it for friends because it's too long, and three that I'm always tinkering with it, it's still very unfinished. In fact, I'm just back from three weeks holiday, during which I revised every bit of it. That third reason is the main advantage; if he is willing to do so, every copy that Arnold sends out may be slightly different, up-dated with whatever new instrument or bit of information that's appeared.

What I'm looking forward to is catalogues on CD-ROM (if any of us can afford the machinery to read it), for then we can get the photos on too. Even on this it might be possible; there's just over a million bytes free on this disk, and I wonder how many photos one could get on to that space if one had the machinery to do it.

Anyway, it's interesting to have it on disk, and I'll see, and maybe report back, on which I use most, the disk or the hard copy.

FoMRHI Comm. 1134

Jeremy Montagu


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

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

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

Get a copy of this book and read it carefully.
BOUWBRIEF ARTICLES

Here are some fairly recent Bouwbrief articles. The gap between these and the last is due to a hasty pick-up from the Bate. I'll try to fill the gap later.

Bouwbrief 65 1992

Making Harpsichords and other early keyboards  Cornelis A Bom
Insuring Makers and /or Dealers in Musical Instruments Erwin Smit
Signing and Dating and Lettering (2) Jan Burema
Organ pipes in ranks at the front of (Chest (Kist)) Organs Jan van der Vogt

Materials and Tools XXV

The Hygrometer - trustworthy or not? Marcel Lefevre

For Discussion

Two responses to Gerhard Landwehr's article in Bouwbrief 64 on varnishing, by Geert W Meinders and G H Borghaerts.

Book Reviews

Paul de Wit's World Directory - reviewed by G Menkveld.

Bouwbrief 66 1992

Madder, Dragonsblood and Tattoos (an interview with the dye millers of "The Cat", Piet Kempenaar and Sjors van Leeuwen) Gerhard Landwehr and Arnold Resthuis
Making a wooden music stand Jan Willem Steffelaar
Signing and Dating and Lettering (3) Jan Burema
Precise fret distances for a given string length using a PC A J van Spronssen

Literature and Drawings

Book Reviews

Harpsichord and Clavichord Construction by Georg Wagner Review by Gerrit Menkveld (apparently a bibliography)
GSJ No 45 1992 Review by Bert Cramer
The Strad for October 1991, February, March, May and June 1992

Bouwbrief 67. 1992

Netherlands instruments in American Collections Jan Bouterse
A new hypothesis regarding the manufacture of bass strings for the lute Klaas Luinters
(a shortened version of Mimmo Peruffo's article in FoMRHIIQ 62, January 1991)
Conical wooden organ pipes - a rediscovered historical method of construction Werner Götz (trans. John Boersma)
(Pyramidal shape with square cross-section)

Materials and Tools XXVII

Where can I get it? Gerrit Menkveld
(A multi-page list of European and US suppliers of wood, strings and other instrument components)

Literature and Drawings

A Handbook on the Strings of the Pianoforte and other Keyboard Instruments with design formulae. by W. Trow Goddard Review Gerrit Menkveld
JAMIS Vols XVI (1990) and XVII (1991) Reviews by Hans Mons
The Strad for July and August 1992
The Principles of Recorder Design E (Article in the "American Recorder" No 2), June 1992
The French Pedal [9drukwind]1 Harmonium (Article in "Vox Humana" No 3 (3rd Year), publication of the Netherlands Harmonium Union)
Instrumentenbau Report 14 includes discussion of the portative organ.

A French harpsichord (1720-1740) anon but high quality was stolen from a Breda car park on 13 June 1992. Length 238 cm, width 92.3 cm, height 26.8 cm. Info to M vd Wijdeven, tel 076 238892 or W vd Ellshout tel 076 238888 H cvP Breda.
THE CLARINET D'AMOUR: A REQUEST FOR ADDITIONAL INFORMATION
Albert R. Rice

Jeremy's comment in Comm. 1104 concerning the lack of clarinets d'amours in the appendix to my book, The Baroque Clarinet (Oxford, 1992), has prompted me to send this brief communication. I believe that a thorough and exacting study of all the d'amour instruments (flutes, oboes, clarinets, and some include bassoons) is urgently needed. We do not have enough concrete evidence about the instruments, their surviving music, and their use by various players. To this end I have been investigating the clarinet d'amour in various museums and private collections. Through the generous assistance of William Maynard of Massapequa Park, New York, I can now present a provisional list of sixty-seven clarinets d'amours. (Mr. Maynard owns the largest and most extensive collection of clarinets in North America.) There must be many more and I welcome any and all corrections and additions to this list.

THREE-KEY (19):

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Description</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kraus(e), I.</td>
<td>In A-flat, (74), pear, horn fittings (only the stock-bell survives). Berlin 293.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In A-flat, 72.5, dark wood, horn fittings. Brunswick 105.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In A-flat?, 66.3, cherry or plum (mtp missing). Munich Mu 107.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In F, 81.3, box (mtp and crook missing), horn fittings. Sigmarigen 296</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In F, 80.9, box (mtp and crook missing), horn fittings. Sigmarigen 319</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In A-flat, 74, boxwood, horn fittings, Hamamatsu.</td>
<td></td>
</tr>
<tr>
<td>J.B.</td>
<td>In F, 82, box, horn fittings, Hamburg 1926, 406.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In A-flat?, 89. Vienna Technisches Museum.</td>
<td></td>
</tr>
<tr>
<td>ISTW [Stinglwagner, Joseph, Triftern].</td>
<td>In F, 74, pear, horn fittings (mtp and crook missing). Berlin 2892.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In F, 75.5, pear, horn fittings, alternate seventh tone hole (mtp and crook are reconstructions). Bonn BH Z 152.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>84 5, plum, horn fittings. Nuremberg MIR 461.</td>
<td></td>
</tr>
<tr>
<td>'Joseph/SW/Triftern' [Stinglwagner, Joseph, Triftern].</td>
<td>In A-flat, 70, stright bell, alternate seventh tone hole. Salzburg 18/5.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In A-flat, 76, alternate seventh tone hole. Salzburg 18/4.</td>
<td></td>
</tr>
</tbody>
</table>
Unmarked. South Germany?. Nuremberg MIR 463.
   Circa 1760. Nuremberg MI 131.
   Left-hand e/b' key, circa 1770. Maynard Collection.

FOUR KEYS (19):
Gehring, Adorf. In F? 75 (without mtp and crook), box stained dark brown, unmounted,
   doubled third and seventh tone holes. Berlin 85.
   In F? 74 (without mtp and crook), box stained dark brown, unmounted, doubled
   third and seventh tone holes. Berlin 84.
Konigsperger, F., Roding. In G, 79, maple, horn fittings, 3 sections Munich Deutsches
   Museum 18869.
Lance, Turin. Museo Donizettiano, Bergamo.
Lehner, F., Germany. In F, 65 (without crook). Brunswick Ck 104.
Rottenburgh, G.A., Brussels. In G, 64.7, box, ivory fittings. Brugge 0.18.XXVIII.
Schlegel, Jeremias, Basle. In G, 80, ebony, four sections, ivory fittings. Brussels 931.
   (attributed), In G (stamped), a = 415, (originally made with two ab/eb"keys).
   Munich Stadtsmuseum Mu 3106.
   (attributed), In G (stamped), a = 415, (originally made with two ab/eb" keys).
   Munich Stadtsmuseum Mu 113.
ISTW [Stinglwagner, Joseph, Triftern]. 72.4 (without crook), plum, 6 sections, horn
   fittings, circa 1770. Nuremberg MIR 462.
   89, maple, horn fittings, 5 sections, (swallowtail a -flat/e-flat" key). Munich
   Stadtsmuseum 115.
   In Ab, 82.2, maple, horn fittings, Oxford 4020.
   In G, Leipzig 1520.
   In F?, 65.7 (mtp and crook missing), box or maple. Leipzig 1522.
   In A, 70, 4 sections, alternate seventh tone hole, straight bell (swallowtail a-flat/e-
   flat" key). Salzburg 18/6.
   In A, 70, 4 sections, alternate seventh tone hole, straight bell (swallowtail a-flat/e-
   flat" key). Salzburg 18/7.
   77.5, 6 sections, dark plum, unmounted, barrel is very long, original mouthpiece is

FIVE KEYS (16):
Fröhlich, G., Dettelbach. End 18th century (missing bell). Nuremberg MI 151.
Lance, Turin. 76. Museo Civico Medievale, Bologna, 1803.
   58.1, Southern Illinois University Museum 69:93:46.
   Paris 2194.
Raingo, Nicolas Marcel, Mons. In G, 68.9, box, ivory fittings, Brussels 2596.
Schlegel, Jeremias, Basle. In F, 83.6, box or maple, brass fittings, Paris C.1135, E.1049.
In F, 87?, Globular bell (listed as alto clarinet). Vienna GdM 133.

Tuerlinckx, Jean Arnold Antoine, Malines. Clarinet in C with bulbous bell, box, ivory fittings, Brussels 2597.


In B-flat?, 52 (missing mtp and crook), box, horn ring (up. joint). Berlin 2890.

In G, 63.8, (missing mtp and crook), box, horn ring. Berlin 2891.

SIX KEYS (6):

Castlas, Turin. 80. Milan, Conservatorio di Milano, Milan (Teatro alla Scala), 111.

Raingo, Nicolas Marcel, Mons. Paris 374-536.

Rottenburgh, Godefroid-Adrien, Brussels. In F, 91.5, box, ivory fittings ($\phi$e$^5$ key).

Brussels 2595.


SEVEN KEYS (1):

Castlas, Turin. In F, 75, box, ivory fittings. Antwerp 67.1.61.

EIGHT KEYS (1):


NINE KEYS (1):

Lancé, Turin. In F, 64.9 (without crook and mtp), horn fittings, 6 sections (including mtp). The Hague Ea 409 1933.

TEN KEYS (1):

Franco. 81, box, bone fittings, bone thumb rest, keys are pillar mounted except e$^7$-flat in block, 6 sections (including curved wooden neck and mouthpiece). Vienna, Kunsthistorische Museum 134.

TWELVE KEYS (3):

Castlas, Turin. In F7, box, ivory, 6 sections (with metal crook, barrel and mtp). Rome, Museo Nazionale Degli Strumenti Musicale 795.

Lesti, Ancona. In F (marked in F, a' = 436), 89.5 (with wooden neck), 81.7 (without mouthpiece). Modena, Museo Civico.


The nineteen three key instruments add substantially to my list of thirteen three-key clarinets. The earliest instruments by Kraus appear to date from the 1740s the latest
by Cramer to about the 1830s. The greatest problem with this list is the inaccuracy of the pitch designations which are based mainly on museum catalogues. For instruments that are playable, careful testing should be carried out with an electronic tuner. I have only been able to play the Ioseph/SW/Triftern instrument in Salzburg. (Through the recent research of Andreas Masel we now have identified the ISTW mark as belonging to Joseph Stinglwagner (1726-1805) of Triftern.)

By the number of instruments and fragments that have survived it is obvious that Kraus specialized in clarinets d'amours during the mid century, and Stinglwagner must have had many orders for them from the 1760s through the end of the century. Instruments made by Italian makers (Castlas, Lancé, Piana, Venera, Lesti, and Franco) all appear to be made after 1800, and most of them from 1810 to 1830. Two nineteenth-century instruments by Tuerlinckx (Brussels 2597) and Schurer are C clarinets with bulbous bells. A second, normal clarinet bell is included with the Tuerlinckx instrument. Two unmarked five-key nineteenth-century examples in Berlin in C and B-flat have original, flared bells. They expand the usual definition of the clarinet d'amour as a low-pitched instrument.
Since writing Comm 957 I have ceased using pilot drills and started entering the gun drill through a sleeve guide to insure the initial bore is accurate. Each of my drills now has a 2" metal sleeve with a 3/8" outside diam to fit neatly into the hollow centre. The internal bore of each sleeve is the exact diam of the drill. Initially I use a small centre drill fitted into the end of a 3/8" silver steel rod with a wooden handle on the other end. With the lathe running I use this to make the initial centre bore on the billet end—the centre drill only goes in about 1/8". The actual boring takes very little time. Switch on the air and feed the drill in. I have a block of wood which is cut so that it rests and slides on the lathe bed. On its top is a groove for the gun drill to rest in. This supports the back of the drill at exactly the right alignment. Very little hand pressure is required when feeding in the drill. Recently I have found that I get even less 'run out' if, once the drill is in, say 3", I continually flex or wiggle it as I feed it in. Difficult to explain the motion on paper—dancing around to Zairean Soukous music helps.

Observe how boring is still rather interesting.
Woodwind Instrument Making: Wooden Collet Chucks for Lathe Work

These are quick, easy and cheap to make. They are accurate and do not damage the piece of work they hold. I describe here how to make one to hold 5/8" work.

Turn a cylinder of hardwood approx 2" diam and approx 4" long. Drill a hole in one end (the back end), just under the diam of your lathe's headstock thread. I have ground down a Ridgeway flat bit to the right size and use it only for this. Rub the headstock thread with some candle wax and use this thread to cut a female thread on the inside of the hole in the end of the wood. It helps to keep the front end of the wood centred on your tailstock to keep it true. This was described by Jon Swayne in Comm 676 for making mandrels for turning bored blanks.

With the wood now firmly screwed onto the headstock, drill a 5/8" hole in the front end using a drill in your tailstock. Now turn a groove to accomodate a 'Jubilee' or similar hose clip. Make it deep enough that the screw on the clip adjuster is completely countersunk beneath the level of the wood. The groove should be just wide enough for the band of the clip to fit in. The clip adjuster is a bit wider than the band and you can widen a recess to accomodate this neatly. This will serve to anchor the clip when it is being adjusted.

Drill two 1/4" holes through the side of the cylinder at right angles to each other so that they cross at the bottom of the 5/8" hole. Make two saw cuts from the front end of the cylinder to these 1/4" holes. These holes are intended to check any tendency for the saw cuts to split at the bottom.

When you put the hose clip in place make sure the protruding end of the band is trailing, so that it cannot catch your hands or clothes when it is rotating. I cover the clip with a gaiter made from a section of motor bike rubber inner tube as a further precaution.
DRILLING/BORING PROCESS FOR CHANTERS AND DRONES

(This article was originally published in Dec the 1991 edition of 'Common Stock'- the Journal of The Lowland and Border Pipers' Society. It is reprinted as a FoMRHI Comm with the kind permission of the author and the Editor)

1. To drill straight accurate holes which are central or in the middle of the material (either wood or plastic) the material should be supported in the chuck as accurately as possible so that an imaginary line would pass through the centre of the material (this is the centre line of the lathe) eg.

2. The material does not have to be finished round before putting it in the chuck. Square stock from wood is equally acceptable provided it is chucked accurately.

3. Face off the end and accurately centre drill about 2-3mm deep, this is the starting hole and the success of the bore depends on this.

4. Using the hand power drill fitted with a long drill (described later) just "peck" away at the hole boring out about 5mm at a time, withdrawing the drill each time to check it has cleared itself of waste material and is not getting too HOT!

5. Try to keep the power drill in line with that imaginary centre line. Special jigs or boring through the tailstock are NOT necessary as this process is self-centering.

Notes about this process.

WHY IT WORKS!! The scientific theory which is the basis of this method is that two revolving objects or mediums that come into contact with each other such as solids, fluids or gases, will automatically self-centre PROVIDED the rotation is at different speeds. It does not apparently have to be in different directions, but obviously the lathe is spinning anti-clockwise (looking at the chuck towards the headstock) and the drill is turning clockwise.

1. To cool the drill I use a spray pack of silicone (Singer Sewing Machine Co.) used to spray on cotton before sewing. It works and more importantly does not appear to stain or affect the hole. Oil can stain, water lifts the grain and some wax also can stain the wood.
I make my drills from wire purchased in 3ft. lengths from the local MODEL SHOP. It comes from the USA and is called PIANO WIRE - but is available in sizes 1/8", 5/32", 7/32" and 1/4". It is superior to what is called "silver steel" as it will not bend as easily and consequently keeps its straight shape. It obviously has carbon in it as witnessed when it is sharpened on a grinding wheel, and it will dull a hacksaw blade.

The angle on the tip is a clearance angle of 5° or so. It is ground back for about an inch in the case of the 1/8" drill -- this is for the waste material.

The style is of a rifle or gun barrel reamer. The grinding of the tip should not be lower than a couple of thou greater than half the diameter. This keeps the drill "central".

The principle of the drill is that the tip or cutting edge is directed by the drill itself as it follows the hole, NOT like a twist bit which tends to be lead by its point and which will consequently wander at times.

I use a small MAKITA hand drill that turns at 4500rpm and my lathe turns at about 900rpm (in the reverse direction as mentioned earlier).

The type of drill described has the added advantage of "polishing" the bore in the wood as it goes and consequently you get a really shiny straight bore. A sample of African blackwood bored in this way gave excellent results. Another advantage is that this style of drill appears to be unaffected by variations in the grain in the wood which means you have less wastage. Sharpening can be done by a slip stone on the leading face only, as the front tip is all that needs to be sharp.

eg.

Sharpen here
A Case for CNC

Computer Numeric Control

Computer aided reamer production for Woodwind instruments.

When confronted with the production of tapered reamers for forming profiled bores of woodwind instruments I found the standard method of production used at the London College of Furniture, where I was studying, to be as follows:

1. A prepared bar of silver steel suitably prepared is turned to a set of steps corresponding to given places in the bore of the instrument.

2. This mechanical artical is then filed to a smooth taper in the lathe.

3. Finally this taper is ground in 1/8 on a grind stone.

4. A refinement possible with the use of a milling machine consists of a V cut in the surface of the blade.

5. This device is then inserted into the step bored joint where either it or the work is rotated at low speed with longitudinal axis force applied to cut a smooth taper.

While this device works perfectly well, its making is slow, tedious, inaccurate, and dangerous.

These tools having a rather artificially high value to the maker as a consequence of this.

The solution would seem to be the use of computer numeric control whereby the taper can simply be cut.

The means of achieving this is as follows.

6. The steel set up in the machine and the computer is given the following information:

<table>
<thead>
<tr>
<th>Bore</th>
<th>Distance in</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.95</td>
<td>0</td>
</tr>
<tr>
<td>17.90</td>
<td>3.5</td>
</tr>
<tr>
<td>17.95</td>
<td>6.5</td>
</tr>
<tr>
<td>17.00</td>
<td>11.0</td>
</tr>
<tr>
<td>18.50</td>
<td>12.5</td>
</tr>
</tbody>
</table>

This is translated into Cartesian Co-ordinates thus:

\[ Z = \text{Distance in} \times Bore \]

\[ X \quad Z \]

| 17.95 | 0   |
| 17.90 | 3.5 |
| 17.95 | 6.5 |
| 18.00 | 11.0|
| 18.50 | 12.5|
This corresponds to the movements of the lead spindle in the Z axis and the cross slide on the saddle in the x axis.

Movement towards the tails stock is Z+ towards the head stock Z-

Movement of the cross slide towards the centre line is X- away from the centre line X+

Thus any cutting point can be expressed as a two co-ordinate function thus:

\[ X = 17.95 \quad Z = 6.5 \]

Thus making the production of all components possible that could be made on a conventional lathe by manual operation, possible by way of computer control, which means of course that they are exactly repeatable.

A reamer entered into the computer looks as follows on the TV:

<table>
<thead>
<tr>
<th>No</th>
<th>X</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>17.95</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>17.90</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>3.5</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>17.95</td>
<td>10</td>
</tr>
</tbody>
</table>

To make the reamer taper
The machine cuts a series of small steps leading the programme as a series of points it is aiming for, thus:

\[ X = 17.95 \quad Z = 6.5 \]

This enables the smooth tapers to be cut in minutes where as the step turning and filing method can take some hours.

What's more this programme can be stored as paper tape audio cassette or floppy disc.

Thus enabling a repeat to be made very quickly and easily - likewise it is possible to modify the programme so it is not essential to start again if it is not quite right. Once made perfect it can be quickly stored for some years until the next time it is needed.

The milling process is then followed as before, but to this I would add that it is perfectly possible to mill in the lathe using and end mill and a universal slide, mounted on the saddle, which is more accurate and reliable than the grind stone.

Barry Jefferies
Low Cost C N C

One of the main difficulties associated with C N C has been its cost; the mass production engineering equipment is very costly.

If one considers the building of a C N C machine, what is needed is to resolve the following problems:

i) Hardware cost; computers are very expensive.
ii) Software costs; programme packs can be very expensive.
iii) Lathe costs; these machines are not cheap.
iv) Retrofit! This being the name given to the various works that connect the computer to the lathe.

The solution to these problems came via a Bate Collection weekend with Alec Lorretto. Here I found a man called Rick Baines in attendance, I explaining to him about my theory of C N C control for quick and easy production of tapered reamers.

He told me about a series of articles in Model Engineering Magazine which detailed the conversion of a Myford ML10 lathe to computer control; it was written by a man called S T Deane who uses the device to make working model steam engines. If it can make a steam train, it can make tapered reamers and rocketing tools for woodwind instruments.

Rick sent me details of the articles which can be obtained from:

Model Engineer (Readers Services Dept)
Argus House
Boundry Way
Hemel Hempstead
Herts
Tel: 0442-6655


He sent me photocopies for a small consideration or one can try one's local library.

A solution is to use:

Redundant games computer Sinclair ZX Spectrum
S T Deane software
Myford ML10 lathe
Home built retrofit

The layout is as above with a strong recommendation for a control to hold all the computer bits together or face the consequences (it comes unplugged when one needs it most!)

The idea is that one mounts an electric motor and a position sensor on the lathe spindles so that it can be turned to pre-determined places by the computer.

The feed spindle (Z axis) can be put through a gear train of change wheels. They are really for cutting threads but can be used to save putting a gear box on the back of the lathe.

Devised by Ron Ogden, a reduction of 10:5:1 has been found to be best.

But the cross slide spindle (X axis) needs a gear box with a 9:1 reduction to produce the correct control, the gear cluster being obtained from:

David Proops Sales Ltd
21 Masons Avenue
Wealdstone
Middlesex
Tel: 081 861 5258

Full instructions are given by S T Deane on how to make the gear box and mount it on the lathe.
The electric motors come from:

Remcon Electronics Ltd
P O Box 81
Chislehurst
Kent
Tel: 081-467-7377

They are what is known as stepping motors (because they move in steps!) and have a sensor on the back that tells the computer it's moved and by how much.

They were originally for German cigarette machines where they activated the dispenser one step = one pack.

So much for retrofit, how about the computer!

You will note from the drawing, a modification to the computer is needed, this device being called an interface. It comes from:

D C P Microdevelopments Ltd
2 Station Close
Lingwood
Norwich
Tel: 0480-830997

This device just plugs into the computer and has wires connected to its other side which go to the lathe via a mute pin plug (20 pin scart plug from Tandy!)

The recommended computer is a Sinclair ZX Spectrum which is rather an old fashioned games computer. Many of these were made, the +3 model being best as it has a facility to use a floppy disc drive rather than audio cassette for programme storage.

This is the other big advantage on has over manual production, one does not have to re-invent the wheel every time one wishes to repeat a component - one merely pops the disc/cassette into the computer and a piece of steel into the lathe and tells it to cut.

Modification can be made in a like manner, one being able to modify the programme in any given part without having to start again.

However, the ZX Spectrum is not the only computer that can be used, as there are interface cards available for others from the same suppliers:

1. Acorn BBC or Masters 28
2. Apple 2/2e/2GS
3. Amstrad CPC 464/664/6128
4. Commodore 64/64C/6128
5. IBM PC/XT

But please note that S T Deane only publishes software listings for ZX Spectrum so a little ingenuity will be required if one is using an alternative computer.

If this still seems as though its going to be expensive I would point out that there is no reason why one cannot use an alternative lathe instead of, or as well as an alternative computer. S T Deane says that a Myford ML7 can be used instead, and I see no reason why others could not be used which would cost less than the Myford at £1266 for an ML 10 or £2438 for an ML 7 (although they can be much cheaper second-hand

As example I might suggest Worco 22 lathe at £930 from:

Worco
Worco House
Middleton Industrial Estate
Guildford
Surrey

or alternatively the Minilor TR 1 lathe at £464 which comes from:

Hegner UK Ltd
Unit 8 North Crescent
Diplock Way
Hailsham
Sussex

In operation the programme gives 2 menus of questions:

PRESS
1. TO KEY DATA IN
2. TO LOAD DATA FROM TAPE
3. TO DUMP DATA TO TAPE
4. TO EXECUTE
5. FOR MANUAL MODE
This menu is therefore offering the following services:

1. Is to write in co-ordinates to be cut.
2. Is to put information from tape storage (or disc) into the computer.
3. Is to load data to storage to stop it being lost when the computer is switched off.
4. Makes the lathe work.
5. For manual operation.

The second menu is as follows:

<table>
<thead>
<tr>
<th>KEY</th>
<th>1 TO ENTER DATA</th>
<th>2 TO LOAD DATA</th>
<th>3 TO EDIT DATA</th>
<th>4 TO SAVE DATA</th>
<th>5 TO PRINT DATA</th>
<th>6 TO PLOT DATA</th>
<th>7 TO CHANGE SCALE</th>
</tr>
</thead>
</table>
1    | is to enter co-ordinates |
2    | is to load from disc or tape stored programmes |
3    | is a line by line editing facility of the program |
4    | is to save program written onto disc or tape |
5    | is to make a print of data if printer is attached |
6    | is for the production of graphic simulation - a reamer would look like the following illustration on the TV: |
7    | is an automatic re-scaler but it will only resolve Z and X in equal proportions nothing more elaborate. |

Some costings for this device have obviously changed since 1989 - at time of writing main component costs are:

<table>
<thead>
<tr>
<th>Component</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZX Intercard</td>
<td>£16.95</td>
</tr>
<tr>
<td>DEP Interpack 2</td>
<td>£54.90</td>
</tr>
<tr>
<td>Remco Motors</td>
<td>£60.38</td>
</tr>
<tr>
<td>Total</td>
<td>£132.23</td>
</tr>
</tbody>
</table>

For anybody who has a lathe and a computer, their costs are not high for the creation of such a useful tool, especially if one compares it with the cost of comparable professional CNC lathes such as Denford Starturn at £6370 which even with a Myford ML 10 and a computer added to the price:

<table>
<thead>
<tr>
<th>Component</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZX Spectrum</td>
<td>£30 (typical second hand value)</td>
</tr>
<tr>
<td>Myford ML 10</td>
<td>£1266</td>
</tr>
<tr>
<td>Retrofit</td>
<td>£133</td>
</tr>
<tr>
<td>Total</td>
<td>£1429</td>
</tr>
</tbody>
</table>

still leaves a saving of £4,941, which is a vast amount of difference, certainly enough to buy the rest of a workshops equipment to the best quality, and a supply of materials too!

Especially if one uses it to cut wood too; but that would be cheating, or would it?

Thanks to Jeremy for suggesting these articles and Helen Marshal for proofreading.

Barry Jefferies

This second menu comes from the program in October 1990 edition of Model Engineer it is for the preparation of data only and will not run the machines.
I read Paul White's Comm (No. 1119, October, '92) with increasing astonishment. As a professional maker of early bassoons I meet many professional players, students, amateurs and other bassoon makers, and I've never met anyone with the attitude problems of this "Italian professional early bassoonist" (who is known to me, and has a quite different version of what transpired between him and Paul). In my experience, professional players of early bassoon are generally very conscientious about authenticity and have researched the history and historical fingerings of their instrument(s) to the best of their ability. They generally seem well aware of gaps in their/our knowledge, and many have experimented extensively with reeds, fingerings and playing techniques, and are thoroughly conversant with historical sources of information on such matters.

My astonishment at Paul's Comm then turned to pure anger as I read about his "colleague" who would supposedly put the bore of one contrabassoon into another "because no one would know the difference". This "colleague" is Graham Lyndon-Jones, and I don't mind identifying him as I know he has something to say on the matter himself. I worked with Graham for 10 years and I know him to be almost obsessively concerned with accuracy and authenticity in every instrument he makes. The very idea that he would "swap" bores, or try to dupe anyone in the manner suggested is utterly ridiculous. The kindest interpretation I can think of is that Paul totally misunderstood Graham's intention of pilot-boring a few blanks for future models. Paul should really get his facts straight before sailing so close to libel.

On to the catalogue of sins of (all?) other bassoon makers today. I'm not familiar with all the examples quoted, but as I myself copy two Denner models, I wish to comment on some of his remarks. Yes, there is a factory which did (maybe still does, but I thought not) make a Denner "copy" with too many keys. No one I've ever met takes this factory seriously nowadays. I copy a 3-keyed J.C. Denner which happens to play at 415 without scaling, and a 4-keyed J. Denner (the next generation) which happens to play at 440 without scaling. As Paul so scathingly pointed out in a previous Comm. (999 Oct.'90), 3-keyed bassoons are not easy to play, and I have no qualms about putting the fourth key on my 3-key model for those who want it. This lack of authenticity is clearly pointed out to all customers. I have even been guilty of the sin of adding a 5th, E-flat key, when specially requested to do so. I don't consider it necessary, and the instrument will still work as intended if it were removed. However if a potential customer (usually amateur, whose enthusiasm outstrips their technique) begs for a few "mod.cons." why not? I tell them the facts and it's their decision. Extra keys can always be removed and the holes
filled in! Incidentally, no professional player has ever requested extra keys from me.

Paul is quite right in commenting that no modern maker uses "historical" reed designs on baroque bassoons. The reason is simple: there is no information about reeds for these instruments. More is known about classical bassoon reeds and I know players and some makers who have experimented with "historical" designs, with variable success. There is much work to be done in this field, and I agree with Paul that this is a crucial factor in the early bassoon world, but let's encourage those who have tried, rather than assume that no one cares.

I find the rest of Paul's Comm. a largely unjustified, inaccurate and depressing wail against the world of early music in general and his potential customers in particular. It seems to me that the many professional bassoon makers I meet are all striving to get closer to historical accuracy (with a few "factories" excepted, perhaps), and the customers, especially the professional players and teachers, are well informed and constantly searching for well made, accurately copied bassoons.
FoMRHI Comm. 1143 Meaness of tone Maggie Lyndon-Jones

A funny thing happened this morning. I had been reading yet another review, this time in the November issue of 'Early Music', an unusually interesting one, when I was struck, not for the first time, by the thought that nobody in the early music scene seems to be nice to each other. I then dismissed the idea as being unfair, but little did I know! The very next morning the October issue of FoMRHI arrived containing a communication by Paul White which seems to be a personal attack on my husband Graham, by implication me, since we work in partnership in our instrument-making and necessarily share the same high ideals about our work, our daughter's god-father and good friend Alberto Grazzi, and our colleague Barbara Stanley.

Taking some of Paul's points in order:

We were delighted when Alberto rang to tell us that he had found an original Grenser bassoon. He brought it along soon afterwards and made use of our workshop over a period of several weeks to make himself a new wing joint for it, with Graham's help. Obviously the first part of any bassoon to deteriorate is the wing joint as this is where all the water accumulates, so it seemed sensible to try to restore the instrument by making a new wing joint. Needless to say there was no question of altering the fingerholes. A fundamental principle of working with bassoons is that the combination of reed and crook variables are so numerous that no-one tampers with fingerholes unless they are absolutely sure they have got the other variables right. It is a delight to hear Alberto playing this instrument in concerts and also recordings. Could there be a hint of sour grapes in Paul White's accusations?

It so happens that there are bassoon makers who make "copies" of instruments for which they have no bore measurements, or choose to ignore them (I am not going to name names, nor identify them indirectly "doing a Paul White" as it will no doubt become known), so it seems ironic that Paul should have picked on us. We never have and never will make instruments which we call copies of historical originals unless we have the measurements first. For the record, we have many many bore measurements of curtals and yet choose to base our most popular model on a consensus of measurements. This is marketed, strangely enough, as being "based on a consensus of measurements", not as being a "copy". Other models we make, however, are "close copies" of museum originals. Funnily enough there is one particular model which we are extremely keen to make but are unable to because we cannot obtain the measurements.
As for inventing sizes of bassoon to suit customers, well bassoons have always come in a wide range of sizes and pitches and also as mentioned above there is the perennial problem of reeds and crooks, together with bore shrinkage, which makes it difficult to identify exactly what pitch the instruments being copied were in originally.

Finally, I know that FoMRHI Comms are never edited and to the best of my knowledge are always accepted from members, but when they are so highly personal and crammed full of inaccuracies I begin to wonder what the purpose of FoMRHI quarterlies are. I had imagined them to be an open forum for the exchange of information about historical instruments.

FoMRHI Comm. 114-4 On The Contrary Graham Lyndon-Jones

With reference to Paul White's thought-provoking Comm (1119) I would like to draw his attention, and that of the world, to the fact that the conversation between him and the other "colleague" contrabassoon maker, who could only have been myself, was not at all as he reported it.

I had for some time been attracted to the idea of doing the big Stanesby, and when a Dubliner at the London College of Furniture, where I was teaching, and Paul both expressed an interest too we decided to go for it. We determined to make two, but finish one quickly in time for the Early Music Exhibition at the Horticultural Hall, because it was 1985, the Handel tercentenary. The team comprised Maggie Lyndon-Jones - chief responsibility all the bores and some boot shaping, Graham Lyndon-Jones - turnery, crooks, reamer making, Bert Cook - small keywork components, Barbara Stanley - turnery, finishing and staining, and Paul White - some graph plotting, formers for key touches and both sets of same and he made a visit to Dublin for further measurements. Most of the time there were three of us in the workshop, and we had a lot of fun. Luckily our boring machine was just big enough for the long joint, with judicious use of a mirror, and Barbara's lathe being enormous was used for turning this item.
The wing joints presented a big problem. We had good dry timber for all the other parts, but nothing for the wing - 3 x 5½ x 39½ inches. Also we needed a hole up the middle, not any old hole but a straight one and quick. Fortunately Jonathan Askey was able to take this on, by modifying the boring rig at the Early Music Shop in Bradford. He asked us how many we wanted, because having set everything up, the unit price would fall with quantity. We decided that six would be nice, (they sent 7!) to cover the eventuality of mistakes, and as I said in case we at some time wanted to make a copy of the A. Eichentopf. I said that we hadn't measured it yet anyway, but it would be nice to have a stock of workpieces for wing joints for the future for us or for Paul White to buy from us. It is perfectly reasonable to make either a Stanesby or an Eichentopf wing-joint from the same pilot-bored (10 mm diameter) baulk of timber. It is not reasonable to proceed with making an instrument without good measurements, and which neither we nor any customer required. This would have meant months of workshop time, keeping people waiting, and losing orders, and therefore money.

To finish the story; the "St Albans" instrument was ready for the exhibition and many were the improvised duos involving it and the Anaconda on Christopher Monk's stand a few feet away. Of course we had learnt a lot, and were still to learn much more: an improved crook profile, key action, fine tuning, and above all trying various reeds (the first really good one was found in the Bate Collection). This instrument then went on tour to the USA and featured in recordings of e.g. Bach's St John Passion and Handel's Susanna, and now resides in Germany. Paul White finished his and it was the centrepiece of a superb Prom (the one in 1991 when Robert King conducted the Music for the Royal Fireworks, in which it looked and sounded superb).

Paul White enjoyed his time with us and learnt some basic bassoon-making techniques from us. He wrote to us at the time, and I quote:

"... Of late I've run up against some pretty mercenary makers who have left a bad taste in my mouth. I greatly admire the way you go about your business making sure to add to collective knowledge of the fagott, and encouraging others to do also. Your factory seems to be as much a laboratory as anything else..."
In Comm. 1119 Paul White raises a number of issues on which I would like to comment, quite separately from the matter of the contrabassoon (see my other Comm. in this issue).

I'm sure that we are all glad that as he says to a large extent we have entered a new golden age of historically enlightened performance.

"Early Music" freaks and the general record-buying and concert-going public are becoming more discriminating and have their favourites. We have reached the stage now when many conductors of modern orchestras publicly affirm their enjoyment in rethinking interpretational problems and their gratitude for the work of the many original instrument orchestras, and the scholarship and inspiration of their conductors. The provision of instruments for these is of course an important part, but only a part, of this process. It occurs to me at this point that we FoMRHI types are singularly lucky in that our efforts are rewarded with a practical and aesthetically important result - viz performance. This is not to decry the splendid work of craftsmen who, for example make copies of old clocks, traction engines, long bows etc. We however can be instrumental (!) in getting some of the way towards recreating some of the world's most beautiful music.

Paul White's worries however are first that many players are careless in the way they treat their instruments, and second that makers are pandering to their every whim even to the point of sacrificing authenticity - shock! - horror! To illustrate his points he selects one potential customer, a leading performer, and criticizes his technique and his plans for the restoration of one of his bassoons. He says that Fröhlich's simple fingerings worked well on Alberto Grazzi's H. Grenser but Mr. Grazzi was far from satisfied with it, having asked Paul White to examine the instrument and render it playable, and even retune it.

Fingering charts and methods are a very important source of information, but it is as well to remember that they were printed with a profit motive, and probably sold more to amateurs and students rather than to the few professional people who would have had no need of them. All wind fingering charts give the expected simple fingerings, and a few give some alternatives. It is a particular characteristic of the bassoon that many alternatives exist and for various purposes and contexts. It does not surprise me that Alberto Grazzi employs some, for stabilizing a note or sweetening its timbre etc etc. He would know what to expect from an antique Grenser as much as he would wish to experiment with it. But such experimentation would
only be valid if the instrument were in fact, as reported in Comm. 1119 in "pristine condition".

Alberto brought the instrument to us, presumably soon afterwards, and I have to say that though he was the lucky owner of a good instrument bought at a reasonable price, the word "pristine" would not have been chosen to describe an instrument whose wing joint was in poor condition, boot joint altered and whose crook could not be authenticated. In fact it bore all the features of so many bassoons that have, at the last and least glamorous period of their useful life, been brought up to a higher pitch. In this case, the wing had been reamed out wider, deforming the taper of the bore. Also the end of the septum had been removed, thus shortening the instrument at the "U" bend. We didn't try playing the instrument at an unknown high pitch as we would have learned nothing. Instead, I rebuilt the septum, in no way harming the original woodwork (and so as to allow myself or anyone else to remove this work for a second attempt for any reason). This allowed the plug to be positioned correctly.

We then made a crook based on measurements from an Uhlmann model and Alberto made a new wing joint based on an equally "hit or miss" reamer we had. The old wing joint was only useful in respect of the distance between the fingerholes, the angles of these holes and the general shape of the outside. It was a privilege to have Alberto working with us in our workshop, in much the same way as we gave open house/workshop to Paul White when he was moving his base to the UK in 1985.

We now have measurements of more H. Grensers, so we intend to do another wing joint which will be sufficiently accurate to validate the subsequent crook/reed experiments to get the simple and the alternative fingerings to work.

Having put that part of the record straight, I agree with Paul White that one should leave well alone if there is extant archival material present. Also it would be wrong to play an antique "to death". With care however an antique can fare as well in the hands of a player as it would in a glass case in a museum. Disuse is as much an enemy, if not more so, as misuse.

Paul White’s second topic for complaint dealt with the shortcomings of builders. Unfortunately for him he cites copyers of Denner bassoons. I doubt if there is any greater range in size (and therefore of pitch) by any other bassoon maker. So we must expect to be commissioned to build these at our modern two standard pitches, or any other, scaling up or down if necessary and why not? I agree that piling on the keys is going too far. The G# key is fair enough though. It looks as if I. Denner was required to fit them later (example
Linz 129) or at the time of manufacture. How many CD purchasers will moan about that G# key being a dead giveaway?

Also we must remember that there is no clear case for not allowing "foreign" instruments in the music of a composer's own country. Such appellations as French bassoon, German flute etc imply that these instruments did well as exports often with immigrant or itinerant players. Then as now people played the instrument that was available - what else could they do?

I do not share Paul White's concern that unresearched inauthentic instruments are on the increase. My feeling is that amateurs are getting more fussy, while professionals are still very careful. We all know much more than we did and most of us are, I hope, humble enough to realize we must go on being receptive to new research. Makers must hold nothing back in striving for authenticity (=honesty). Any compromise or customisation being openly agreed between him/her and the player. So I hope we will heed Paul White's warnings but not wallow in his sort of pessimism.

We must not forget that instrument making (and restoration) must be closely allied with playing technique. I end with a quote:

"We are forced to realize anew how subjective any attempt at a historical approach must properly be ... I find it salutory and indeed reassuring, that instinctive musicianship must always have the last word" (Roger Norrington, "Early Music News", Jan '93).
Dear Mr. Montagu,

I am very sorry to read in this month's issue of FoMRHI Quarterly the article by Mr. White about 'post-modern bassoon players'. He complains of the new generation early music musician who knows little or nothing about original instruments but just wants to earn money by playing. I am the Italian bassoonist to which Mr White was obviously referring and I really do feel offended by the inaccuracy of the article and of his conclusions. I have been involved with early instrument performance from the age of 17, and after more than 15 years of research, experiment and practice, I now play full time with what would be considered one of the most important baroque orchestras in the UK.

I took him two original bassoons the first of which was a Prudent in poor condition and Mr. White advised me to leave it, something that I did following that visit. I thought the second instrument (eight keys H. Grenser with pre-1806 stamp without original crook) had been changed from its original state, but obviously Mr. White quickly came to the conclusion that I was one of his 'post-modern reluctant-mind-retrainer arrogant' musicians. He seemed to dismiss the instrument as unworthy of measurement and close examination on the grounds that the popularity of H. Grenser was overrated, but more because my request for him to restore the instrument was taken as a frivolous attempt to alter it in order to make it easier to play!

Before going to see Mr. White I had the opportunity of trying several original H. Grenser from museums (two instruments in Leipzig and one in Munich) and from other players who also have the privilege of owning a Grenser bassoon. All that knowledge had been taken into account when I told Mr. White that the instrument I had didn't work as well as it could do.

I have since taken the bassoon to several experts and all have agreed that the instrument is not in 'pristine condition' but has obviously been altered, as a quick inspection would have easily revealed to Mr. White. (The septum of the boot joint has been cut to shorten the whole instrument, the wing joint and the finger holes widened to make the instrument play at a higher pitch.)

The fact that Mr. White puts so much emphasis on the knowledge of a fingering chart shows how little he understands of and how little respect he has for his colleagues in the profession. I thought he would be able to appreciate the difference between blowing out a note in his workshop without any pitch reference and playing in an orchestra with all the refinement required. Unfortunately for us life is not as easy as looking up a fingering on a chart.

In these days of intense musicology and performance specialisation, I feel sorry that Mr. White's instinct didn't lead him towards cooperation with an enthusiastic professional player. Like many other professional musicians involved in early music, I have done research myself on technical aspects of bassoon playing and reed making, but mostly I am interested in the aspect of research to do with performance practise.
Mr. White seems to be incapable of understanding that we, as musicians, are troubled every day about the 'originality' of our performances. Is it right to play German music on a French instrument? Is it acceptable to play most European baroque music at a 415 Hz? Would have Mozart been happy if we played his Parisian symphonies on a German bassoon? Who knows whether Vivaldi wrote his concertos for a 18th century north european type of bassoon or for a type of curtal or dulcian still played at the time in Venice and commonly called fagotto? This would seem a good enough reason not to perform his concertos until we know the answer to the question.

This would be indeed a good attitude for a musicologist, but we as musicians have the duty to overcome part of these problems in order to give music life and people pleasure, perfectly aware of the inevitable compromise we have to make between what we should do as an early music performer and what we can and have to do as mere musicians to communicate with an audience which come to concerts to be entertained and not only to listen to a true historical performance.

I believe active musicians play an important role in the process of rediscovery and understanding of early music. Sharing experience between academics and players should be the base for further exciting steps forward in this field. Mr. White's suggestion and hope that musicians should just follow pedantically the path of enlightened and pure researchers and makers (like himself?) seems to me very narrow minded (could I say arrogant?).

I do feel very grateful for musicological research; surely in return Mr. White should be more respectful to musicians who, by constantly submitting their work to audience approval, give a meaning to any kind of academic study on music.

Alberto Grazzi
Beethoven and the Early Music Industry

I was recently amazed and amused by hearing on radio an extract of Beethoven's Fifth Symphony played by the Hannover Band conducted by Roy Goodman. The wispy-sounding violins were swallowed up by the sound of the wind and percussion. I presume that in this recording, contrary to other 'period' instrument interpretations, original numbers of performers were used on each part, and contrary to most recordings, the judgement of balance was not left to the recording engineer.

Every scholar would strongly favour suspending judgement on how music sounded historically until after first exploring the sounds that can be made when the equipment and its usage are historically accurate. It can be presumed that Goodman was intending to do this here, but unfortunately, like all the other directors of 'period' instrument ensembles, he is not interested in delving into the research into what is historically accurate equipment. The one time that I met him, I brought Goodman's attention to my research into the history of violin stringing published in the Strad (Jan., March and April 1988), but he obviously didn't follow it up. I told him that violins in Beethoven's time had string tensions more than 50% greater than that which is standard on modern 'period' violins, and thus sounded fuller and louder, as well as allowing stronger bowing without fear of shrillness. He obviously didn't take me seriously, probably because no-one else seemed to either.

The directors of 'period' ensembles are proud of the musicological research into original sources of the music they use, but any interest in the results of historical research into the equipment their musicians use is eclipsed by their overriding need to meet the very high standards of 'quality' of performance they perceive are expected by critics, broadcasters, recording companies and audiences. If the musicians can offer that 'quality' using equipment that is acceptable as 'period' types by these critics and customers (who usually know little about it and are happy to take the players' words on this), the directors feel that they dare ask no more. Of course, 'quality' is defined by the standards of the current 'serious' music culture and has no historical relevance.

In the early 'amateur' days of the early music movement, it was led by music researchers of all types. Now in its 'professional' and 'commercial' phase, musicologists are still employed to provide repertoire and historical hooks to hang programmes on, but (at least from an instruments point of view) it is led by the professional players who offer the 'quality' the music industry expects. They dictate what the ensemble leaders can have and what the instrument makers can sell.

In the recording I am referring to, besides the violins sounding weaker and thinner than original ones in Beethoven's time, I suspect that the other instruments were louder. I don't know much about wind instruments, but this suspicion is based on several recent experiences I've had:

In my collection I have a Millhouse oboe from about 1800. I had various staples made for it by the method of Comm 431 according to the specifications of Comm 804, which should be just right for the instrument. A talented recorder player, oboist (modern) and reed maker borrowed these and Comm 804, hoping to make reeds and play the instrument with an early music ensemble. A couple of months later he returned the instrument, saying that reeds he made to the designs given 'didn't work' in tune at any pitch near to modern (the original pitch should have been ½ semitone below modern). I don't trust his judgement since he played too loudly in the group with his modern oboe, and did play beautifully on the Millhouse with a test reed that he said was unsatisfactory. I also gave a duplicate of Comm 804 to a local 'period' oboe player and reed maker with similar 'failure'. He reported that the London professionals (with whom he has lessons) use a radically different reed design. It seems that historically accurate reed designs don't give oboe players the sounds they feel they need.

I discussed Comm 1119 with a professional 'period' woodwind maker I know, and when I suggested that he made known which aspects of his instruments were historically accurate and which not, he said that this would be 'commercial suicide'. He said that he started with a basic historical design and then made the 'best' instrument that he could. The criteria for quality here are obviously what the players want. This usually involves 'full resonance' besides being easy to play evenly and quickly and in tune. It is highly unlikely that the playing qualities of typical original instruments with reeds of original design have much bearing on these judgements.
In the unusual case where a musician has the requisite education and intelligence to understand historical research plus the interest in following it, it could still be 'commercial suicide' to put that research into practice in the 'period' orchestra environment. The days when being more authentic than the next musician offered advantages in getting playing opportunities are truly over, largely because historical accuracy in equipment does not affect the commercial interests of the directors of the 'period' instrument ensembles and their customers.

Essential to the growth of the early music movement has been the perception that following historical guidelines usually led to a sound for the music that one could easily convince oneself was more attractive than if one followed more modern approaches. Whenever one could not convince oneself of this, the historical information has always been ignored. Examples of this ignoring early in the movement has been the standard temp? defined by Simpson and Praetorius, and doubled first voices as well as all-gut bass strings on lutes of Dowland's period in England.

The association of greater attractiveness with more historical accuracy has been part of the belief system of the movement, and is one of the two platforms on which the movement has been selling its wares to the public. The other platform exploits the deification of the creative artist in our modern culture (dating from the Romantic period), claiming that the early-music approach more truly expresses the intentions and expectations of the composers.

When there is conflict between attractiveness and research findings in the history of music, not only the players ignore the history. Some of the directors of 'period' ensembles and critics are scholars as well, and are well aware of the history. When I was a member of Musica Reservata we played several concerts of music by Praetorius. Michael Morrow (the director) told me that Praetorius indicated how long many of his compositions took to perform, but he couldn't imagine doing them slowly enough to meet those times. His tempos were not in the least influenced by his scholarship. More encouraging is a critic-scholar who has taken my research on tempo standards seriously, and whenever asked for tempo advice by early-music groups replies that there is no tempo they could take that is too slow. Here, at least, there is an attempt at compromise, giving the historical evidence a chance to influence the 'musical' choices.

The early music industry offers the listener both enjoyable music and historical flavour. It is assumed that for enjoyability, modern performance and tone-quality standards are required. The industry has also produced its own standards for achieving historical flavour, and these standards take the form of a belief system or mythology about historical practices which derive from 'practical' compromises between modern practices and poorly-researched history.

The taste for historical flavour without serious interest in historical accuracy is clearly shown when I canvass audience preferences at my own performances. They prefer us in costume (rather than any kind of modern dress) but are not concerned about any matching of the costume with the time and place of the repertoire played.

There is nothing to be gained by someone 'blowing the whistle', publicly exposing the frauds where historical accuracy is falsely claimed by people in the early music industry. Neither the public nor other members of the industry will rise in indignation. They just don't want to know. Anyone who reports or admits to unauthenticity is an embarrassment to the mythology and is ignored or quelled in any other way available. The investment in technique, instruments and style is too great to be open to any challenge, especially an argument for change, no matter how rational.

Professional musicians and makers need strong belief systems because to be a good practitioner in any craft you have to believe in what you are doing. A belief system of what is required for historical flavour was agreed on by the musicians in each area of the early music field when it became professionalised, after which it has become fixed and unquestionable.

Roy Goodman's recording of Beethoven's Fifth will not be the great revelation in authentic orchestral balance that he probably hoped it would. The reason is not that it happens to be flawed historically. It just doesn't sound attractive enough. I can't help feeling sorry for him. At least he tried to be more historically accurate. Maybe some day we will be able to hear what Beethoven's Fifth originally sounded like. The early music industry is incapable of offering us this experience.
On Embellishment Function and Context

Complexity

According to a leading theory of human evolution, the complexity of social relationships that can be handled is the criterion of natural selection which led to the development of our brain size, which is much larger than that needed for survival. Now that we have that brain size, we like to use it. The complexities in many aspects of our culture have optima for each individual and average optima for populations.

In every area of activity, each person prefers an optimum level of complexity in what he focuses attention on at any one time and a different optimum level of complexity in what he can keep track of and effectively handle over a period of time. If over some time the actual level is lower than the optimum, he or she is dissatisfied and will increase the complexity if possible (by broadening scope or introducing subtleties or other complications). If it is higher he or she is similarly uncomfortable and will simplify the actual situation if possible. When the level is right, short-term fluctuations in complexity are usually welcomed, with high spots considered stimulating (but potentially exhausting) and low spots relaxing (but potentially boring).

Decoration in the arts and crafts has always been an example of injecting complexity into the product to enhance satisfaction of the consumer (and often of the producer as well). Once an element of decoration becomes so commonplace that it ceases to attract attention, its contribution to complexity evaporates and pressures build up for addition or change. The loss of attention is avoided when there is variety. When variety is overwhelmed by popularity of one decorative element, it becomes a fashion that usually passes (when it is considered ugly) but sometimes becomes a background factor in the culture, only noticed when missing.

The modern anti-Victorian fashion for simplicity (in the name of modesty, functional directness, 'honesty' and resistance to changes of fashion) has been an attempt to achieve a common denominator in our new mass culture. Ostentatious display is embarrassing because it is likely to induce criticism. Victorian response (from those that matter) was almost always expected to be one of admiration. With decoration inhibited, the current need for complexity is diverted to more subtle aesthetic factors which are not so readily learned about and appreciated. This reduces the breadth of consumer appeal rather than increasing it, as intended.

Components of this anti-flamboyance fashion that can be seen in the early-music movement are the reluctance to enhance the historical flavour by performing in costume, and the reluctance to use the full complement of decoration in the music that is indicated in the sources. Higher levels of decoration are coming back into fashion in the field of visual design, and I am looking forward to it coming back in the field of 'serious' music, where the early-music branch has the greatest scope for developing it.

Musical Décoratation

One can define decoration in music as any change from a previous state that was complete in itself that increases complexity. This could include adding accompaniments or orchestration, but I shall confine myself here only to decoration modifying melodies, which is also called embellishment or ornamentation. Components of embellishment include gracing (also called colouration), division (also called passage-work, diminution or figuration), and time alteration (e.g. dotted rhythms).

These components, when listed in order of increasing skill or training needed to modify the notated music by them during performance are: time alteration, gracing and division. Anyone could do the first, any competent performer the second, and not all competent performers the third. Since notation is only bothered with when one cannot comfortably do without it (using memory or improvisation), this is also the sequence of increasing appearance notated in the music.

Notes could be played before or after their written times for various reasons, but when time alteration was described, it usually involved giving rhythmic variety to sequences of equal-length notes,
including such sequences in graces and divisions. Sancta Maria described three popular patterns for a sequence of four crotchets or four quavers: long-short-long-short, short-long-short-long and short-short-short-long (e.g. triplet shorts and a double-length long).

Gracing involves slurred variation in amplitude of the main (original) note and/or pitch around it, in a fairly stereotyped pattern. After the grace starts, the slurring removes the subsequent initial transient noises of note articulation by singing or playing them on one puff of the breath, bow stroke or pluck. Patterns of graces have names such as trillo, messa di voce, vibrato, appoggiatura, mordent, turn, and shake. There can be considerable variation in the time for each change of amplitude or pitch in each pattern, and in some cases in the notes themselves. Combinations in tandem also occur frequently. When graces were notated, each sign could correspond to a grace name or a category of grace names (e.g. relishes and falls in Elizabethan England), or one sign only could mean any grace.

In pre-classical times, grace signs usually appeared only in music for instruments that generally play more than one note at a time (such as keyboards, lutes and viols played lyra-style). There is no reason to expect large differences between embellishment practices used on different instruments then since all were supposed to be imitating whatever the voice did at that time and place. So it thus seems that singers and players of instruments that usually play only one note at a time generally had the skill to extemporaneously incorporate graces in their playing, while some players of the former type of instrument (called 'fundament' instruments by Praetorius) needed the help of grace notation in their music. The difference could be that improvised gracing while playing more than just a melody was beyond the optimum complexity level for these players that needed notation.

Division involves replacing the original (main) note with a number of shorter notes which are articulated in the same way as melody notes are. These occur in a much wider variety of patterns. When a division pattern is stereotyped it can have a name (e.g. the tirade and groppo, or a named grace played as a division). Except for perhaps in very early medieval music, there are no signs appearing on music that have been identified as indicating that the associated note is to be divided. When divisions were notated, they were generally written out, just as the rest of the music notation.

Some musicologists are of the opinion that embellishment was much more widespread amongst players of plucked instruments (including harpsichords) than other musicians because this was a way of sustaining their notes longer. This hypothesis is supported by Robinson's statement in his method for the lute: "note that the longer the time is of a single stroke, that the more neede it hath of a relish, for a relish will help, both to grace it, and also it helps to continue the sound of the note his full time: but in a quicke time a little touch or jerke will serve". The reason for extending the length of the long note being graced (and not other long notes that are not graced) is the same reason for gracing it, namely to offer emphasis. The real issue here is the use of embellishment as a means of expression of emphasis on instruments with small dynamic range, compared to the more natural way: of doing this by increased loudness on instruments of large dynamic range, such as the voice. (It is difficult for us nowadays to appreciate the use of orator-imitating pointed dynamics then because our phrasing is very different). Yet the use of embellishment (inducing arousal by increasing complexity) clearly was not considered inferior to increasing loudness for providing emphasis. Because of the need for variety, the fortunate performer who has a large dynamic range at his disposal would express emphasis by using both means. He or she would use somewhat less embellishment than the performer with less dynamic scope, but could not afford to neglect embellishment to any serious extent, largely because of its valuable contribution to complexity.

As with psalteries and harps, keyboard instruments (with the possible partial exception of clavichords) cannot properly slur notes, and so cannot properly produce graces. Some authors (such as Praetorius), who primarily played keyboards, described embellishment patterns without distinguishing between graces and divisions. Modern musicologists can be similarly handicapped.

An early embellishing practice greatly under-appreciated nowadays is heterophony. Evidence for it exists from ancient Greece as well as in our medieval, Renaissance and baroque times. It needs more than one voice performing the same melodic line. One voice performs an embellished version
while the remaining voice or voices perform it relatively undecorated.

Medieval Embellishment

The first clear evidence for gracing comes from the early years of the 16th century when there was an enormous growth in amateur involvement in the singing and instrumental playing of notated music, probably initiated and sustained by the new availability of printed music. Before then, music was almost always written either for the use of professionals or as presentations to people of high rank, either for their private enjoyment or the use of the professional musicians in their employ. Writing about performance practices was not appropriate in these sources, nor was it discussed by theorists since it was not (in their view) what music was about, and it was too detailed to be mentioned by the chroniclers of events. So there is no reason for us to expect any direct evidence about gracing to have been produced, no matter how prevalent it might have been.

There is fragmentary evidence from the 15th century (and possibly from the 14th century as well) indicating that the training of vocalists included improvising a simple discantus and different divided versions of that discantus to various tenor pitch patterns (Fallows (1990)). Improvising a discantus is a higher-level skill than embellishment. Then, as well as since then, the distinction between the results of improvisation and composition could be very blurred since many compositions were written-down improvisations (with perhaps polish applied). From its beginning, the surviving music includes much melisma which includes divided versions of simpler melodies. A major problem that musicologists face, when trying to define an urtext of what was the composer’s intention for a composition of which several non-autograph copies survive, is in trying to choose between the differences in embellishment between them. The trouble here is that it is not clear how integrated into the tune each embellishment is. This can vary with time (and/or place), and as a tune becomes more familiar, more attractive old embellishments tend to get integrated into the tune and new (mostly ephemeral) embellishments are added. It is likely that the integration of embellishments into familiar tunes was a major factor in the slowing of tempo that occurred in medieval and Renaissance times, the slowing being needed to maintain the optimum average level of complexity.

Of relevance here is my research into standard tempi from the end of the 17th century back to the beginning of the 16th century. It is significant that modern early-music performers and musicologists are comfortable with tempi which are about twice as fast as the original tempi I deduced. But they attempt a much lower level of improvised embellishment than that suggested by the sources that give indications of it. The principle of optimum level of complexity seems to be involved here, suggesting that satisfactory tempi can only approach original slowness if higher levels of embellishment are used.

Using similar criteria to their estimates of standard tempi in the above period, musicologists have estimated standard tempi at earlier times. It is quite possible that they have been similarly in error about original tempi at those earlier times as well. If this is true, then there must probably was considerably more medieval embellishment than that which appears (as division) in the surviving music. My guess is that non-stereotyped gracing patterns played a large part here. At such slow tempi it is possible that some variations in the amplitude and/or pitch were considerably faster that the fastest written notes. This applies more to homophonic than polyphonic music then since the complexity value of polyphony was probably higher than when it later became more familiar.

Grace Fashions with Modern Descendants

To maintain the complexity value of gracing, a choice amongst various graces was usually available. Occasionally a particular grace became so popular that it temporarily overshadowed all others. This happened with vibrato around 1610. The fashion soon subsided and this grace was subsequently underused. This was testified to with some nostalgia by Piccinini, Mersenne and Mace (incidently demonstrating how international musical fashions were). This popularity seems to have been repeated late in the 19th century when the Joachim quartet embraced continuous vibrato. They subsequently abandoned it (when a grace is used continuously, it soon loses most of its expressive power). But others, mostly violinists, continued using it for other reasons, such as masking intonation faults and softening shrillness of tone. Earlier in the 19th century violin stringing fashion was to use strings as thick as possible to maximise power and warmth. This high-tension fashion was then abandoned to make playing easier and quicken string response. Thinner strings would have led to the perception of loss of warmth that could be replaced by continuous vibrato. Violin string tensions have
continued to decrease since then, as has tolerance for inaccurate intonation, so the original reasons for adopting continuous vibrato remain as strong as ever.

The messa di voce (soft-start - swell - soft-end) grace was first mentioned by Caccini. It gained popularity as an imitation of a sigh in the emotional Italian baroque style. By the middle of the 18th century it became so popular that it was applied to most notes that could have it. The other graces never fully recovered from their partial eclipse then. The soft start of a note suppresses the initial transient noise of articulation, and this component of the messa di voce was subsequently often employed as a sign of refinement. Otherwise the messa di voce note shaping went out of fashion. Recently the early music movement adopted a note shaping that is a compromise between the messa di voce and a flat featureless note shape (like a harmonium), mixed with a hushed-up modern continuous vibrato. This shaping, used for music of all periods, is a background factor of style, attracting no attention and so not contributing to complexity. That is served by faster tempi.

Pitch Ambiguity, Clarity and Variety

In a few types of graces (e.g. the long appoggiatura and the shake), one hears ambiguity about which of two diatonically adjacent notes is the main or original note. This ambiguity is essential for the aesthetic effect of the grace. Yet, it is usually easily resolved by the ear from the harmonic environment the grace occurs in. Such simultaneous ambiguity and its resolution occurs with divisions at cadences, where which way the melody is going is usually quite obvious. When where it is going is not so obvious from the musical environment, it can be made so by using particular division patterns which would be immediately recognised to signal the appearance of a cadence.

In all of these cases, ornamentation adds spice (complexity) to a melody without seriously reducing clarity. This also occurs with the other types of graces since the main note sounds for considerably more of its original undecorated time than any other note. Those divisions that retain such a strong presence of the main note, as well as all divisions in heterophony (since the main notes are still represented), similarly conserve essential clarity. Otherwise, division destroys melodic clarity.

Though loss of clarity is unfortunate in circumstances where it is important, there are many circumstances in which it is not. Listeners have always varied in their judgements of importance, so while most enjoyed, some complained. Many of the complaints (especially by composers) have survived. Embellished parts without melodic clarity can contribute attractive texture or be a vehicle for display of technique or imagination or be a vehicle for emotional expressivity. These can be accepted as long as the listener can hang on to a strong or familiar ground or rhythm, or a strong or familiar harmonic or contrapuntal environment. High levels of melody-obscurining divisions can be exhilarating to listen to, but it eventually becomes tiring (even to jazz enthusiasts). There is much evidence that variety in the level of embellishments as well as types of embellishments has always been valued highly to keep them fresh and interesting. It has never been unfashionable to sing or play a tune without improvised embellishments. But in pre-classical music, it has always been unfashionable for competent musicians to do it that way most of the time.

Artifices and Clarity

Following is a model of how some of the verbal and musical artifices relevant to the history of music can relate to clarity and appreciation. It may add to the understanding of those who wonder, as I do, about how and why things were as they were. Those who are just interested in finding responding to and using the fruits of historical research will not find much of interest here.

In the beginning there is the word. Words are strung together in utterances of varying degrees of meaning. Clarity in expression for conveying meaning is not important in many circumstances. Examples are structured sound to accompany activity, ritual that expresses group solidarity and purpose, the retelling of well-known tales for entertainment, and expressing emotion. Such clarity is important in other circumstances. Examples are: new tales for entertainment and pleas for favourable treatment from God (prayers) or others (e.g. prospective lovers). In pleas, the need to convince often demands particular clarity because it includes some sort of rational argument.

Let us now introduce the artifices of regular metres and rhyme. Versification leads to unusual verbal constructions which sometimes makes the meaning harder to ascertain. When ambiguity in meaning
is intended, It is easier to express with this artifice.

Another verbal artifice is declamation. It starts with the need for clarity when an orator wants to convince a large audience in difficult acoustics. Any characteristic of speech needed to convey meaning is exaggerated. Examples are: stronger and more highly-differentiated consonants, more space between words and phrases, slower more deliberate enunciation and stronger inflections, including greater loudness on important words and phrases. This style of presentation not only improves clarity, but also projects the orator's conviction and authority. Training in rhetoric used during declamation gives the orator facility in stringing words and ideas together in a convincing way. Orators are so successful at convincing audiences that the artifice of declamation is associated with the power to convince, regardless of other factors. But when declamation is used in more intimate surroundings, there often can be ambiguity between public and private interpretations of the message.

The essential unnaturalness and tendency to include some ambiguity in meaning in verbal artifices can be used as a shield behind which one can express messages that one dares not express in normal speaking. This added freedom of expression can be very useful socially, and can give an artifice added popularity, especially when it induces the wrath of those who object to what they consider to be misuse of that freedom. (This effect can occur in musical artifices if they can be associated with something that is frowned upon).

Now let us introduce the artifice of singing the words. This unnatural way of saying words loses some of their verbal intonation and so makes them somewhat harder to understand. There is also a tune to listen to, which may be distracting. Add the artifice of embellishing the tune and this makes both the words and the tune less clear. Another artifice which similarly makes both verbal and melodic comprehension more difficult is polyphony. The words appear at different times in the different tunes of the different parts. This recipe for confusion is compounded in those motets that have different sets of words for the different musical parts performed simultaneously.

One can add many other artifices. Most contribute attractive complexity. Some (like declamation) increase clarity in language communication, but most decrease it. Clarity of idea communication is another matter, and it is in the nature of arts that this is often deliberately obscured by ambiguity, either by artifices or the use of the language. The majority of listeners prefer having artifices. To them the loss of clarity is not a sacrifice. It induces a heightened awareness that increases response. In the case most common in music history, where the intention is to convince, these artifices are expected to be more convincing by heightening awareness in the object of the exercise. The message is harder to understand, but if it comes through, it is with more power than the clear message without artifices. Without artifices the attempt to convince is mere propaganda, while an attempt to entertain needs more powerful tale-telling to avoid boredom.

For greater appreciation, artifices and other means of including ambiguity are used to veil that which is understandable, but not so much as to lose it. Understandability is most vulnerable on first hearing of a new work. Reaction to the first hearing is often decisive in whether it will be performed again. How far the poet, composer or performer can go in introducing novelty depends on what is familiar to the listener. One type of listening takes the familiar for granted as a background and focuses attention on what is new, while another focuses attention on the familiar and treats that which is new as a background (with no attempt to comprehend) that complements and may compete with the familiar. Both of these types respond to a mix of the familiar with the new. The familiar can include poetic or musical form. It can also include verbal phrases or complete sets of words or the obvious nature of the message, and it can include all or parts of a tune or a contrapuntal, rhythmic or harmonic context. The unfamiliar can include the original contributions of the poet or composer or the embellishments of the performer. After a number of hearings, much more becomes familiar, and listening attention can either wander (because of no challenge) or wallow in appreciation. Incorporating something new would satisfy a wider audience. What can be new is improvised embellishment by the performer. This means for extending the performing life of a composition can be very valuable in a culture that has much less choice of musical repertoire than we are used to.
Applying the Principles of Stringing Plucked Instruments to the Irish Harp

In Comm 1112, John Downing presents a very useful discussion of Irish harp history and geometry, but I find it difficult to accept his assumption of equal-gauge stringing (implying equal-tension stringing) as the ideal for perfect harmonic scaling (i.e. a string an octave higher is half as long), and equal-tension stringing when the scaling is not ideal. According to the Mersenne-Taylor formula, the length, pitch and density of a string determines its stress (the tension divided by the string's cross-sectional area). The scaling (relating pitches and lengths) and the density of the string material gives the stresses of all of the strings. It is limits on string stress (breaking on the high end and loss of sound quality on the low end) that the scaling has to fit into. But just because the ratio of the tension and the cross-sectional area is fixed by the scaling doesn’t stop them from galloping off together for other reasons. If Downing thinks that theory leads to equal tension, this is mistaken. If his stringing is based on historical evidence or on successful practical experience, I am prepared to be wrong about questioning it. I have no experience with Irish harp stringing.

Equal-tension stringing has been very common on plucked and bowed fingerboard instruments. The equal tension is between strings of equal string stop (open-string vibrating length). But when string stop varies as we compare different members of a family of such instruments, the longer the string stop, the higher the string tension. There is a tendency for the tension to be proportional to the string stop in these families of instruments.

A major factor in why this happens with plucked instruments is that players like to use the same technique on all of the strings, and that involves their having the same ‘feel’. They like all strings to ‘give’ the same in response to the same plucking force. With equal string stop, the same force causes the same displacement (‘give’) at the same plucking point on each string only if they are at the same tension.

From the geometry of the situation (simplified by the approximation that displacement is much smaller than the distance between the plucking point and the end), one can arrive at the following formula relating displacement (s), vibrating length (L), displacing force (F), string tension (T) and the fraction of the vibrating length at which the plucking point is located (r):

$$s = F L r (1-r) / T$$

If we want the same ‘feel’ (the ratio $F/s$ is constant) and the same mix of fundamental and higher harmonics in the string’s vibration (achieved by keeping r constant), then tension should be proportional to length. This applies to different-length instruments in a family. Then, for strings of diameters $D_1$ and $D_2$ tuned to frequencies $f_1$ and $f_2$:

$$D_2 = D_1 \left( \frac{f_1}{f_2} \right) \sqrt{\frac{L_1}{L_2}}.$$  

If, as Downing would have it, we want the tension to be constant on strings of different length:

$$D_2 = D_1 \left( \frac{f_1}{f_2} \right) \left( \frac{L_1}{L_2} \right)^{2/5}.$$  

The stringing on a modern concert harp is between these two cases. The technique keeps r fairly constant. Comparing other string diameters with any particular one chosen for general tension level, over the range from the highest string down to the thickest unwound string, they are much closer to that calculated by equal ‘feel’ than that calculated by equal tension. To an accuracy within 5%:

$$D_2 = D_1 \left( \frac{f_1}{f_2} \right) \left[ \frac{(L_1/L_2)}{4} \right] /5.$$  

Over that range of almost 5 octaves, string tension increases by a factor of 7 and the ‘feel’ softens ($F/s$ decreases) by a factor of 2.

Over the total range of a harpsichord from treble to bass, tension increases by less than a factor of 2 and ‘feel’ softens by a factor of 2%. The smaller tension variation here is related to r decreasing from .5 to .1. In the bass, the low r makes a very weak fundamental component of the string vibration. Keeping tension light and using copper or brass gives more higher harmonics, helping the ear to reconstruct the fundamental.

On the Irish harp, I presume that the brass stringing is heavier (for its length) than on the harpsichord, so there would be less higher harmonics in the string vibration, leading us to expect the player to pluck at a higher r in the bass. I would guess that the tension and plucking-position profiles would be closer to that of the modern concert harp than to the harpsichord.
An attribution of an unsigned spinet.

A small spinet recently acquired by the Shrine to Music museum in Vermillion, SD, has been suggested to have been made in Germany\(^1\). Since I believe I have shown that two clavichords which had previously been regarded as German (and could be used as evidence for the spinet's origin) are in fact of Italian origin\(^2\), the attribution of this instrument deserves further study.

The case is made of thin maple with dovetailed corner joints, a style of construction one also finds in the two clavichords in Leipzig\(^3\). The projecting keyboard cheek bracket is carved with a small cornucopia in the same style as in the Leipzig clavichord no. 2. Clavichord no. 3 may originally have had the same cheek brackets, but these have since been replaced by Otto Marx who also made other extensive repairs. Nevertheless, a superficial similarity in the the style of construction is apparent between the two clavichords and the spinet. The location of the tuning pins is unusual in their being placed close to the left hand bridge, in the same manner as Guarracino spinets and the earlier 1598 Fabri\(^4\). Instruments by these makers are also of maple with doevtailed corner joints. However, these stylistic similarities are not sufficient in my view for any reliable attribution\(^5\), although they do confirm the likelihood that the clavichords were made in Naples.

The comparison of mouldings permits, in principle, a most reliable attribution to be made; it was the purpose of my essay (see note 2) to argue this case and the arguments will not be repeated here. The major qualification is that the evidence for comparison is limited to what has survived. If we are not fortunate enough to have two surviving mouldings of identical shape we cannot make an attribution with a high degree of confidence. Nevertheless, it is possible to deal with variations in moulding shape and estimate the measure of confidence one can apply to a comparison of the mouldings.

None of the mouldings on the Shrine's spinet is identical with

\(^1\) Personal communication from B. von Hünerbein. Apparently a "Gutachten" on the instrument by Hubert Henkel (which I have not seen) argues for a German origin.

\(^2\) D. Wraight, "The Identification and Authentication of Italian String Keyboard Instruments", vol.3 The Historical Harpsichord, Essays in honor of Frank Hubbard, ed. Howard Schott (Stuyvesant, NY, 1992).

\(^3\) Musikinstrumenten-Museum der Universität Leipzig, catalogue numbers 2 and 3.

\(^4\) In the collection of Luigi Tagliavini.

\(^5\) As I have argued; op. cit. note 2 above.
any other mouldings known to me. There are however similarities to other mouldings which are noteworthy:

1. A part of the upper outside case edge moulding of the spinet is very close to that of the moulding in the same place of the "1503" Milano harpsichord. It was argued that this harpsichord came from the same workshop as Leipzig no. 3. The spinet's moulding shows more wear, apparently due to a cutter flaw. It is conceivable that the harpsichord uses a sharpened version of this cutter.

2. The large round bead on the lower edge moulding of the spinet and that of another harpsichord are identical. This harpsichord was adjudged to have close similarities with the clavichord no. 3 and the Milano harpsichord; the probability was estimated as "better than even" that they came from the same workshop.

The difficulty we have to deal with here is that there are only parts of mouldings which match closely, or identically. This may happen by chance with instruments from different workshops. It also implies that for the comparisons to be relevant, the mouldings must have been made in several stages. Although I believe that most Italian mouldings were made from a one-piece cutter, it is not inconceivable that several planes should have been used. There are certainly examples of mouldings being made in a composite way from separate pieces of moulding. It was in fact the apparent "canting" of some parts of these mouldings which led me to consider whether they were produced from more than one cutter, before I had even studied the spinet's mouldings.

Although the arcade is clearly cut, I have not been able to find any which match it and we are left with the sparse indications of the other mouldings and general stylistic considerations as a way to identifying this instrument. These incline me to place it in the same tradition and at the same date as the other four instruments mentioned. I regard it as possible and furthermore likely that it came from the same workshop, although the evidence cannot do any more than point in this direction. In any event, it is more likely that it came from this workshop than from that of any other instrument presently known to me, based on moulding similarities. This locates its place of construction as Naples and date as circa. 1540, based on the dated keyboard of the Milano harpsichord (1537).

Acknowledgement: I would like to thank Rodger S. Kelly of the Shrine to Music museum for his kindness in providing me with moulding impressions.

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*N and F Gallini, Museo degli strumenti musicali del commune di Milano catalogo (Milano, 1963); inventory number 579/CXI.

Wraight, op.cit. p. 138-141.

Harpischord Dampers – Historic vs. Modern

First, thank you to Jeremy, Ephraim, et al at FoMRHI, and to its contributors and other members for making possible the sharing of so much knowledge and experience. Reading the Quarterly over the years has been very stimulating and motivating for my work and musings on early keyboards. I will now stop being only a reader and try contributing something useful for others to think about, and perhaps try.

This first topic deals with harpsichord dampers — an item which has been in plain sight for years, but which seems to have been given little thought by modern builders as an item to be studied with an "historic" eye. Indeed, as Grant O'Brien points out in his superb (thank you, Dr. O’Brien) book on the Ruckers harpsichord builders, "Virtually all seventeenth and eighteenth century harpsichords that I have seen with apparently original jacks have dampers with sloping sides."¹ yet, "virtually all modern builders use flag dampers with a horizontal lower surface."²

Even without the luck of finding original dampers still in their jacks, there is still evidence enough in the jacks themselves to indicate the approximate shape of damper they used. Since, before the string can be damped, the plectrum needs room to move around and under the string during the jack's descent, a horizontal damper obviously needs to be placed somewhat above the level of the tip of the plectrum. Historic jacks, unlike too many current ones, have plectra angled upward 8°-20° referenced to the jack body's front. This significantly raises the tip of the plectrum above the level of its base, simultaneously raising the level at which a horizontal damper would need to be set, to perhaps 3 mm above the plectrum slot in the tongue. Yet historic jacks had damper openings which descended at least to the plectrum's base, and in many cases significantly below it. Either the old builders didn't mind doing a lot of extra handwork for no reason, or they didn't use horizontal flag dampers.

The modern damper shape, coupled with the fact that many current builders use a cloth significantly stiffer than the type used historically, leaves us in an unauthentic condition that presents problems which historic players did not experience, takes away sonic possibilities which they did enjoy, and contributes much to the harpsichord's reputation for being "fussy".

Most people familiar with harpsichords nowadays are also familiar with the sight of dampers with little notches in them above the strings, and with dampers which have curled. The notch is made when the flat, bottom edge of the damper comes down on a vigorously vibrating string. The stiffer
and more unmoving the cloth, the more concentrated is the area which has to absorb the string's energy. When a damper is set too low in its slot, the jack ends up hanging from the string by its damper. Depending on the stiffness of the cloth and the weight of the jack this often results in the lower corner of the damper curling up as the jack slowly sinks down to the more solid support of the keylever. Often this distortion becomes set, so that even when the damper is repositioned in its slot the damper remains misshapen, making it difficult to adjust it to damp in both the on and off positions of the register.

The long-ignored historic damper shape does not encounter these problems because it does not trap all that energy in a head-on collision, but deflects and absorbs it through its shape and compliance. The sloped shape (either slanted in a damper slot or curved as a "mouse ear" damper in the oval hole of a Rucker's jack) contacts the string gradually in both planes of vibration as it descends rather than abruptly in only the vertical direction. This is particularly helpful with heavy bass strings, and with widely moving muselar strings, where the string energy against a flag damper can either knock the damper out of position or cause the whole jack to be lifted and rattled in its register mortise.

Where strings are arranged in close pairs, such as virginals, spinets, and 2x8's of grands, a sloped shape greatly reduces the probability of a damper interfering with the motion of a neighboring string:

A grand harpsichord using modern flag dampers must have its dampers very carefully adjusted so that they do not interfere with nearby strings yet all stay on their own strings when the register is shifted off. If a damper slides off its string and the jack drops slightly, then when the register is shifted "on" the leading corner of the damper can catch on its string and cause resistance to the movement, which can cause a slight springback of the register when the lever is released. This causes inconsistent plucking across the register. This is not a problem with the historic damper. The very slight forward pressure the historic damper does exert on the string is just enough to ensure the jack will always sit back in its slot for a consistent start to the pluck. This is a definite
advantage when trying to create a consistent touch where there is any looseness in the fit of the jacks in their register mortises.

When a register of jacks with historic dampers is shifted off, the dampers lose contact with the strings. This leaves the strings free to vibrate sympathetically, filling in the abrupt plucked sound with a sustaining shimmer. The degree of this depends on the configuration and liveliness of the particular harpsichord.

An undamped 4' choir will not receive much energy from the 8' bridge's strings, and the extra resonance will be apparent, but not at all obtrusive. This fact permits the sloped damper shape to be easily used on a 4' choir, thereby eliminating the micro-adjusting necessary to make sure that the 4' flag dampers stay on their strings when the register is off and yet do not interfere with overhead 8' strings when in the on position. In fact, the very close string spacing found in most original 18th century French harpsichords, including treble 4' strings lying almost directly under 8' strings, is, I believe, strong evidence that this sloped shape was the one used, and that there was never any intention that the 4' strings be damped when not playing. This added shimmer would have been part of the normal 8' sound. To historic ears, I believe, the 8' might very well have sounded too "dry" without it. (Somewhat like the difference in damping between Viennese and English forte-pianos, if you were an Englishman perhaps).

Since, unlike the separated 8' and 4' choirs, two 8' choirs share the same bridge, the transfer of vibrating energy from one playing choir to the other unplaying choir is maximized, and the sympathetic "haze" can be quite marked. In a double-manual harpsichord it is quite easy to play whichever 8' alone one wishes without disengaging the other 8'. Since most 20th century harpsichords have not revealed much useful difference in sound between the 4' played with the lower 8' and the 4' played with the upper 8', and since rarely is the 4' played solo, the current performance practice seems to be not to use the lower 8' register lever except possibly for tuning. It has always seemed strange to this builder that the French (and others) went to the trouble to install a register lever easily accessible to the player, in the keywell, only to have the (modern) players never use it. Aside from the two possible reasons for the use of the lever alluded to above, I believe a major reason for its presence is to access the sympathetic haze available with the historically shaped damper: the upper 8' played with an undamped lower 8'. The effect can be wonderful, depending on the type of music and the resonance of the instrument. Rapidly modulating music on a very lively instrument may result in clashing tonalities, but, wisely chosen, the effect can be a very useful addition to
the resources of the upper manual. The fact the historic damper is easier to keep in good regulation and damps better are additional advantages.

A single-manual with two 8' choirs does not have the same possibilities of controlling this sympathetic effect as does a double-manual, which very well may explain 1.) why the Flemish preferred the 1x8', 1x4' disposition, 6 2.) why the French seemed to have made so few singles, 3.) why the Italians usually had no convenient way to turn a register off, and perhaps 4.) partly why Fleischer preferred using two sets of jacks on one choir of 8' strings to get the two 8' sounds on his 1710 single (see footnote 3).

Plastic jacks, because of their slick surfaces and a desire to keep horizontal dampers from being knocked out of position by the strings, usually have damper arms which grip with enough tension (and/or teeth) that they need a fairly strong, hard cloth for ease of installation. But these harder cloths with their subsequent notching, curling, and increased nodal ringing have not helped the harpsichord's maintenance reputation.

A sloping damper of a relatively hard cloth will not work as well as one made of a soft cloth. The softer material will absorb the energy over a larger area of itself by flexing and twisting around. It is less critical about being positioned perfectly. Soft cloth is easily gripped sufficiently by the rough surface of a saw-cut damper slot in a wooden jack. Its resiliency makes it less likely, than the hard cloth, to have the string knock it out of position, form a notch, or a curl.

Going forward by going backward

To try the historic damper shape, a flag damper can be trimmed to a sloping shape and lowered in its slot. If the results aren't agreeable, the damper can be turned upside down to return to the familiar horizontal bottom edge. If you do like what you find and the damper cloth is a little hard to get the full benefits of the historic shape, you may want to eventually cut a new set of dampers with a softer cloth.

For spinets and virginals, switching to the historic damper is really all advantages with no drawbacks.

The same pretty much applies to single manual grands with 1x8', 1x4' except for the slight, I believe, possibility that some ears may refuse to accept the unfamiliar 4' "haze" on the 8' solo sound. Try removing the 4' jacks first and playing the 8' to assess the effect before starting to modify dampers.
For the usual configuration of double-manuals, changing the 4' dampers and the upper 8' dampers should present no problems (check the 4' shimmer effect first, as in the paragraph above, just in case). Whether you modify the lower 8' dampers will depend upon how the instrument is normally used and whether it has a buff stop on the lower 8':

a.) If it is not normally used with the lower 8' turned off then there will be no problems with modifying the lower 8' dampers, and an additional timbre will be gained for the upper manual.

b.) If the instrument is sometimes registered with the lower 8' off and the sympathetic haze might interfere with the sound desired, turning "on" a lower manual buff stop will essentially stop the sympathetic resonance, giving additional choices of timbre for with or without.

c.) If there is no lower 8' buff to have it both ways, as above, then before converting the lower 8' dampers, remove the lower 8' jacks and try the other registration possibilities with those strings now undamped. Play a variety of music. If the shimmer is just a bit too long or strong try putting back some of the lower 8' bass jacks with their horizontal dampers, a few at a time, and play some more. If the sympathetic resonances do not disturb the registrations which have the lower 8' off, then go ahead and modify as many of the lower 8' dampers as sounds good to you.

As mentioned earlier in the historical context, single manual grands with 2x8' seem to present more of a problem for the historic damper. Horizontal flag dampers might be the solution to this situation or it might be useful to have the added haze on just one choir so that the resource of the familiar, drier sound is still available with the other choir. Remove each register of jacks alternately and try a variety of music to find out 1.) if you like the effect, and 2.) which register you prefer dry and which "wet". As mentioned above, the effect can be reduced by keeping flag dampers on a number of the bass jacks. If the instrument has a buff stop, it would be advantageous to use the sloped dampers on that same set of strings, as discussed above.

The slope of the damper can vary depending on the specific conditions, but if the sympathetic shimmer is an objective then the angle must be at least sufficient to allow the string full freedom of motion when the register is in the off position. Straight or curved cuts may be used:

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<table>
<thead>
<tr>
<th>curved cut possibility:</th>
<th>straight one:</th>
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<td>optional cut to make damper more compliant</td>
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If, unlike the illustrations, the plectra in your jacks do not point up, it may take a little more care to get the shape you need and still intersect the string where it needs to, but do try. (The jack with a horizontal plectrum is another 20th century invention which has given us another set of playing and maintenance problems, but that is another discussion.)

I believe the historic damper is a worthy addition to our revival of historic performance practices. Even if the resulting sympathetic enforcement in grands sounds unusual at first to some people, the improvement in harpsichord regulation and fussiness, at least, will be appreciated by everybody involved with the instrument.


2. Ibid., p. 223.

3. Listen to the Handel Suites recorded by Colin Tilney originally on LP, recently re-released on CD. On Disc 1 he uses a 1710 Fleischer single which has no dampers on the 4' at all, so whenever he plays the 8' solo, the 4' strings vibrate sympathetically. (Disc 2 uses a 1728 Zell double). Archiv Galleria 427 170-2.

4. Which is not to say there shouldn't be significant differences of effect.

5. almost never, but perhaps something is different about the sound of our 4', or our taste.

"Through" Dampers

For any given frequency of a string there are portions of the string that are moving up and down (and sideways), and in between these portions are the nodal points, which don't move. If a harpsichord damper is located at a nodal point for a particular frequency it cannot efficiently damp out that pitch even though it may quiet all the rest of the output from the string. Given that plucking proportions in harpsichords range from 9% to 50% across the compass, it's inevitable that some dampers will be located at a nodal point for a frequency with significant output.

While nodal ringing could be viewed as a form of sympathetic vibration, it is not a desirable form because it is 1.) random in occurrence and pitch relation across the instrument's range, 2.) often high enough in the overtone structure to be a pitch which does not reinforce or emphasize the fundamental pitch, and 3.) at a high enough frequency to lie more in the noise domain than in a useful musical range. Thus builders like the Ruckers expended effort to eliminate it while providing freedom to other forms of sympathetic vibrations in their instruments.

A jack with two separated dampers virtually eliminates this nodal ringing problem. A double-dampered instrument goes to complete silence much more quickly than a single-dampered one, thus expanding articulation possibilities and giving an impression of a wider dynamic range.

Although the Ruckers builders consistently made their 8' jacks with two dampers, as did several Italian makers, most modern harpsichords use jacks with only single dampers. Where particular strings have an objectionable amount of nodal ringing several techniques have been tried to eliminate it. Method A: a thinner damper material is folded in half in the damper slot so that two thin dampers bear on the string. Occasionally this suffices, but usually the twins are too close together and too limp to do much good.

Method B: another damper is glued on the opposite side of the jack. Properly done this works quite well, but it is obviously not very adjustable for later regulation, although using rubber cement as the adhesive can sometimes allow the damper to be pulled slightly into a different position later.

Method C: Another way of providing double dampers in jacks which weren't designed for them is available for single manual harpsichords with two 8' choirs. As mentioned in the previous Communication on historic dampers, this particular harpsichord configuration probably provides the best reason for using horizontal flag dampers (because of the sonic consequences of trying to use sloped dampers). Instead of the
usual way of cutting the damper to protrude from the front of the jack, it can be cut to protrude from the back also. This way each jack of a given note has a damper for both strings of that note, not just for the string it plucks, so each string has two dampers and no nodal ringing.

This approach can be used on just those notes which stand out too much with nodal ringing, or, if the instrument is well set up without excessive register movement, it can be used on all the jacks to provide double damper benefits for the instrument. This is especially good for Italian singles and for "Flemish" singles with two 8' choirs, since their usually strong sound seems often to be accompanied by significant nodal ringing.

One Flemish-type single which came through the shop recently had strong nodal ringing on every note. It might not have been a problem for an audience in a concert hall, but for more intimate conditions it was quite apparent there was no true silence anywhere in music played on it. It was quite annoying, especially in the player's position. The owner had combatted this nodal ringing for years with the common Method D: Ignore it. When the jacks were equipped with "through" dampers, the tone gained clarity, music was no longer fuzzy, and silence was available as an expressive option.

This type of "through double damping" can be useful in certain applications. While it requires some careful fitting initially, experience has shown it needs very little attention later. The dampers strike two strings simultaneously front and back so they don't get tipped up in their slots (as single dampers can) and only get half the abuse of ordinary single-sided horizontal dampers. And the silence is wonderful.

Rubber cement has another use with dampers. In jacks where dampers keep getting knocked out of position, often a thin coat of it, or contact cement, in the damper arm slot will provide better grip. The intent is to change the coefficient of friction of the damper arm (especially of plastic jacks), not to glue the damper in, so don't put any cement on the damper cloth and do let the stuff dry before inserting the damper.
More on Sympathetic Strings

This has been a regular topic in the last several Quarterlies. Much of my Comm. on Historic Harpsichord Dampers is actually dealing with sympathetic strings and their, I believe, intended place in the sound of grand harpsichords. This is an application where a set of sympathetic strings could also be a set of "working" strings.

It may have been necessary to have sloped dampers on Ruckers doubles to avoid interference between manuals, but the same type of damper is found on single manuals where there is no interference problem. That type of damper simply worked well, and gave the builders, and customers, the sound they liked. Is anybody aware of grand harpsichords (aside from the early Italians) which were built with only one choir of strings? Perhaps the advantage of the grand design over the virginals and spinets wasn't just because it could have a larger cavity and soundboard, or "one more set of strings", but because it could have an overall type of sound impossible to attain on the single-strung configurations?

Another source of sympathetic string vibrations on harpsichords are the string lengths between the bridge pins and the hitchpins (and on virginals, between the bridge pins and the tuning pins). Significant, because if these lengths are damped the sound of the instrument becomes noticeably "drier" and less appealing (to most people anyway). Intentional probably, because the hitchpin rails are generally designed in such a way as to allow these lengths freedom of vibration. Later, hitchpin rails of fortepianos were designed to make it easy to damp these lengths.

On clavichords the string lengths between the bridge pins and the tuning pins make a noticeable sympathetic contribution to the color and sustain of the upper portion of the compass. By the mid-18th century, at least, some designs show that their builders went to significant effort to consciously plan the lengths of these portions (Silbermann and Friederici, for instance).

People interested in the interactions of energy between strings, and between soundboard structures and strings, would probably find much of interest in an article, "The Coupled Motions of Piano Strings" by Gabriel Weinreich in the Jan. 1979 Scientific American. The phenomena revealed and investigated in the article occur in far more places than the strings of the piano. While not directly dealing with sympathetic strings, it reveals the processes and forces involved in such systems. It should also give insights as to the effects of proximity and shared structures on sympathetic stringing. Among other things, it explains the
effects of vertical string motion vs. horizontal string motion, the effects of single stringing, the effects of paired stringing both when one string is being played and when two are being played. Reading this, for instance, makes clear the physical happenings behind the acoustical reasons why clavichords are double strung — not for mechanical reasons. (There are simpler ways to control the touch than requiring tuning twice as many strings. In fact, pianos were made in the 19th century single-strung, but they failed because of unsatisfactory sound — no tricks can give a single string the sonic characteristics of two.)

Interesting reading.

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- Ian Abernethy; 0573-4502.
- Ian Allan (add gamba, med.fidl).
- James Bisgood, 38 Osterley Road, Osterley, Isleworth, Middx TW7 4PN, UK; 081-560 5314.
- Philippe Bolton; fax 90 61 97 82.
- Maria Boxall & Niall MacCunnich, Fig Tree House, Church Street, [rest as before].
- Bernard Brauchli, Av. des Derisiers 19A, CH-1009 Pully, Switzerland; tel & fax: (41)21/285976.
- City of London Polytechnic – change name to London Guildhall University.
- Lucy Coad, 29 Stevens Crescent, Totterdown, Bristol BS3 4UH, UK; 0272-710328.
- Mathew Dart, 45 Bonnington Square [rest as before].
- John Downing, (add reed organs, brass; R).
- Peter Forrester; 0263-837711.
- Charles Foster, Glen Cottage, 63 Holburn Street [rest as before].
- Julian Goodacre, (add; res).

F
- Stephen Gottlieb, 9 Collingwood Avenue, Muswell Hill, London N10 3EH, UK; 081-883-2602 (hute, viol, cittern; M,coll).
- James Gregory, Foscote Cottage, Foscot, Chipping Norton, Oxon OX7 6RH, UK; 0608-659034 (trav; M,P).
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- Sean Rawnsley, Teullié, F-81140 Vaour, Tarn, France; (33) 63 96 38 60.
- P Roovers, NL 9712 CR [rest as before]; 31-50-140852 3 fax 133683.0009.
- John Shortridge, 1591 Lockmeade Pl, Oldsmar, FL 34677, USA.
- Stephen Smith, 6333 East Hwy 402, Loveland, CO 80537, USA; (303) 663-1513 (recrdr, ww; M).
- Tim Thurston, Halecat Barn, Halecat, Witherslack, Grange-over-Sands, Cumbria LA11 6RT, UK; 044 852-572.
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Oxford, OX1 1DB, UK