FOMRHI Quarterly

BULLETIN 39
Bulletin Supplement
Plans: Bate Collection
Plans: Paris Conservatoire
Boalch Third Edition
Membership List

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604 New Grove DoMI: JM no.1, detailed comments further to Comm.578
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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.
As usual with the April Q, you will receive herewith the annual LIST OF MEMBERS. It represents a lot of work (I'm still not computerised or word-processed or whatever the correct term is) so please make it worth while my doing it by using it. Get in touch with fellow members who are interested in the same instruments, and if you're travelling, especially to places where there are only one or two members, get in touch with them, too. The more isolated people are, the more they welcome contact with colleagues.

John Dick has mentioned one point. We used to use C for collectors, but recently changed that to denote conservators, and this has left a number of members out on a limb. So, wherever I have a note (and whenever I both remember and have room on a line; I've not typed the list yet), I'll put Coll for collectors, especially when they are not also players or makers.

If you have any other suggestions, do please let me know. The object of the list is to be useful and informative, and if we can include details that would make it better in either or both respects, we will.

FURTHER TO: Bull.37, p.5: Uta Henning tells me that there is a copy of that book on electric harpsichords by Mazzolari in the British Library catalogued under the pseudonym of Parthenius, Joseph Marianus, shelf-mark 78.c.13. So anyone interested who didn't have £200 can read it there. (Apologies to Uta, and you; I forgot this one for the last Bulletin).

Bull.38, p.3: Paul Hailperin says that the sample of hemp thread he sent me was waxed, but that even unwaxed he finds it a bit stiff for lapping (he says the same about my linen thread). He has sent two further samples of thread, one a ‘Coton à Broder’ made in France, #16 (which denoted the thickness), the other ‘Artikel 206/5’ (the /5 is the colour, and a number of colours are available) from Kannenfeld-Werkstätten 4012 Basel, Bäslser Webstube, described as Baumwoll-Stickgarn which comes in 75m reels. Both are a fine soft cotton, the French one laid like a rope and the Swiss one a very fine woven cord. I should have said that the wax on his hemp was his wax, as he described in the Bull, and that he finds my linen thread better for tying reeds.

Bull.39, p.5: Several more people have said 'keep FoMRFHIQ as it is'. Peter Bavington says: "If the editor is unhappy about a Comm, a courteous and reasoned reply is a better response than excluding, curtailing or altering what the member submitted. Most members are capable of evaluating Comms for themselves. Let free exchange of information and opinions continue." And David Crookes said "Yes, for Pete's sake keep the Q as it is, and stop mooting the possibility of change. As for going formal and respectable, forget it. There are plenty of respectable sepulchral journals already: the Q represents the alternative society which freely says what it thinks. It will be a sad day when we outlaw foul typing and personal attacks. Stay informal."

Bull.39, p.6: Two members have sent in sources of mother of pearl. John Paul suggests Chas Singleton & Co Ltd, Church Lane, Hackenthorpe, Sheffield, tel: 487976. And Henri Vanherle has
produced Friedlein's address and another source from John Rodd's book Repairing and Restoring Antique Furniture: F. Friedlein & Co Ltd, 718 Old Ford Road, London E3 2TA, and Erica Banjos, 14731 Lull Street, Unit 3 Van Nuys, CA 91405, USA (I suspect that there should be a comma between Unit 3 and Van Nuys), who have a ten dollar minimum order. Both also supply ivory, and Friedlein told me years ago that they only stock ivory that comes with a proper export licence.

Other recommendations to other sources would be welcome. Many of you must have found dealers whom you could recommend to your colleagues.

Bull.38, p.6: There have been several responses to George Bowden's query about varnish. Two of them are lengthy and will be found as Comms further on in this Q. John Paul writes "The probability is that best pale drying oil is linseed oil. As to which one, I would suggest going by the word 'best' and not worry about the pale. The best linseed oils are cold pressed, sun cured and stand oil and I would suggest that you experiment. I have used stand pil to make varnish with good results, but I chose it because I had it in stock rather than for any other reason. The other kinds of linseed oil, refined, raw and boiled, I would not recommend for paint making or paint making for instrument purposes - they are house paint qualities. The above are available from artists supply shops in this country under the Winsor & Newton label." JM adds that everything anyone is likely to need to know about varnish (including emphasis on the dangers of making your own) will be found in Peter and Ann Mactaggart's Painting and Marbling Harpsichord Cases; see my review in Q 34 (January last year), Comm.518.

Bull.38, p.8: Harvey Hope has come across some more dehumidifiers; he says that he is not yet in a position to recommend either of them, but that information may be useful. The Toshiba 'Dry Mini' is available at £287 including VAT and delivery from Ace Air Conditioning Equipment Ltd, Ace House, Cedar Way, Gamley Street, Kings Cross, London NW1 1YP. Briggs Enterprises, Schorne Lodge, School Lane, N.Marston, Bucks MK18 3PD sell a 'Dryfast' dehumidifier at £299 inclusive, and will also hire one at £6 per week (minimum 4 weeks) if you want to try it out. Ace Air Conditioning also supply air cleaners, humidifiers and ionisers, which is worth bearing in mind. If you live near heavy traffic, you do need to keep an eye on sulphur and other pollutant levels, and in England at least (and certainly in America) you need a humidifier as much as a dehumidifier, especially if you have central heating. I have both in the Bate and the dehumidifier is set to switch off when it has got the humidity down to between 55% and 60% (they aren't much more accurate than that), and the humidifier is set to switch on when it gets below 52% or so, certainly before it gets to 50%. I'm aiming to keep as near 55% as I can. Luckily they are to some extent symbiotic; the humidifier needs purified water if it is not to start growing algae and stinking, and the dehumidifier produces distilled water, so I keep the humidifier tank topped up from the dehumidifier (in the English climate the latter produces more than the former can consume as a rule; only occasionally do I have to resort to the tap and purifier tablets).

I asked, as I promised last time, for more technical information from Condensation Control, but all I got was a vague letter.
David Crookes has sent three brief comments on Comms:

Comm.588: Let's have lots more like this. If you come on something organological in your reading, type it up for the Q.

JM adds: be a bit careful, though. One member has typed out a whole article from a 1961 periodical. I've sent it up to Eph with this, but I have also written to the member to ask whether he has cleared it with either the author (who may still be alive and anyway hasn't been dead for 50 years) or the periodical, the point being that it must still be in copyright. Snippets are fine, but whole articles one does need to be careful with.

Comm.595: This was a valuable correction to my generalisation, but Bach, Handel and Co were still in action well after 1730!

Comm.599: Yes, definitely. The utterly English stump counters the "French song and fiddle" of ten lines back.

There is an agreement that Eph and I don't comment on Comms in the same issue as they appear, but I hope that I may be allowed to add a little information on two herewith (rather than commenting on them):

A Comm herewith by David Crookes on the Viole d'Aline: I have seen one of these once. My memory is that it was simply, perhaps complexly would be better, a mandoline on a fancy body, as are for example the flat-back mandolines or the mandolin banjos. It was tuned the normal mandoline way, the same as the violin. Who invented it and why, I don't know. Has anyone found the patent? (Doesn't always help; I have several instruments marked Patent; there never were any patents for them).

Also a Comm herewith by Len McCormack with queries on the Vihuela: I have slides of contemporary (I mean contemporary with us) makers of the Vihuela in Argentina which look different to me from guitars. Is there a surviving tradition of the vihuela in South America, and if so can anyone give us details of it? It could answer many of Len's and other people's questions about this instrument with information that the Jacquemart André Museum instrument cannot provide. Unfortunately, I have lost contact with the chap who gave me the slides. Can Raúl Pérez, our only member in Argentina, help at all?

PLANS: Sylvie and James Fawcett have sent me an up-to-date list of plans from the Paris Conservatoire, which is duplicated but may be clear enough to print. They say that if you join the Société des Amis of the museum, which costs 70 francs, you get a discount of 20f off each plan you buy as well as free admission to the museum.

Anyone else who can produce up-to-date lists of plans from any museum, please do so (including our museum curator members!).

I said in the last Bull that we were not likely to get any more Bate plans for a while, and I was wrong. Noel Sheehan (about whom I wrote on p.3 of the last Bull) has very kindly sent a drawing of my Milhouse 5-key flute which is added to the list as it is on loan to the Bate. It costs £1.00 as it is only the one sheet, and you'll find the usual x4 reduction here. I hope that there may also soon be another plan.

One member wrote to ask whether every Bate plan was available as a Miniplan (x8 reduction) "since this option is cheaper". I
told him that the Miniplans were just for fun (or to use as postcards) and that they did not include the bore measurement sheets. I must confess to being a bit narked. I have priced the Bate plans much lower than most museums (hurting Ken's feelings a bit in the process; he rightly felt that his work was worth more than I was charging) because I wanted to help makers, especially the beginning and amateur maker (the professional makers are probably laughing at me all the way to the bank). So when someone wants to get a plan for 20 pence instead of two pounds, it jars a bit, especially as the money we make on the plans goes into our purchase fund, which, since we get no purchase grant from the University, is the only way we can get money to buy new instruments.

QUERIES & REQUESTS: Charles Mould has been asked to prepare the third edition of Boalch. There is a letter from him as a Comm herewith. If you have any information about keyboard instruments, please respond to it. Nothing is more important to us than reference books of this sort, and the better we can all help to make them, the more we shall all benefit. Don't wait for others to do it for you; you may be the only one who has got the information (or the others may be even more reluctant to put pen to paper or finger to typewriter than you are).

David Noble writes "I am particularly interested in the English Tenor Oboe (Vox Humana)... If you can suggest further sources of information I would much appreciate it." Can anyone help him? It seems to be an instrument that nobody has worked on, so if you can help, copy to me for FoMRHIQ would be appreciated. As far as I know, we don't know what it was made for even. I know that suggestions have been made of military band use, but I suspect that that is only because it is a very plain design. Has anyone come across any parts for it in band music? There was a slightly tatty one in sale at Sotheby's yesterday; I haven't heard what it went for, but the estimate was £2,000-£3,000, which struck me as high. The maker was Milhouse of Newark and it looked to me a bit thicker in the body than most that I've seen.

Danny Hathaway has a whole string of queries. He wants information on harps (brays, their use and construction; early joinery in respect of the harp; plans and any other information on Gothic harps), on woodwinds (just about everything, but including methods of measuring, especially bore and accounting for movement and shrinkage, and reamers). Some of what he wants he'll have found by now in previous Qs, but some of the above would make good subjects for Comms from any of you who are feeling helpful. We haven't had anything on reamers for a long time, and what we have had is now all out of print, so what about some more, please? And I don't think we've ever had anything on brays. Nor do I remember any basic information for beginners (which I assume him to be, as we all were once) on measuring.

The Israel Museum has a very attractive 18th century Venetian Period Room in Chinoiserie style. They would like to have a harpsichord or a spinet in the room (best, but not essentially, also chinoiserie). The friend who wrote to me about it says that they never intend to play the instrument, and that they have a certain amount of money given to them for this. So if any of you know of an empty case of the right period which
would look right, please let me know, and I'll pass word on. They are not interested in a reproduction. I think that they are being short-sighted in saying that it will never be played; I have a suspicion that once they get something, sooner or later someone will say 'wouldn't it be nice if...'. So, if you know of a playable example, they might be interested in that.

**STRINGS:** Rémy Gug has sent me a list of the strings he makes for keyboard instruments. A reduced copy of the list is all down the right-hand side of this page (and by the time you get it, it will have been reduced again, but I hope that it will be readable nevertheless). Further copies are available from him. As far as I know, only he and Malcolm Rose produce the real strings for these instruments, and both appear in our List of Members.

**BATE COLLECTION ACCESSIONS:** One of the University funds has helped us to acquire a boxwood 4-key oboe by Grundmann & Floth, dated 1800. This came from the same collection in Holland as the Grenser bassoon I mentioned in the last Bulletin. There are two more instruments I'm still trying to find the money for; does anyone know where I can raise £31,000?! The two keys on this oboe apart from the usual C and Eb are a cross F and a G#. One comment I've received on the instrument is "if you can't play the Mozart on that, you can't play it on anything."

We have also acquired a tárógtató by Magyóróssy which I was able to pay for because so many of you have bought our plans. Also a few smaller odds and ends, especially clarinets and flutes (mostly gifts and loans from Philip Bate).

I list the Bate Accessions because, of course, I know about them. I am equally happy to list accessions at other museums if they will tell me about them. There have been several lists recently in the AMIS Newsletter, but I can't really lift them from there (and anyway I'm not typing them out myself). I assume that our American members see AMIS News (if not, you should; write to Peggy Downie who's in Our Members' List) but not many others will do so.

Can I ask all our museum members to consider sending us recent acquisition lists from time to time? And I
ask the rest of you to draw this request to the attention of any museum curators you happen to be gossiping with. I know that I say this whenever I review a museum catalogue, but the knowledge of where what is, is our life-blood.

LIBRARY OF CONGRESS: The L of C has now sent out an official release saying that Cathy Folkers has been appointed Curator of the Dayton Miller Collection (which I told you unofficially in Bull.37) and that requests for appointments to study anything in the DCM Collection will be accepted from January this year. Enquiries to: Library of Congress, Music Division, curator of musical instruments, Washington DC 20540; tel: (202) 287-5503. As many of you will know, nothing is on display there, but they are planning to move the flutes in due course to a new building. Watch this space, as they say.

After the last Q appeared, Cathy wrote and sorted out the confusion I'd got into over her name. She is now Mrs Ardal Powell socially and domestically, but she remains Catherine Folkers at the Library of Congress, and she still makes flutes as half of the firm of Folkers and Powell. She confused me with what appeared on her renewal form and change of address, and as a result I confused you; sorry.

HARPSICHORD RECORDINGS: Denzil Wraight sent me the following note about recordings of a couple of important museum instruments. Again, I'd be very glad of more such notes; they are important to us, especially when they relate to an instrument for which a plan is available as with the Giusti.

Two recordings of old harpsichords have been issued recently about which readers may not know:
The 1681 GIUSTI harpsichord in the Germanisches Nationalmuseum (from whom a drawing is available) is played by Lucy Russell; the programme is of Frescobaldi and Storace and available from b&b records, cat. no. bbr 16 301. In case of difficulty contact Bär & Bartosch Verlagsdruckerei, Postfach 1667, D-7800 Freiburg i. Br., West Germany.
The 1594 Hans Ruckers combined harpsichord and virginals which is not so accessible for many, being in Schloß Köpenick, East Berlin, has been recorded. Armin Thalheim plays a programme of pieces from the Fitzwilliam Virginal book, Karges, Scheidt and Sweelinck and the restorer of the instrument, Martin-Christian Schmidt can be heard as the other pair of hands in the Farnaby duet for two virginals. Eterna 8 27 699 is the record number. An extremely interesting description of the instrument and of its restoration has been written by M-C.S in Neue Museumskunde, Jahrgang 21.1/78, Deutscher Verlag der Wissenschaften, Berlin.

1985 MUSIC YEAR: Marco Tiella would like to collect the titles of musicological works of FoMRHI members and present the list as the FoMRHI contribution to the European Music Year 1985. If any of you would like to appear in this list, please send him a list of title of anything that you've written. Obviously you don't need to send anything that has appeared (or has been reviewed) in FoMRHIG, but anything else.
The Bate Collection has a special display for the year of all the instruments contemporary with Schütz, Bach and Handel (we have no Italian keyboards, so I left Scarlatti off the poster
to avoid confusion). As usual with our Special Exhibitions there is a little 20p Catalogue (by post 50p I'm afraid). I am not sure that I have ever bothered to tell you of the Bate Collection Special Exhibitions; there is a different one each term, always with a 20p catalogue. Last term was Clarinets of the Near, Middle and Far East; next term will be Instruments of the Bible and that will stay up till the end of September.

The National Portrait Gallery is planning a Handel Exhibition from 8th November to 23rd February. As well as appropriate portraits there will be a fair number of instruments (which I have been asked to advise on and to write the catalogue for). The strings and keyboards are still in a bit of flux, but there will be flutes, oboes, recorders and bassoons by the two Stanesbys, horns by Hofmaster and, I hope, Leichamschneider, and so on. We are trying to duplicate Pepusch's list of the instruments at Cannons (where Handel wrote the Chandos anthems), quite a few of which we've found, though not all; then there will be a general collection of the instruments that Handel wrote for in his operas and other works (we couldn't find any trace of a violetta marina, and I don't know of any trombones in this country of the right period, but pretty well everything else he scored for will be there, except perhaps double bass for which there might not be room even if we could find one in original state); partly for fun, and partly because they were both such Handel enthusiasts, we shall have also all the Hellier instruments from Warwick that fit the period and also the six surviving Granville Sharp instruments which are now here in the Bate (those also because the National Portrait Gallery has the Zoffany painting of the Sharp Family's Musical Boating Party in which they appear, which will also be in the Exhibition). It should be worth seeing, and there will, of course, be a glossy catalogue with lots of pictures.

Anybody else doing anything for the 1985 Centenaries? There's still time to tell me for the July Q.

EXHIBITIONS: Most of you have probably seen notices of the Boston Early Music Festival & Exhibition (which of course also focuses on the 1985 Centenaries). It runs from 3rd to 9th June and includes an instrument-makers' exhibition, a lot of concerts, a conference on Bach, Handel and the Baroque Orchestra, a joint meeting of AMIS (it occurred to me after writing the note on p.6 that some of you may not know what that stands for; it's the American Musical Instrument Society) and the Galpin Society from 30th May to 3rd June. The only thing they haven't got (it was thought of but was abandoned) is a big centenary exhibition at the Museum of Fine Arts, but even without that, it'll be quite a jamboree. All information is available from their office at 25 Huntington Avenue, Boston MA 02116, tel: (617) 262-1240. Information for AMIS/Galpin Meeting from either of the Secretaries, both of whom are in our Members' List.

There will also be the English Early Music Exhibition as every two years at the Horticultural Hall from 8th to 10th November. Information, bookings, etc, as usual from Richard Wood at the Early Music Shop, 28 Sunbridge Road, Bradford, West Yorks BD1 2AE. I shan't have a stand myself this year, partly because the cost has gone up a bit, and partly because our Treasurer is the wife of another member who always exhibits anyway. So
You will find FoMRHI with Graham Lyndon-Jones and Maggie and I look forward to seeing you there (and taking your 1986 renewals while you’re there).

**BATE WEEKEND:** Also in November will be the next Bate Collection Weekend, the weekend before the Horticultural Hall, November 2nd and 3rd. This will be on recorders, with emphasis on making and on voicing and improving the instruments the instruments you have already and play. It will be led by Alec Loretto and he suggests that participants bring any dud instruments they happen to have which they might like to see whether they could be improved. He also suggests bringing your best instruments, including your own make, because there will be a session with Alan Davis playing on original instruments (eg our Bressan) and any modern instruments that participants allow to be used to see how they compare. The cost will be, as in the past, £15 for the weekend and £10 for either day. We start at 10.30 for coffee each day (sessions from 11.00) and finish when we do. Alan Davis will be with us on the Sunday, afternoon and evening. Final information in the July Bulletin.

**SWEDISH COURSE IN INSTRUMENT MAKING:** As there has been each year since 1979 (though we’ve not been told of it before) there will be a course for making early string and keyboard instruments at the Birkagården High School in Stockholm at their summer residence at Marholmen a few miles north of Stockholm. The course lasts a fortnight, from July 10th to 25th, and in that time, even if you’ve not made an instrument before, you will be able to complete an instrument; the course is geared to this. The tutors are Arne Lindberg and Hans Erik Svensson, both of whom are FoMRHI members, and all information is available from them. The only other things I can tell you are that the scenery is beautiful, the food is excellent and even if you are building a harpsichord in a fortnight, there is still time for eating, swimming and even sleeping.

**NEMA:** The National Early Music Association has recently held its AGM and has issued a Broadsheet about what it has been doing and an Education Report. Among other things they have introduced a student membership rate of £2 a year. They will be present at the Incorporated Society of Musicians AGM this week (the ISM, which represents solo-performing musicians in this country and also both school and private music teachers, is at last beginning to take an interest in early music; some of us have been plugging at them to do so for a long time). They have also issued an untitled document which appears to be a newsletter or journal (it’s difficult to tell which) which includes an interesting interview with Lord Gowrie, the Arts Minister, a couple of articles reprinted from Flûte à Bec, and some other articles. Information from NEMA, 39 Capel Road, Forest Gate, London E7 0JP (Robin Atter, the Information Officer).

**MY MOVEMENTS:** I shall be in Washington and New York for the CIMCIM Meetings at the end of May, and hope to see some of you there. I don’t think I can go on to Boston (see previous page) because we’re still in term here, and I have lectures to give. I hope to be in Stockholm and Helsinki from July 30th to August 8th for the International Council for Traditional Music Conference, and might see others of you there. The Conference was
supposed also to go to Leningrad, but that part of the programme seems to have been dropped unfortunately.

As yet I have no summer plans, but I shall be away on holiday for some of the time, so if you are planning to come and see the Bate Collection, do please write first. I'm single-handed still, and if I'm away, we're shut. Sooner or later I hope that we will get a Friends of the Bate off the ground (it needs a Secretary and a Treasurer to run it), and when we do, we should be able to build up a corps of volunteers who will sit in when I'm not here so that we don't have to shut. Even then, you'd only be able to look at things through the glass, so appointments would still be necessary to get at instruments.

If you're here unexpectedly, you can always take a chance, of course, and if I am here, you're very welcome.

DEADLINE FOR NEXT Q: July 1st.

That's it for now; there may be some additions while I do the List of Members.

Bulletin Supplement

Denzil Wraight has agreed to do an English review/summary of Gug's big paper on Nuremberg wire-drawing technology which appeared in the Sept, 1984 issue of Musique Ancienne. I have not yet had a volunteer to review the 86 page "Der Cremoneser Lack" by Knopf, (1979) Verlag Das Musikinstrumenten, Frankfurt am Main. Nor has one materialized to provide a summary of what is written in the 35 page "Die Form der Geige" by Kayser, (1947), Occident Verlag, Zurich, as requested by George M. Bowden. Volunteers of course get to keep the copies sent them.

There are two NWEMP activities in the autumn where early-instrument makers are invited to display their wares at no charge. One is the Early Music Festival at Bramall Hall, Bramall, Cheshire on the weekend of the 12-13 October. The other is the Early Music Competition at the College of Adult Education in Manchester on Saturday, 2 November. Space is very limited, so reserve early. The person to contact is me.

Odd Johnson has a Stoppani Strad-model baroque tenor viola for sale. Anyone interested please contact him at Buflaatv 26, 4000 Stavanger, Norway.

Concerning Karp's comment in Bull 38 p.4 about the unlikeliness of case hardening iron music wire, am I being naive by asking whether it is not possible to put the tensile strength back into the wire by a few more draws through the die plate?

While on wire strings, p.6 above lists Gug's tensile strength values in units of Kg/mm². To compare with the data discussed in my review of Karp's booklet (Comm. 606), multiply by 9.81 to get MPa. So Gug's reproduction Nuremberg iron has a strength of about 1080 MPa, while my suggestion in that review was that Nuremberg wire should have a strength of 1200 MPa to tune a standard Ruckers 6 voet scale instrument to Cammerton.

My assumption there of 1.4 semitones between the breaking and working pitches is based on Adlung's statement (1769) that "when a harpsichord is strung so that the pitch can be safely raised a semitone, one can be secure" (Hubbard p.281). The difference between 1200 and 1080 MPa is just about a semitone in breaking pitch. If Gug truly reproduces Nuremberg wire, the working pitch of Ruckers-scaled instruments was no higher than a'=c.405 Hz, as Karp claims.

Concerning the large 5-string instrument Smith draws in Comm 594, the Hills book called it a 5-string bass viol with a cello-like body. I see no point in calling the drawing a cello version rather than the gamba Strad called it, the difference would only be in tuning. Of what musical use would cello tuning be?
Boxwood Flute, W. Milhouse London
Jeremy Montagu Collection IV 131

keys for top joint

key for middle joint

key for foot joint

measured & drawn by
Sherman’s Music Services
Dec. 1984
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UNIVERSITY OF OXFORD
BATE COLLECTION OF HISTORICAL INSTRUMENTS

A = c 437 Hz
scale: 1 size

W. Milhouse
London
537 Cornary

Dwg No.: x 1081
Diffusion de dessins techniques d'instruments du Musée Instrumental

Bon de commande à remplir en lettres capitales et à renvoyer à l'adresse ci-dessus :

Nom et prénom ..........................................................
Adresse ...........................................................................
Désire acquérir les plans suivants :

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<tr>
<th>DESIGNATION</th>
<th>PRIX</th>
<th>FRAIS D'ENVOI</th>
<th>QUANTITÉ</th>
<th>MONTANT DE LA COMMANDE EN F.F</th>
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<td>n°5 - VIOLE DE GAMBE (pardessus), six cordes, Nicolas Bertrand, Paris 1714, E.1005 C.138, diapason: 310 mm, Pierre Jaquier, 1976</td>
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Signature :
Makers of the Harpsichord and Clavichord 1440-1840

D.H. Boalch

Third Edition to be published by Oxford University Press

Editor - Charles Mould

You may well have seen in one or other of the journals concerning Early Music that I have been invited by Oxford University Press to produce a third edition of Donald Boalch's well-known work "Makers of the Harpsichord and Clavichord, 1440 - 1840". The original invitation was extended to Mr Boalch in the summer of 1984 by OUP, but since he felt that he could not undertake yet a third revision, he suggested to OUP that I might be interested. Since I had been privileged to know Donald as a friend for many years, and also since he had acted as my supervisor for the last few years of research for my doctoral thesis on the development of the English harpsichord, I was both pleased and honoured to be asked to undertake the work, particularly since it was at his suggestion and with his blessing.

Since the printing of the second edition by OUP in 1974, Donald Boalch has received a substantial number of letters giving errata or addenda and these he has kindly passed to me and they will, of course, be incorporated in the work. Nevertheless, it is clear that there is a wealth of information to be included in a third edition which as yet has not been available generally. Much of this information is in the hands of present-day builders, keyboard performers, and scholars, through whose hands instruments may pass for a variety of reasons. Apart, therefore, from appealing to the Curators of Museums and established Collections, my main appeal for information is to people such as yourself who may have had access to instruments in the past twelve years. May I therefore ask you to be so kind as to send to me any information which you may have acquired since...
1972 (the effective cut-off date for information appearing in Donald Boalch's second edition) concerning instruments or makers already in the second edition, or new information which has come to light since then. All aspects of the makers and instruments are of value including the present and past owners of instruments.

I should at this stage add some caveats, for, despite the temptation to extend the volume to the early piano, I am limiting myself strictly to the clavichord and harpsichord. I am, however, extending my research, somewhat against Donald Boalch's advice, but with the encouragement of a number of friends, to the uncharted field of anonymous instruments, for which I have, as yet, to devise a classification scheme. I hope therefore that if you favour me with a reply it will include such instruments. I would also be interested in your views on a classification scheme for anonymous instruments which to you would be the most helpful. In addition, at this early stage in the project, I would be most grateful to receive from you any other observations which would make Boalch III more useful to you.

I should also say that the timescale for the completion of the project is somewhat indeterminate. As you will know, I have a full-time job as Secretary of the Bodleian Library, (Donald Boalch also had a full-time job as a Librarian when he completed the first and second editions, and so I am not too daunted by the prospect). Nevertheless, I am not in the fortunate position of being able to give my full daily attention to the project. I hope, however that "Boalch III" will be in the hands of the press by May 1987 at the latest, and preferably well beforehand.

With respect to the information which would be of value may I ask you when referring to instruments to give me such obvious details as the exact inscription, the overall description, including, if possible the scale (length of longer string at the c above middle c), specification, disposition, case materials, decorations, and any other peripheral details, including the present and past owners. I have refrained from giving you a form to fill in, since it is my experience that such forms rarely cover everything, and often ask for quite impossible detail. In addition, experienced recipients of this letter will be well aware of the information which is useful.

Finally, may I say that I hope to be able to travel in the USA in the early summer of 1985, including a visit to the Boston Early Music Festival (3-9 June) and in Europe in 1986. If a visit to meet you in either year would be helpful, I would be pleased to try and arrange this. Alternatively, there is always open-house at the Bodleian Library in Oxford, where I would be delighted to see you, or at my home at Abbey Cottage, Dorchester on Thames, Oxfordshire. Please do not hesitate to contact me at either address, though I am trying, so far as possible to conduct all business through the Library's address. Regardless of the address to which you send communications I will acknowledge everything.

Please reply to: Dr Charles Mould, Secretary of the Library Bodleian Library, Oxford OX1 3BG Telephone Oxford (0865) 244675 Telex 83656

A very useful book, designed for 'amateur trombonists and sackbuters' but with plenty of information for any of interested in the instrument and its use. It includes descriptions of pretty well all the surviving instruments, much of the contemporary and modern literature, and, which may be the more important to many of us, of a number of soi-disant reproductions. Dr. Fischer is himself an amateur sacbuter and the genesis of the book was his attempts to play various modern instruments and his problems in making them sound like the originals. Thus there is a good deal of information on how the originals were made, what of and what sizes, how they were put together, and the differences that this makes to the sound. There is a good deal of sackbut-playing going on today, much of it on wholly spurious instruments (in Musica Reservata we mostly used pea-shooters with the end of the bell cut off) producing wholly spurious sounds. Anybody who is using sackbuts, whether as a player, musical director, or in any other capacity should read this book; they will then at least see where the problems lie and have the beginnings of an idea of what can be done about them.

Review of: John Barnes, Making a Spinet by Traditional Methods, Mac & Me, Welwyn, 1985, 52 pp, 24 figs., £4.50.

For the first time one must record some disappointment with a MacTaggart publication. Not because of any inaccuracies, nor because it is the first by another author rather than by Ann and Peter, but because it does not stand up by itself. Far too often details are incomprehensible because they suddenly slide off into a reference to a set of plans which John has prepared and which he sells himself (and there is no indication in the book as to the price of the plans). In other words, this book is the instruction manual for building an instrument from plans which do not come with it and which are available from a different source at an undisclosed price, and which can be supplemented with photographs, also available only from John but which are listed, though again without price, in the back of this book. I have to say that I think that this is a daft idea. Either John should have published the book, too, or the MacTaggarts should have published the plan. At the very least, full details of the plan, including its price, should be cited here (preferably with a miniplan reduction so that at least one could see what on earth he is talking about).

The instrument that is the basis of the book is a spinet by Stephen Keene and Charles Brackley c.1715 in the author's own collection (Boalch 22), and as John says in his introduction, the plans show what Keene did and the book describes how he did it. Again as John says, the traditional methods are, on the whole, both quicker and easier for any small workshop;
only if one is going in for mass-production is it worth making jigs and other necessities for bulk work. The general points are adequate and very clearly set out, but I do not think that it would be possible to finish any single part of the instrument, simply because one comes up, again and again, hard against a reference to some detail which is shown on the plan but not described in the book.

I think that what we need is another review of this book, by someone, preferably someone who has not previously built a spinet, who is willing to buy John's plan (or who has already done so) and who would be willing to try to first follow the book alone, and then work on it with the plan. Only then can we really judge how useful the book will be. So I'll send the book up to Eph and he can either send it out to someone or can wait till one of you writes in and asks for it.

I hope that this will work; I only wish that the book could stand by itself, because we could do with books like this, especially for spinets which are very useful, and very popular instruments.

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FoMRHI Comm: 602  
Jeremy Montagu


This is the first volume of a monograph series in honour of Frank Hubbard. He joined FoMRHI (our 85th member) in December 1975, and tragically we printed his obituary in our third Q, in April 1976. His Three Centuries of Harpsichord Making has, of course, been enormously influential, but he was such a practical scholar that he would, I think, have contributed much to our pages. At least this series, if it continues as well as this first volume, will continue the work he has done. It contains three essays, two short and one long. One of the short ones is a lecture that Hubbard gave in 1974 on Reconstructing the Harpsichord, a survey of harpsichord types and models with a good deal of autobiography, a very interesting text to have preserved and an excellent introduction to the series. The other short one is by Christopher Page, In the Direction of the Beginning, a brief, but inevitably with Chris, excellent and scholarly investigation into why should the harpsichord have been invented. The bulk of the book, 90 pages, is a highly detailed study by William Dowd, Hubbard's associate and colleague in the Boston Revolution which led the return to the real harpsichord, on The Surviving Instruments of the Blanchet Workshop, covering in the minutest detail, with many measurements and line drawings, all the surviving Blanchet instruments and the first three Taskins, since they represent a natural continuation of the Blanchet shop work'. Little more needs to be said; if you have Dowd's experience and have had all the opportunities that he has had to study these instruments, you're OK; if not, if you work with French harpsichords at all, you have to have this book, even at this price, which seems to me pretty steep for 125 pages. Perhaps if it sells well, they will be encouraged to produce larger editions, and so lower prices, for future volumes.
Let me start by saying that the music is wonderful. The BBC broadcast all sixteen Sonatas on three successive Sunday mornings a few months back (but from a different recording) and so many people, including me, roared out the shops to buy the records that all those shops which had ordered one or two copies of what they thought a pretty minority interested, were telephoning all the wholesalers they could find to try to get more copies in. Now let me go on to say that the performance here is excellent, too; better, in fact, than the other set which the BBC used, rather more musical and much more intense. The music itself is so intense that it needs a fully committed performance, and that it receives. The other performance has a more elaborate continuo (cello or gamba and sometimes lute) but this is perfectly adequate and very well recorded.

The instruments used are a Sebastian Klotz violin of 1741 and the organ of the Evangelical Pfarrkirche, Wieslet. The cassette is Chrome-dioxide and recorded with Dolby B (though I must agree with Paul Hailperin, through whose good offices we received this to review, that to my ear it sounds better without the Dolby switch than with; a bit more hiss, but also more atmosphere). My only complaint is that the notes with the cassettes don't give the scordatura for each sonata. Necessarily, for a cassette, they are brief, but there is room, beside the reproduction of the original vignettes for each Sonata, to give the tuning which, as you probably know, differs for each one. This, of course, is partly what gives the music its intensity; playing in A major, for example, with the violin tuned A,E,A,E; added interest is that this tuning for Sonata 2 produces a quite different tone colour from that for Sonata 5, also in A major but tuned A,E,A,C#. The scordatura also allows Biber to write music quite unplayable on the violin as we normally think of it, especially when, as in Sonata 11, he cross-tunes (lowest string G, third string the D to which the second is usually tuned, the second on the treble clef G and the top on the upper D).

If you don't know these Sonatas, a superb musical experience is awaiting you; if you do know them, this performance is the best that I've heard. Either way, you'll get a lot of lasting pleasure for DM 48. Thank you, Paul, for asking them to send them to us.

I have headed this JM no. 1 because it is the first of my such detailed lists, but I hope that there may be an ES and many others as well. If you have a copy, or have access to a copy, do please keep notes of any comments that you can make. As I said in Comm. 578, the Dictionary is good enough that we should all help to make it better.

When reading the following do please remember that I am only picking up things that should be corrected. It will appear to be wholly negative; what proves that it is in fact positive is the large gaps between comments.

Since it is a Dictionary, I shan't cite page numbers; the entries are all alphabetical and thus easily found in your own copies.

Accelerando: I wondered why a Dictionary of Musical Instruments should include performance instructions. It does seem to waste space, but in fact I have found the definitions useful, and the articles on performance practice very valuable.

(And my first comment is positive, not negative. What I'm doing here is picking up all the marginal notes I made while reading).

Acoustics: Why are percussion instruments ignored? A lot of detailed comments could be made on this whole entry, but I'm afraid that I find myself at such variance with conventional acousticians that I'm not going to make any. My basic problem is that almost everything they say about the acoustics of instruments ceases to be true the moment you pick up a non-European (and often even a European folk) instrument. My experience is that when you show an acoustician an ethnic instrument and ask why it does this or that, he says 'glug'; maybe I've been unfortunate with my acoustician, but I do have a strong suspicion that the 'science' of acoustics is based purely on explaining what happens to our orchestral instruments, and thus is not a science at all, any more than say biology would be if biologists had never noticed that there were creatures up in the sky and under the water.

Aeolian harp: 'in England, with the strings on an inclined fingerboard over which...'? A fingerboard on an aeolian harp? Where did that idea come from? I think he meant soundboard.

Agidigbo: A lamellophone (what are usually called sansas or mbiras, with cane, wood, or metal tongues which are plucked with the thumbs and a finger; lamellophone is a good term for them) with 'keys'. I have been arguing with Stanley Sadie about this use of keys (and on xylophones) since Comm. 578 appeared. He says that it is common usage; quite right, it is, but nevertheless it's wrong and should not be used in a Dictionary of this sort. The language one uses in common speech is often quite different from that which one uses in writing a work of reference or scholarship; always one has to think of the precise meaning of words, and a key is something that is used to open something (eg access to an organ pipe for the air). Because the first European instrument to have keys was the organ, that usage was established; when the same keyboard was transferred to clavichords, harpsichords, etc, nobody
would have dreamed of objecting. However, when one transfers
the term to an instrument like a lamellophone simply because
it has been called by the ignorant a thumb-piano (a term which
is grossly offensive in the eyes of any of the Africans who
play the instrument), and to a xylophone because for only the
past 60 or 70 years xylophones in our culture have been laid
out in the same pattern as piano keyboards (before that they
were laid out like dulcimers), this is wrong. Xylophones have
bars of wood (if you want to be pedantic, sometimes they are
plaques, being wider than they are thick, but bars will do as
a generic term); other instruments of that class have bars (or
again plaques) of metal, glass and other materials. Lamello-
phones have (not surprisingly) lamellae, which are more often
referred to as tongues and which are acoustically reeds, as
Hugh Tracey once pointed out to me when I objected to his use
of that name. They are a form of plucked free reed, though
distinct from the normal free reeds in that they do not vibrate
through a closely-fitting frame, as do the normal plucked free-
reeds (better known as jews harps) or the blown ones in mouth-
organs and such instruments as harmoniums, accordions, etc.
Sadie thinks that I am being too fussy in this respect; I be-
lieve that such a Dictionary should get things right and not
follow common usage when common usage is wrong.

Agogo: Is the enu, a large ceremonial iron bell, really 55 to
68 cm wide?

Akadinda: Here we have a xylophone with keys.

Alboka: The photograph is reversed. This is an unsigned article
with a statement in it which one might wish to check (that the
tuning has changed in fairly recent times, date unspecified).
Again this is something that I've been arguing with Sadie; of
course one cannot expect all the very short notes to be signed,
but I feel strongly that when they say that one scale was for-
merly used but another 'has become commonly preferred', they
should give references. After all, they got the information
from somewhere, why not tell us where? Either they can give
the author, whose work one can then look up in the standard
bibliographies, or they can cite the reference from which they
worked.

Algaita: '... the player... blowing both round and through the
reed...'. Blowing round the reed isn't going to make any sound.
They are describing the technique of continuous blowing, com-
mon on shawms everywhere, and I think the confusion is between
blowing from the cheeks (cheek-pumping as it is sometimes
called) and breathing in simultaneously through the nose.

Althorn: The instrument illustrated is a beauty, a Kühler with
Shaw's disc valves, but it is so untypical that I feel that it
would be misleading to the general reader.

Amadinda: '...the name meaning 'the keys'...'. This I do not be-
lieve. Surely it cannot mean anything that we would relate to
keys; if you showed a Ganda a bunch of keys would he say Ama-
dinda?

Anandalahari: Sometimes one does win; for about twenty years
I have been stressing that these are string instruments and not
drums. They have been confused with friction drums because
there is a string rising vertically from a drum-head; the string
is plucked and the pitch produced depends on the tension of
the string, and not on the drum-head. Picken confirmed this in *Musica Asiatica* 3, and throughout this Dictionary they are classed as variable tension chordophones. (This one of the few areas where the Hornbostel-Sachs Classification System has to be revised).

**Angklung:** The picture really doesn't show anything at all.

**Apwanga:** Here we go again on semantics: 'Side blown ivory trumpet...and one stop in the tip'. I don't have to explain what a stop is, do I? No way can you fit one to the tip of an ivory horn (no argument over the use of trumpet; there is no pair of definitions distinguishing horn from trumpet which works, apart from our orchestral instruments, where we know which is which; the two words can only be interchangeable). As I said in one review (I also reviewed the Dictionary for the *Musical Times*, and I can't remember which I said it in), nobody has used stop to mean finger hole since the good old days of the clarionet. And yet, we find it throughout this Dictionary, especially for African instruments, and the Africans are likely to find it as insulting as keys on the lamellophone. A pity in a work like this which does, on the whole, try to treat all the world's instruments on an equal basis.

**Arabah:** 'Its soundboard is half a coconut shell...'. Here we have an author who cannot handle the English language. This sort of problem arises again and again in her articles, and I blame the editorial staff for this; it is up to them to sub-edit and to help someone whose command of English is poor and who cannot distinguish between a soundboard and a soundbox or resonator. Her syntax is also rocky at times, so that descriptions which are clear in her own mind (I presume) are not clear to the reader. This is a pity because she has written most of the Indonesian and Malaysian instrument articles.

**Ardin:** 'Arched harp...and a handle more than 100 cm long'. What part of the harp can be described as a handle? I suppose he means the neck or arm (both terms are used). What adds to the confusion is the photo, which shows an absolutely straight arm without any trace of arching; if the photo is right, it's an angle harp, not an arched harp.

**Arghnl:** '...with cylindrical bore...'. As can be seen from the photo, the bore is a stepped cone, though cylindrical in the main. This is one of the acoustical problems of the non-European instruments; why does it behave like a cylindrical pipe when it isn't? As Tony Baines suggested to me, probably because the end of the reed is closed, but we don't know for certain. Anyway, it isn't physically cylindrical.

'...the first four parts of the instrument...inside the mouth!' This is nonsense; there are four parts because there are two parallel tubes, the upper two parts of each are partly in the mouth (the uppermost part, the reed, is wholly in the mouth, along with the first half inch or so of the second).

'...The arghnul is made of bamboo...'. Well, it depends on what you mean by bamboo. It's a reed of some sort but not actually a bamboo.

'...producing a diatonic scale.' No; terms such as diatonic scale are totally meaningless when applied to non-European cultures. It produces the scale favoured in its own locality, and
this scale will vary widely in the sizes of its intervals, and even in the order of its steps, from one locality to another and even from village to village within one area.

Referring to the drone pipe:... only the last two lengthening pieces are removed.' Not suprising; there are only two lengthening pieces.

Arpanetta: A full-page plate of both sides of an example, and no reference either in the caption or in the text (which again is anonymous) of the presence of 4' strings, and indeed what seem to be 2' as well as 8'.

Arpeggione: Am I wrong in suspecting that Chanot's pattern of violin was responsible for the basic shape of this instrument? It has his shape of body, his shape of sound holes. Anyway, there is no reference to him in this article. Nor is there a photo of the Chanot model violin with the article on that family.

Arpicembalo: To say that this was a term used for 'an early harpsichord with piano and forte' is true but misleading; we are used to the Italian (which probably misleads the Italians but isn't so likely to mislead the English-speakers!).

Arpichordum: When saying that 'According to Praetorius... a virginal equipped with a device of the kind...gave it a harp-like sound', it would be useful to add that brays were used on the harp, which is why a virginal with brays sounded like a harp.

Atumpan: Barrels are barrel-shaped; the atumpan, on the other hand, as can be seen in the photograph, is not barrel-shaped but goblet-shaped. (They are often wrong on drum shapes, as we shall see in due course). The sticks are angularly hooked (unlike ghose for other West African drums, which are curved in the shape that hooks usually have).

Arghüll: (Apologies; lunch-break came between this and the previous page, and I missed the worst point) '...and by partly covering (shading) the stops a wide range of pitches...'. Here we have the worst example of stops I've found so far. One of the authors was once a student of mine, and I'm ashamed if any student of mine could say such a thing.

Atuñas: 'Large, side-blown flute...' but what's important is that it is a side-blown duct flute; side-blown flute suggests blown across a hole, even though there is reference further on to it's having an air duct. I can't imagine a duct on a flute that wasn't an air duct, can you?

It also has 'four stops'.

Aulos: '... the holmos... which serves as a staple for the... reeds!'. My understanding of holmos is that the reeds were inserted into it, whereas the function of a staple is to have a reed put on to it. Am I wrong?

On the phorbeia, the cheek strap, '...the purpose... of preventing an unsightly bulge of the cheeks, is refuted by the fact that women did not use it.' I'm not convinced that this follows; the Greek ideal of bodily pefection was more applicable to men than to women, who were very much second-class citizens (in fact were hardly citizens at all).

I think this'll do for this Q. More to follow.

In the last Q, this work was given a general review by Jeremy with a promise of extensive commentaries in subsequent Q's. He added that I would do the same, with an invitation for others to join in. This is my general review, which mainly considers coverage.

According to the Preface, this dictionary "might be said to include five broad categories of article: first, on the instruments of classical Western music; second, on the makers of those instruments; third, on modern Western instruments (many of them electronic) and their makers; fourth, on performing practice (largely in the Western tradition); and fifth - by far the most numerous - on non-Western and folk or traditional instruments."

These categories are fairly strictly adhered to, so while very obscure instruments and makers are included, there are no entries for even the most influential instrument scholars such as Praetorius, Mersenne, Sachs and Baines. Of course such scholars are frequently referred to in the articles on instruments, but outlines of the scope of each of their contributions to the field is just as important as such information on makers.

Other notable omissions are influential dealers in instruments and restorers that couldn't be squeezed in on the basis of having made a few instruments. And, as could be expected, I must complain about the missing out of all string makers, some of which have been serving the music world for well over a century, and whose innovations in the last generation have revolutionized stringing practices on most instruments. Also missing are mention of the tools and methodology of instrument making. Musical instrument technology is included in articles such as 'acoustics' and 'soundpost' but with patchy success.

There is excellent coverage of instruments of classical western music that I have more than casual knowledge about. This is not the case with respect to makers. "As regards makers of instruments,..." the preface states, "the dictionary...aims to preserve the sense of values traditional to Grove dictionaries. Makers of modest importance and inventors of 'one off', fanciful instruments are excluded unless their work is of historical significance." Modern makers are included.

Let us see who are the reputable modern makers of historical instruments that are so honoured. It seems to be helpful to be a contributor to the dictionary. So our members Harwood, Barnes and Monk are in. They certainly deserve to be, but so do many others who aren't in. Besides Harwood, the only other 20th century lute or viol makers I could find were either also harpsichord makers (written about by Howard Schott) or Lefkowitz's two contributions (Kessler and Sprenger). Oh yes, there is also Dolmetsch. Twentieth century harpsichord makers are better represented, mainly by the contributions of Schott, who includes his choice of about a dozen. As for modern early wind instrument makers, all I've noticed are Monk's entries on Korber, Moenk, and Weber, von Huene's entry on Steinkopf and one on von Huene. And of course there is Dolmetsch. To be in, it seems that you have to be an old timer (at least 45 years old) be influential in some way (such as sell a lot of kits), and above all, strike the fancy of one of the dictionary contributors. The criteria for inclusion in many cases are very far from obvious. Reputation means an awful lot to people. The importance of recent contributions to the history of musical instruments could clearly be determined in a less arbitrary fashion.

Coverage of early makers is also unevenly distributed, with fretted instruments again being under-represented. I've noticed only about half a dozen entries on early lute makers, about the same on viol makers, one cittern maker and no baroque guitar maker
who is not noted for other instruments he made. Another dozen or two of early fretted instrument makers would make the coverage properly comprehensive. Concerning the orchestral bowed instruments, makers of the double bass have been neglected in the sense that some of those who made the best surviving instruments are either not given entries or their entries (as violin makers) do not mention the instrument.

The entries on modern western instruments and their makers include sound sculptures and other oddities. It is clear that the exclusion of "inventors of 'one-off' fanciful instruments" was here suspended, probably with the idea that anything that might influence somebody else could be of "historical significance".

Performance practice is reasonably well covered, in the extensive article under that title; other extensive articles under other titles such as 'band' and 'improvisation', and in the entries on the individual instruments. It seems that almost every tempo or expression marking that ever adorned a score has an entry to itself (nevertheless, I couldn't find the 17th century terms Brisk, Drag and Away). There is no entry on 'tablature', and I could find no explanation of it. Curiously, playing technique is omitted from the list of factors in the general article. Coverage of this topic is uneven, with extensive entries on bowing and fingering, but no entries on plucking or strumming.

In conclusion, coverage is excellent in some areas but there is plenty of room for improvement in others. As for the content of the entries, quality and comprehensiveness is generally very good. As to be expected with such a large work, there are quite a few mistakes, omissions and questionable interpretations. I will discuss these in subsequent Comms which review specific entries.

Comm 620 continued from p. 43

Relate that constant pressure and a given pitchmetrical scale is already a 2-dimensional criterium, put together by historically unobservable parameters. That restricts the range of regulation and artistic performance in historically plausible dimensions like actual musical consonance, dynamics, and soundcolour. So we should better be very critical to our modern physical ideas and rational observational procedures when we deal with products of performed historical, material and metrical intelligence. If we want to know what Stradivarius knew, we must measure what Stradivarius measured, because we know what we measure and measure what we know, at any period.

If this can be presented without any misuse of scissors and with no spills of eggs and tea, I may support the FOMRHI quarterly with experimental procedures for the examination of Recorders, that I have actually used myself.

Some of it is very modern, but still within the technical possibilities of most private workshops. Other things are uncovered from the Arche of human natural investigation, but very fundamental to examination, understanding, and free-handed derivation of conical, pneumatic, harmonical oscillators in non-classical terms that are closer to music, and the dynamical, harmonical morphology of oscillating air.

Sverre Kolberg, Jonas Lies vei 2d, 1412 Sofiemyr Norway.
A summary of 18th century measurements of frequencies associated with pitches is presented. In each case, Karp carefully recalculates the resulting frequencies from the raw data presented and the standards of length and weight used, with results not significantly different from the original reports:

Taylor (1713 in England) measured $a' = 383$ Hz and 390 Hz in two experiments comparing the pitch produced by a quill clicking against the teeth of a fast-turning gear in a clockwork with the corresponding pitch on his harpsichord. The number of clicks per second can accurately be calculated from the mechanism of the clockwork. Taylor arrived at $a' = 383$ Hz in a third experiment calculating the frequency using the string vibration formula largely arrived at earlier by Mersenne (see Comm. 344) and perfected by himself. The method is to measure the weight of a length of string and then place it on a monochord with a weight producing a tension, and find the distance between bridges that gives the pitch offered by the harpsichord. Taylor's formula leads to the frequency associated with that pitch. (This pitch is almost a tone below Praetorius's CammerThon (Comm. 342), and could well have been called 'Consort Pitch' (see Comm. 597) in England.)

At about the same time in France, Sauveur (1713) derived a similar formula to Taylor's, but of less accuracy. He did a similar experiment with an iron harpsichord string and concluded that $C = 121 \frac{1}{2}$ Hz. With Taylor's accurate formula, Karp gets $C = 121$ Hz, leading to $a' = 340$ Hz, depending on the temperament used. (As indicated in Comm. 442, I suggest that this was the new French chamber pitch associated with new wind instruments, a semitone below Praetorius's CammerThon, and which became the recognized standard a few decades later.)

Karp discusses later similar determinations of 'choir pitch' by string measurements and Taylor's formula. Euler (1727 in Basel or St. Petersburg) found $d^\# = 559$ Hz, which is equivalent to $a'' = c = 395$ Hz, and in 1739 (in St. Petersburg) he found $a' = 392$ Hz. In 1762 Bernoulli (in Basel) determined that $C = 116$ Hz, equivalent to $a'' = 390$ Hz. Karp is surprised that these were called 'choir' pitches. I have found other instances of what I consider to be 18th century continuations of the alternative ChorThon of Catholic centres that Praetorius reported (and preferred to his tone-higher North-German Chor/CammerThon).

The final early pitch determination using Taylor's formula that Karp discusses is that of Lambert (1775 in Berlin). He found that $a'' = 415$ Hz was the pitch of his flute. Reichardt (1776) wrote that the pitch of orchestras in Berlin was very low (see Mendel (1979), p. 80), and so I suspect that this pitch could have been called Camerton there.

The main purpose of this booklet is to show that measurements of the tensile strength of 18th century harpsichord strings, coupled with the scale lengths of surviving Swedish instruments, indicate that they were tuned at a maximum pitch of $a'' = c = 405$ Hz and that their working pitch was probably close to that measured by Taylor, Euler and Bernoulli. The data brought to bear on this issue includes early and modern measurements of tensile strength and how it varies with diameter, the diameters associated with Swedish wire guages, and the scale lengths of Swedish instruments with the intended string guages marked.

Early measurements of tensile strength in France by Mersenne (1635), Sauveur (1713) and Coulomb (1784) are analysed by Karp. Mersenne's measurements on .38mm wires lead to strengths of 995 MPa for gold and silver, 822 MPa for iron, and 800 MPa for red
and yellow brass. Karp does not trust these data, confining his discussion of them to an Appendix. (My comments on this continue a controversy on this subject we've had (Comms. 137, 164, 183 and 199), so I'll confine them to an Appendix as well.) Since instrument pitch mainly depends on the strength of the iron used, I shall now largely be ignoring non-ferrous strings. Sauveur's data leads to a strength of iron of 1015 or 1040 MPa, depending on which of his alternative rules that we calculate from. He assumed that this was independent of diameter, and it is not clear to what extent this assumption was based on measurement. Coulomb's data leads to a strength of 1031, 982 and 810 MPa for harpsichord strings of .15, .25 and .50 mm. respectively.

Modern measurements of the tensile strength of late 18th and early 19th century iron strings are summarized by Karp. They are by Schmidt, Gug, Poda (et al) and himself. The range is from 687 to 1177 MPa on strings between .22 and .45 mm, in diameter. These figures are most disparate. Karp doesn't try to make sense of them, but instead tries to define an upper limit derived from Pomp & Knackstedt's 1923 set of measurements of .03% carbon iron. In 23 passes through the drawplate, giving a 93% reduction in diameter (from 5mm to .38mm), the strength increased from 386 MPa to 1207 MPa. Further draws did not change the tensile strength. Karp considers that these data represent the highest strength that iron can be drawn to, and indeed they are higher than all measurements of old wire. He then considers a Swedish 18th century wire-drawing schedule used by Rinman which has the same % reduction in the same number of passes as Pomp & Knackstedt's schedule. Then he calculates the strengths of Rinman's wire by assuming that the same % reduction as in Pomp & Knackstedt's data results in the same increase in tensile strength. So, for example, Rinman's .16, .25 and .50mm strings would have tensile strengths of 1139, 1069 and 915 MPa respectively. These Rinman strengths would give a string a breaking pitch of about a semitone higher than Coulomb's strengths. Of the modern measurements of old wire Karp lists, 5 are above and 9 below the theoretical Rinman strengths.

Karp then attempts to predict the highest frequencies of strings on several mid-18th century Swedish keyboard instruments from their lengths, guages and the Rinman tensile strengths, allowing a safety factor below breaking pitch of a semitone for harpsichords and a tone for the (brass) clavichord. The result is a'=405 Hz in each case, and he suggests that a working pitch of a'=390 Hz was likely. Unfortunately, because he used Rinman strengths rather than Pomp & Knackstadt strengths, the a'=415 Hz pitch is more a typical value than the maximum value Karp states it is . Nevertheless, this is an important result. A few non-Swedish instruments described in the Henkel Leipzig catalogs are then discussed, with Karp usually coming to the same conclusion, suggesting that there is "the possibility of a greater standardization of mid-18th century harpsichord working pitches than is now believed [by scholars] to be the case".

He questions the wisdom of the a'=415 Hz standardization observed by modern players "without justification on objective grounds". There is some such justification in O'Brien's article "The Stringing and Pitches of Ruckers Instruments" (The Brussels Museum ..., Bulletin Vol VII - 1/2 - 1977). The maximum string stress implied by the scaling of Ruckers instruments is very close to the Swedish harpsichords discussed by Karp. O'Brien compared the longer Taskin scaling to the Ruckers scaling, and the ratio multiplied by the a' frequency of 409 Hz given by Taskin's tuning fork gives a'=418 Hz for the Ruckers pitch. Nevertheless, with Karp's data, it is possible to argue that Ruckers and Taskin pitches were the same, with the difference in scale compensating for a difference in tensile strength because Taskin's strings were thinner.

From our knowledge of pitch standards we have good reason to believe that some harpsichords played at a semitone higher than the pitch Karp calculates. How can that be? These instruments could have been shorter in scale, or used stronger (and perhaps more brittle) strings, or they could have been strung in brass in place of iron and tuned at a fourth or fifth lower than the required pitch (the player then transposing). Karp's observations taken together with Gug's researches (in Musique Ancienne Sept 1984)
point to a possible way that the second factor could operate, i.e., that stronger iron than that of Rinman was available.

If one assumes a Ruckers standard 6 voet scale and a breaking pitch a semitone above modern (this gives a semitone and a bit safety margin over an a'=430 Hz Cammerton), one needs an iron with strength of about 1200 MPa, the maximum strength in the Pomp & Knackstedt data. Rinman wire doesn't approach this strength in useful diameters.

Karp parenthetically remarks that "when redrawing old wire a marked increase in tensile stress could be affected by an extremely light pass through the drawplate". Gug's article indicates that the Nuremberg wire makers normally made about a dozen draws per halving of diameter. In contrast, Rinman's drawing schedule starts with seven and ends with only three draws per halving for the thinnest wires. Gug (p 52) quotes Karmarsch (in Prechtl J.J., Technologische Enzyklopädie, Stuttgart 1833) saying that it is preferable to draw fine wires by a large number of draws of small reduction, rather than a few widely spaced ones, and that this is above all true when the wire is intended for musical instruments. My suggestion is that this approach could lead to wire of consistent maximum strength.

Altogether this is a very interesting Technical Report. There is much information on Swedish wire-making technology that I haven't mentioned. And there is an Appendix on early steel from which Comm 548 was extracted. There is much here to contribute to our knowledge of wire history and technology.

Appendix: Mersenne's measurements of tensile strengths.

Karp believes that Mersenne's report of the tensile strength of gold is impossibly high, that of silver "astonishingly high and the value for copper is just barely conceivable". He has no argument with the iron and brass values, but decides that "something is clearly wrong". He thinks he finds a clue to the 'error' in another chapter where Mersenne was keeping all factors except string material constant and exploring pitch differences due to the material. Mersenne reported a constant diameter, length and tension, and gave a table of weights and the resultant relative pitches. From the diameters, lengths and weights, Karp calculates densities and finds them about 30% bigger than modern figures (and Mersenne's own density figures reported in another chapter). There seems to be something wrong here and Karp assigns the 'error' to some undetermined place amongst the conversion factors, concluding that the tensile strength measurements should suffer the same error.

I am unable to prove that Mersenne is right about the tensile strength of gold without producing an alloy with that strength. Nor can Karp prove that such a strength for a gold alloy is impossible without a thorough exploration of relevant possible alloys. The few tensile strength measurements of gold-copper alloys I've seen show that undrawn material is at least as strong as brass. If I remember correctly, the Incas and/or Aztecs used chisels of gold-copper alloy to cut marble. Similarly, without knowing the types and concentrations of impurities in Mersenne's silver and copper, it would be impossible to determine whether his measurements are accurate or not. I very much doubt whether Karp has enough information on which to base a quality evaluation of the Mersenne data he questions.

I can see no error in Mersenne's report of the experiment exploring the pitches produced by different materials. After presenting the data, Mersenne discussed how one would bring the pitches of the strings of different materials into unison, and this involved varying the tension or varying the length. It is thus clear that the length reported was the sounding length and not the total length of the string. Mersenne was using the weight of strings of equal total length purely as a relative measure of density. The 30% difference Karp found just results from the difference between the sounding length (that was mentioned) and the total length (that wasn't).
I had not answered Eph's Comm. 491 because I thought that the matter did not deserve all that space in FoMRHI. I had told him that I was not convinced, and I had read with pleasure Garry Crighton's Comm. 559 supporting my interpretation. Eph strikes again in the last quarterly: I must now answer. It will be best to go back to the passage from Praetorius' Syntagma that was at the origin of the discussion: some readers might have lost track of what the discussion goes about, and Praetorius' text of course remains the yardstick for an appreciation of our interpretations. I quote it along an English translation that I think is both correct and unbiased:

Die Engelländer/wenn sie alleine damit etwas musiciren, so machen sie alles bissweilen vmb ein Quart, bissweilen auch eine Quint tieffer, also, dass sie die zuerstten Saaten im kleinen Bass vors D; im Tenor vnd Alt vors A; Im Cant vors e rechnen vnd halten : Do sonsten/wie oben in der Tabell zu ersehen ein jede (nach dem Cammerthon zu rechnen) eine Quint tieffer/Als nemlich der Bass ins GG; der Tenor vnd Alt ins D; der Cant ins A gestimmet ist. Vnd dass gibt in diesem Stimmwerck viel ein anmutigere/prachtigere vnd herrlichere Harmonij, als wenn man im rechten Thon bleibet. (Syntagma. IT, 44)

The English, when they play something on viols alone, make everything sometimes a fourth, sometimes also a fifth lower, in such a way that they consider the lowest string of the small bass as D, of the tenor and alto as A, of the treble as e, while otherwise, as can be seen in the table above, each one is tuned a fifth lower (thinking in Cammerthon), namely the bass in GG, the tenor and alto in D, the treble in A. And this gives with this set of instruments a much more pleasant, magnificent and majestic harmony than if one remained in the ordinary pitch.

The discussion is concerned with basically two interpretations which (if I understand Eph's correctly) may be proposed in the following paraphrases of Praetorius' text; I underline the points at which the two interpretations diverge:

Eph's interpretation:  
The English, when they play something on viols alone, make everything sometimes a fourth,

My interpretation:  
The English, when they play something on viols alone, make everything sometimes a fourth,
sometimes also a fifth lower than Cammerthon.

in such a way that they consider the lowest string of the small bass as D, of the tenor and alto as A, of the treble as e, while in fact each instrument (as tuned for playing alone) actually sounds a fifth lower (thinking in Cammerthon), as can be seen in the table above, namely the bass in GG, the tenor and alto in D, the treble in A.

And this tuning scheme gives a much more pleasant, magnificent and majestic harmony than if one remained in the ordinary pitch.

The divergence as to the exact meaning of Stimmwerck is of little consequence. It can be checked on pp. 12-13 or 19 of Syntagma II that Praetorius understands the term as meaning 'a set of instruments', synonymous to Accort and obviously similar to the English 'consort'.

Eph's interpretation reduces to saying that the English, when they play on viols alone, slacken their strings so as to tune them a fourth or a fifth below Cammerthon, and play with the same nominal tunings as before. My interpretation reduces to saying that the English, when they play on viols alone, change their nominal tunings so as to perform a transposition down a fourth or a fifth, but without any actual retuning of their instruments.

I consider that Eph's interpretation is untenable for several reasons, among others:

1. I fail to see why Praetorius would say nothing of the pitch at which the English viol players played when they were not alone. How could it have been so important to know the special pitch for viols alone and at the same time unimportant to know the ordinary pitch? Eph's assumption about the ordinary pitch being 'up to a minor third higher' than the special one is based on a knowledge of English viol sizes, of the properties of gut strings, of the English repertoire, etc., that was not available to Praetorius' German readers. For what Praetorius himself says of the ordinary pitch (nothing, that is), it might as well have been lower than the special one.

2. If nevertheless it was important to know the English special pitch in terms of Cammerthon, I am at loss to see why Praetorius did not bother to give the exact English viol tuning associated
with it (English viols, Eph explains in Comm. 442, were not tuned in fifths like the German ones, contrarily to what Praetorius implies). I similarly fail to see why he did not bother to ascertain whether the special pitch was exactly a fourth or a fifth lower than Cammerthon (while I can easily see how a transposition can be down a fourth or a fifth depending on the key of the piece transposed). I cannot refrain thinking that Eph's "scenario" in Comm. 442, however one considers it, implies some carelessness from Praetorius' part.

3. When describing the special pitch in terms of absolute pitch, Praetorius writes "as can be seen in the table above". But the table referred to is a table of German tunings and there is nothing to be seen in it about any English pitch or tuning!

4. In my translation above, the words do sonsten are rendered as "while otherwise", which I think is much closer to the real meaning than Eph's implied translation (he never formally gives it) into "while in fact". The adversative meaning of do sonsten is such, if I understand German correctly, that the second part of the statement can but concern the other tuning, the one for viols when they do not play alone.

5. I am convinced that the concept of absolute pitch implicit in Eph's interpretation, and especially in the idea that Praetorius would have tried to define a relationship between English and German standards, is anachronistic. Praetorius and his contemporaries were concerned with pitch, I believe, only insofar as it was problematic for playing in ensembles. The idea behind Eph's interpretation is that Praetorius wanted his German readers to play the English repertoire at the "right" pitch (not to say the "authentic" pitch, which sounds like a joke). But Eph will reject this conviction saying that it is a "theory" ...

Eph nevertheless rightly points to some problems of Praetorius' statement. He argues against my interpretation that the ordinary pitch (that is, the pitch for viols playing with other instruments or voices) that would result does not correspond to what that pitch actually was, as can be deduced from the size of early-17th-century English viols. He also points that the nominal tunings that Praetorius would give in my interpretation do not correspond to the tunings that can be deduced from the repertoire.

Even some of my objections seem valid against my own interpretation. In view of my "theory" in point 5 above, it is very odd that Praetorius should mention Cammerthon at all in the context of this discussion of English pitches. I had thought, in Comm. 490, that perhaps Praetorius did not understand Cammerthon here as a specific technical term referring to the German standard. After all Cammerthon is the German for 'chamber pitch', so that I thought that Praetorius might have referred to an English chamber pitch (i.e., the English ordinary pitch) which may or may not have been similar to the German Cammerthon.
But this overlooked the fact that Praetorius formally refers to "the table above", which is the TABELLA UNIVERSALIS Aller blasenden vnd besaiteten Instrumenten, the Universal Table of All Wind and Stringed Instruments (Syntagma II, pp. 18-30), which gives the German tuning of the instruments at Cammerthon. So we remain with the problem (which even Eph's interpretation does not escape: see my objection 3 above) of knowing why Praetorius refers to German tunings and to Cammerthon in this context. Any correct interpretation of his statement must take this into account, and I agree with Eph that we should reject any idea that Praetorius was mistaken - or naïve.

One obstacle on which both Eph's interpretation and mine stumble is Praetorius' reference to "the table above", that is to German tunings. This, I now think, suggests the probable solution of the problem, namely that Praetorius discusses the whole matter in terms of German tunings and of German practices. He describes how German viol players, playing on German viols, could perform something similar to the English practice. What he means could be paraphrased as follows:

The English, when they play something on viols alone, make everything sometimes a fourth or sometimes a fifth lower (than when they play with other instruments of voices); and they do this as if (also, dass), playing on viols tuned with the lowest string of the small bass as GG, of the tenor and alto as A and of the treble as e (thinking in Cammerthon), as can be seen in the table above, they would consider these strings as D, A and e respectively. And this would give a much more pleasant harmony, etc.

This interpretation fully accounts for all of the problems mentioned above, including the fact that the tunings to which he refers seem German rather than English (cf. my 2d objection against Eph's interpretation). It is in agreement with the fact that Praetorius was writing for German readers who probably knew very little about English usages - and who perhaps did not care much. It also fully accords, I must confess, with my "theory" that Praetorius' contemporaries may not have been much concerned with questions of playing at the "right" pitch.

I am not particularly anxious to make this the final interpretation. The only point I ever wanted to make in this discussion is that it seems to me quite dangerous to draw conclusions about pitch-relationships on the basis of statements such as Praetorius'. My Comm. 490 was not intended to mean anything else.

As to the idea that the English shifted viol sizes, which Eph dislikes, it must be realized that it is a necessary consequence of the idea that they transposed down a fourth or a fifth by renaming their strings: indeed, unless the repertoire made no use of the notes in the lowest fourth or fifth of the viol compass, which I take for quite unlikely, the viols would have lacked the lowest notes for the transposed pieces.
I would like to add one further consideration: Eph argues in Comm. 597 against 'the latest fashion [...] to believe that one can authentically perform English viol music by transposing downwards and dispensing with the treble viol'. I feel it quite disappointing that, although I thought that the matter under discussion was of genuine interest, it should be intermixed with silly considerations of "authenticity". It is perfectly clear to me that English viol music can be performed "authentically" at any pitch - as I believe it was in the 17th century.

Modern advocates of authenticity may want to take note that Praetorius, speaking of viol playing, writes (Syntagma, II, p. 44):

Ja/wenn er auch mit der Nasen darzu helfen könnte/vnd mach-te vnd brechte alles fein rein/just vnd anmutig ins Ge-hör/so ist nicht gross dran gelegen ...

which means that
1. playing with the nose may be authentic;
2. playing with the nose is not a necessary condition to being authentic;
3. playing with the nose is not sufficient to guarantee authenticity.

So, Eph, let me conclude with these three proposals:
1. Let M. Parrott play at any pitch he pleases, if what he plays is "pleasant to the hear" (and if he does not claim to play at the authentic pitch);
2. Let’s not mix matters of authenticity with serious matters such as those of early pitch;
3. Keep in mind that all we know of early music shows that no concept about it is less authentic than that of authenticity.

Nicolas Meeûs

While working in the archive of Wölfenbuttel I recently had the good fortune to discover a letter which, although signed merely with the initials M. P., readily could be indentified as by Praetorius himself. Even although the letter is written in some sort of English, Praetorius' style is immediately recognizable, as is his calligraphy. The letter is addressed to a Bernhart S., apparently an Englishman since Praetorius writes him in what he seems to believe is English. The letter also seems to refer to esoteric jokes which indicate that this Bernhart S., obviously knowledgeable in musical matters, may have been adolescent in Germany. Browsing through vols 16-18 of The New Grove indica-
tes that the only person that could be identified as the ad-
ressee of this letter is the famous organ builder Father Smith.
This identification raises a most interesting question: Praetorius
is known to have died in 1621 while Smith, born around
1630, is believed to have come to England around 1666. The let-
ter to be published presently proves that either Praetorius died
older than one had thought up to now, or that Smith was born
younger.

The letter would deserve a detailed analysis, together with a
translation into modern English. The problems involved are so
complex, however, that I thought it preferable to first publish
a plain transcription, leaving a more thorough discussion for
later. It goes without saying that comments and proposals for
help in the translation are welcome. Here follows Praetorius' text:

M. Bernhart S., Dearest Ffriend,
Let mee descrieb yo' the most extra-ordinarij annd befremdend
Historia/that happened Yester Day/nachdem eine gantze Ge-
sellschaft der Musicorum/mit allerley Instrumenten, also
eine Capellam Fidicinam, zusammen musicirt hatten. I had
join'd the Personen/vm eine Kanne Krauterbier aus zu leeren
vnd trinken/oder zwey/when antequam sumamus potum a Man cam
in a strang vnd Ffrend Equipage/dresst like a Türk oder
Barbar vnd speeking an awe full Brogu. His name/he said/was
Nem Reges vnd hee had in the righte Hande ein Rasiermesze
that he calld Ockham (oder vielleicht Ockegham)/vnd in
the other Hande hatte er ein device oder Systema formd like
a Gabel oder Vorke, mit which hee kept hitting on his head/
vnd which hee calld a Fforking Thune.

Der Kerll jumpd to wards eine Bass Viol de Gamba vnd pluckd
the lowest string/aszing was für eine note it giveth. Thasz
war a strang question. In deed/the personen had playd a va-
riety of Paduane, Gaigiarde, Concerti vnd tutti quan-
ti, for which the several viol strings had been tuned to se-
veral notes. Als ob nemblich das D auff die funfte Saite fur
eine Paduana, das A vff denselbe Saite fur ein Concerto,
vsw., do sonsten etc. Das war aber zu schwer vnd difficult
für der Herr Reges zu verstehen vnd vnderstande. Hee cryed
that any given string should give only one note, which you,
my Dearest Ffriend, certainly will recognize as a very unus-
ual vnd odd idee. Hee further declard and claimd that one
should play at one single Pitch Pitch Pitch. Für mich ist
dasz Türk oder Chinese. Der Kerll then disappeared with his
gantz Equipage. Ist that nicht ungebort vnnl unglablich?
Aber, wie man sagt, if Michael writes rubbisch ...

In der Hoffnung ihnen gesund zu finden bleibe ich, Ihr,
M. F.
I should like to thank Martyn Hodgson for improving upon my account of why the 12th fret on a lute produces a better octave at \((17/18)^{12}\) than at half the distance from the nut to the bridge (FoHMR Comm. 556). And I appreciate his kind words for my *Lutes, viols and temperaments* ('a major work of real scholarship... most interesting... one of the very few modern books which all players...should read.... represents a standard against which other books should be measured'). At the risk of seeming ungrateful, however, may I quibble—informatively, I hope—about some details. Actually I am most grateful that he read my work with some care before reviewing it; to be treated so responsibly is a privilege. But even so—

1) It was really an irregular style of intonation, and not some form of meantone temperament, that I admitted for the high-baroque Basse de Viole when in concert with the harpsichord. In the keyboard tuning (discussed on p. 37 and in Appendix 2) most of the whole-tones were larger or smaller than half of either major 3rd they might be part of. This is a substantial quibble because the new kind of tuning, while accommodating a greater number of keys than a meantone temperament, made them sound different from one another (whereas a meantone temperament merely has good and bad intervals). My point was that Marais and therefore any good player could match it without much changing the frets—which is very different to using a meantone fretting scheme.

2) My remark that "The only real test is the sound" was offered, not as a general rule (which might amount to saying 'ignore my book'), but with reference to certain conclusions in particular: "that Dowland's music requires a more or less equal temperament, that the music of Schlick and Milán fits meantone temperament, and that the preludes published by Attaignant are not suited to pythagorean intonation". I acknowledged the subjectivity of my own hearing by saying it is "worthwhile to use our ears as best we can, and hope for a well-informed consensus to confirm our perceptions, or improve upon them". Far from 'casting doubt on the perception of those who may not agree with my conclusions', I said the only person who had complained about my use of the ear was "a scholar who had not heard the tunings" (and therefore hadn't any perceptions of his own by which to judge how sensible or eccentric mine might be). I make this quibble because of its bearing on some of the others.

A statistical study of the kind Mr Hodgson calls for (and which I helped to design) can be found in vol. iii (1979) of BIOS, the Journal of the British Institute of Organ Studies. It has been beyond my resources to do this with fretted instruments, but the tape cassette, with Jakob Lindberg, John Hsu and Peter Sykes playing various examples in various tunings, is indeed available (if need be, directly from Cambridge University Press).
3) Mr Hodgson believes 'the 17th C. French School of Lutenists (epitomized by Denis Gaultier)... often sound better... in a meantone temperament'. I might agree for many of Gaultier's pieces in a major key (to use the modern term) or in some of the relatively new-fangled minor keys of the day. But I believe one should consider how a meantone temperament affects the many passages, particularly in the traditional minor modes, where the first fret is used for $B^b$ on the A string but for $F#$ on the F string (see Examples 1 and 2), or where the third fret is used for $G#$ on the F string but for C on the A or D string (see Examples 3 and 4). Having covered this ground in my treatment of Milán, Dowland, Schlick et al., I didn't go over it again in the context of the $A_d f_a d_f$ tuning because I had already shown that it is precisely the open strings a third apart which make the use of a meantone fretting problematical. But as this escaped so appreciative a reader as Mr Hodgson (he suggests that the open-string thirds favour meantone temperament), perhaps I should indeed have discussed the baroque lute tunings.

1. Rhetorique, 165

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\begin{Verbatim}
\textbf{1.} Rhetorique, 165
\textbf{3.} Rhetorique, 200
\end{Verbatim}
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\begin{Verbatim}
\textbf{2.} Livre de tablature, 22
\textbf{4.} Pièces du luth, 24
\end{Verbatim}
```
For a proper argument as to the historical performing practice one would have to consider not only the difficulties within certain pieces but also the want of ancillary evidence (i.e., apart from the sound) that 17th-century players were accustomed to shifting the frets systematically when going from one mode to another. I did of course cite Jean Denis' proposal (1650) "to perfect the lute and the gamba by finding a way to make its semitones major and minor as we have them the harpsichord, which cannot be done with the tied-on frets with which one plays the lute, because they would have to be staggered".

I wouldn't have said that the A d f a d' f' tuning became 'pretty much the norm (excepting Italy) by the early decades of the 17th C.', as my access to that repertoire isn't great enough to warrant so drastic a revision of Hans Radke's feasible account of its tunings, in vol. xvi of Die Musikforschung, according to which the A d f a d' f' tuning came into use around 1635 (its first dated appearances being in 1638). But I might have raised the question whether some significant part of the music in the historically transitional tunings may accommodate a meantone fretting. If Mr Hodgson or some other reader can come up with something interesting in this regard, I would be delighted to have stimulated their research (and to cite it in a later edition). To encourage them, here is a chart showing where some of the problematical areas lie for some of the tunings listed by Radke (p. 41):
4) A minor quibble: my dismissal of Bartolus ("Bartolus said that on the organ Reinhard's scheme eliminated the wolf, which of course is rubbish") does not depend on his illustration of Italian and French tablature with various fret positions labeled 0 (in the former) and 3 (in the latter), etc. That was but one of several inanities that might have been cited by the way to show how little he knew about music, and I imagine that if Mr Hodgson actually read him, he would give him no more benefit of the doubt than I did.

5) Having told the publisher, the dedicatee and various others that Gerhard Sonne's appendix is the best part of the book, I believe Mr Hodgson's account of it wants some rectifying. To say that it is 'in essence' about 'tangential arcs' obscures Mr Sonne's novel use of elliptical curves (where appropriate) as well as circular arcs. Even worse, it misses the point of the concluding sentence and of the title ("Lute design and the art of proportion"): that in certain lutes a modular and some other, more complex geometrical design have been tempered to conform with one another. This was the point of including a brief appendix on the matter.

Mr Sonne had in mind also the broader objective of his research in progress: to offer not merely 'a pragmatic approach to geometrical description' (FoMRHI Comm. 377), nor merely a 'game to play, more constructive than crosswords' (FoMRHI Comm. 5), but rather to document an aspect of historical practice and thought. So it was natural for him to discuss instruments for which
his proposed reconstructions of the mould are supported by evidence from related sources of the period (hence his penetrating remarks on Arnaut, Syrlin, Alberti, Serlio, Baron et al., the significance of which Mr Hodgson overlooked) and whose actual measurements fit his proposed reconstructions so well that the coincidence is very likely to be significant. His statement that "Our attempts to recover the original design would be hopelessly speculative if the instruments were merely constructed with the help of any old geometrical device" is based on a considerable experience in investigating just how good a fit can be obtained by arbitrarily generating a lot of complex mathematical schemes. Living as I do in a town whose most illustrious former citizen was Johannes Kepler, I recall that an ellipse can sometimes be more fitting than several circles.
With a half-dozen pages of text at his disposal, Mr Söhne did not undertake a complete account of his methods and data. He did not discuss, for instance, the extent to which various other instruments which he has examined answer to the same geometrical outline as the 1582 lute, nor did he go beyond a modicum of citations from the treatises: given more space he could have included more in the way of Figures 1 and 2. Some of the additional information is available in the longer accounts of his work which have been appearing over the last five years in various American, German and French periodicals. For the instruments in question here, the data relating to 'goodness of fit' are as follows:

**Vvendelio Venere, tenor lute (1582)**
Vienna, Sammlung Alter Musikinstrumente, C 36
modulus (derived from the rose): -47 mm

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal rose diameter</td>
<td>94.3</td>
</tr>
<tr>
<td>Vertical rose diameter</td>
<td>93.9</td>
</tr>
<tr>
<td>Maximum external width</td>
<td>331.5</td>
</tr>
<tr>
<td>Corresponding mould width</td>
<td>-329.5</td>
</tr>
<tr>
<td>Distance from bottom edge to centre of rose</td>
<td>288.0</td>
</tr>
<tr>
<td>Corresponding distance without ribs and capping strip</td>
<td>-286.0</td>
</tr>
<tr>
<td>Length of capping strip</td>
<td>469.0</td>
</tr>
</tbody>
</table>

**Matteo Sellas, liuto attiorbato (c1640)**
Leipzig, Musikinstrumentenmuseum der Karl-Marx Universität, 495
modulus (Venetian inch): -29 mm

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rose diameter</td>
<td>86.3</td>
</tr>
<tr>
<td>Maximum external width</td>
<td>264.2</td>
</tr>
<tr>
<td>Corresponding mould width</td>
<td>262.0</td>
</tr>
<tr>
<td>Distance from bottom edge to centre of rose</td>
<td>206.0</td>
</tr>
<tr>
<td>Corresponding distance without ribs and capping strip</td>
<td>-204.0</td>
</tr>
<tr>
<td>Distance from bottom edge to first nut</td>
<td>581.3</td>
</tr>
<tr>
<td>String length to the first nut</td>
<td>506.5</td>
</tr>
<tr>
<td>Distance from bottom edge to bridge</td>
<td>74.8</td>
</tr>
<tr>
<td>Corresponding distance without ribs and capping strip</td>
<td>-72.8</td>
</tr>
<tr>
<td>Length of lowest bass string</td>
<td>722.0</td>
</tr>
<tr>
<td>Length of highest bass string</td>
<td>726.5</td>
</tr>
</tbody>
</table>

The curves fit comparably well, but the only sensible way to show this would be to superimpose physically the reconstructed geometrical design upon a drawing of the actual profile of the instrument. Apropos this distinction: the way in which the lengths of the bass strings vary on the liuto attiorbato has to do of course with the fact that the neck is tilted slightly to the left.
Mr Hodgson's inference to the contrary (he assumes the neck and body are in the same alignment) is due to his not having quite grasped the significance of the term "geometrical design" in the captions to some of the figures: as the asymmetrical slant was purely pragmatic and apparently not integrated into any 'Pythagorean' reckoning, it is, quite properly, omitted in the schematic analysis of the geometrical design. The 7:1 ratio between the distances from the first nut to the bridge (17 M) and thence to the edge (2 M) could be cited apropos Mr Söhne's discussion of the fact that "nearly all the extant instruments which lend themselves to mathematical analysis do not embody the ratios most familiar to renaissance music theory".

Mr Söhne's remark that "the front profile lends itself readily to this kind of analysis in about one out of three cases" shows his discretion and reluctance to use procrustean methods. His reference to "other instruments poorly preserved, or... conceived in so complicated a fashion that several interpretations are possible, or... designed without any mathematical method" is perfectly sensible. He has, after all, made careful and detailed measurements of some 110 old-master instruments of the lute family, and his drawings to scale have been commissioned by some of the leading museums and used by some of the leading lute makers of our time. The beauty of his analyses lies in their simplicity and in the historical feasibility which he has documented so nicely with references to contemporary treatises. I hope any FoMRHI members who have not yet encountered it will judge his work for themselves, particularly as I believe it represents a standard by which other such efforts should be measured.

6) An additional piece of information might have been included: there is a paperback edition at a lower price (£7.50 and not £17.50).

May I take the occasion to offer some emendations. Page 21, lines 3-7 should read (again I thank Mr Hodgson for his critical insights): "...makes no allowance for the string's stiffness or for its greater tension when pressed down to the fret. To compensate, the length should be slightly greater...." The middle of line 9 should read "comparable to twice the width of a double fret", and note 4 should refer to "Jahnel 1962: 150-53 and 235".

Also, at page 36 I believe it would be worthwhile to supplement the discussion of Praetorius and Marais with the following extracts from Book 4, chapters 36 and 34 of Zarlino's Sopplimenti musicali (1588), which are more penetrating than the passages from Zarlino cited on page 19:
l'Orecchia di colui che sona
öl Liuto öl Viola da tasti, quando
s'incontra... le parti discordate;
subito... col dito uiene ad alterar
le chordhe, ch'ei tocca; il ch'è
à lui (s'è perito di cotale
Istrumento) cosa facile,
facendola in un tratto
un poco più grue öl un poco più acuta
oueramente che i Corpi che rendono
i Suoni... non sono toccati da i
Sonatori, ...come ne gli Organi,
ne i Grauecembali... & altri simili;
i quali chiamano Instrumenti stabili;
oueramente che i detti Corpi sono
toccati... aiutandoli con le dita,
di modo che faccino il Suono un poco
più grue o un poco più acuto;
si fà nel Violone, nel Liuto,
& in altri simili.... se tutte
queste sorti d'Istrumenti saranno
semplicemente considerati nella
Temperatura de i loro Systema...
duasi in Tuoni & Semituoni;
come l'Organo, il Grauecembalo...
il Flauto & altri simili;
ouer... Semituoni equali,
come hò dimostrato del Liuto, & del
Violone & di simili; terrò per
impossibile, che in loro si possa
udir cotale Specie Naturale...
ne i suoi ueri Inteualli; massimamente
in quelli, ch'io chiamò Stabili....
l'Organo, il Grauecembalo & altri
simili, contengono un temperamento
stabile; la Viola & il Leuto un'altro,
ma alterabile.... Onde non si può
con uerità dire... che si sona
la Specie... d'Aristosseno
con la Viola, col Liuto,
con la Lira, & con l'Arpa
When the ear of the player of
either a lute or a fretted viol
finds the intervals out of tune,
he immediately alters with his finger
the strings that he is playing—which
is an easy thing for him if he is
expert with such instruments—
making it (sic) at once
a little lower or higher.

Either the bodies which render
the sounds are not touched by the
players, as on organs,
harpsichords and the like,
which are called stable instruments,
or else the said bodies are
touched, helping with the fingers
so that they make the sound a little
lower or a little higher,
as one does on the viol, the lute
and the like. If all
these kinds of instruments are
considered merely as to the
tempering of their scales
—divided into tones and semitones
like the organ, the harpsichord,
the flute and the like,
or else into equal semitones
as I have shown for the lute, the
viol and the like— I regard it as
impossible that in these one could
hear that natural (untempered) scale
in its true intervals, particularly
in those (instruments) I call stable.
The organ, the harpsichord and the
like have a temperament (which is)
stable; the viol and lute, another
—but alterable. So it cannot
truly be said that one plays
(in) the scale of Aristoxenus
on the viol, the lute,
the lira da braccio or the harp.
I am not at all certain that the contents of this Comm will please many people but it will be interesting to get a reaction from any reader(s) stimulated (enraged?) enough to react by writing for a subsequent quarterly or, to me direct.

My scholarship is limited and I am only a part time Guitar and Lute maker and an amateur guitarist. Also this is my first contribution to what I consider to be a virtual cornucopia of information and inspiration, as well as a violent depressant, when it sometimes reveals to me how little I know, so, I pray prospective assassins will fire their cannons at me quietly and softly.

When guitarists have been trying one of my guitars and seen a lute lying about - artfully placed so that they must see it - they often try to play it but, soon put it down again. Not only is their technique incorrect but, because of its shape, they cannot even hold the lute properly and it promptly slips down into their lap and beams at them with its rose. The problem is doubled if their front is of similar shape to the lute back. Nevertheless they and myself for that matter keep returning to it, trying to play it, saying, the while, "I wish I could play the lute it has such a lovely sound". The only trouble is, often, they have neither the time nor, if they are honest, the inclination to learn properly.

There was a vogue, a few years back, for guitarists to "play the lute", after a fashion, but, the researches and developments of the Lute Society's Lutenists soon put paid to that.

Now I am aware that the Vihuela was and the modern "copies" are, strung and tuned in the same manner as the Renaissance Lute. Beyond this point is, no doubt, where I shall part company with the purists but, hopefully, will receive written and/or telephoned reaction(s) which will at least tell me where I stand (or lie RIP). If guitarists wish to play lute music with the "Authentic" (See Comm 591, Page 38, Q No 38) or what they think of as a lute sound, is it not possible that the Vihuela could enable them to do that, perhaps after adjustment (Inclusion?) of soundboard strutting and bridge position? The instrument is easier to hold (for guitarists) than a lute, and guitar technique, perhaps modified, can, presumably, be used to play the instrument. This suggestion may be anathema, rebarbative and repugnant to some instrument makers and purist instrumentalists but, does it do any harm to the music? What is an instrument for anyway? I tend to think of it as a tool of the musicians trade.

It seems to me that there is a popular precedent for this sort of thing to be done - I refer to Julian Bream's "Glute", which, even if not "authentic" gives a recognisable and popularly acceptable lute sound to most of his listeners. Does authenticity matter if you like the sound?
Also I am not too sure that many people would know what was an historically "authentic" sound and I would venture even fewer would have the temerity to announce, to the world at large, that this or that is the authentic sound of the "original" instrument, be it Lute or, Vihuela. The sound produced in historical times may well have been different from that which we produce on our modern "copies", due, either to materials or constructional differences and/or playing technique differences. Not forgetting string materials and production methods particularly (eg:- nylon strung as opposed to gut strung lutes and modern gut as opposed to ancient gut string production). I accept that if you construct a lute, using traditional materials, in the traditional manner (ie you "copy") you will get a certain overall characteristic sound but, think of the various Baroque lute sounds you can get from just doing that! I think it highly probable that some historical lutes sounded like some Vihuelas of the same period.

When listening to music played on Lute and Vihuela, on the same recording, I can observe that there is a noticeable difference in sound, between the two, but not a tremendous difference and in fact the Vihuela often sounds remarkably similar to some Baroque Lutes I have heard. In any case, from the guitarist's point of view, the Vihuela is certainly closer in sound to the Lute, than to the modern classical guitar.

Incidentally, there seems to be a large question mark above the knowledge of string materials used for the Vihuela and it has been suggested that the Vihuela died the death originally, because the source of strings for the instrument dried up (Any takers)?

Enough! Regardless of all the foregoing, I wish to make a perfectly "ordinary" Vihuela de Mano in order to make a fist of playing Luis Milan etc. with something like the correct sound and I shall be very grateful if someone can point me in the direction of a source of drawings for same. Perhaps someone could even offer to sell me some. For me, as an amateur, string materials and cross sectional sizes are a problem, as is the strutting to the soundboard.

The "copies" of Vihuelas I have seen, seem to vary in external shape tremendously, whilst the well known surviving original, discussed in one of the learned Journals seems to bear only a superficial visual resemblance to any of them. Some Vihuelas look remarkably like some five course guitars (Baroque?) with much of the decoration removed. Is it a free for all and are some Luthiers just making a Vihuela version of a "Glute" to a shape they like, or have seen, in a painting or drawing?

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The superbe fluid for this device is red wine, of course, which is also historically correct! It lowers the surface tension without making bubbles. For sober measurements, one should dilute 1:2.

Everyone of us have heard of flute- calibration under constant manometric pressure and with a given pitometrical scale. I dont know if that is realized or if it is just a phantacy. But it is a bad phantacy in any case. What is done to moisture, and how can it be accurately related to museum instruments?

continued on p. 24
The belly is of very broad-grained pine; the back, ribs and neck are of either maple or sycamore.

What was the Viole d'Aline?

Recently I bought an instrument called Viole d'Aline. I know that's the right name because it says so inside on a label which in full reads as follows:

Anno 1904.
PARIS
ARNOLI
"VIOLE D'ALINE"
(PATENTED)
No. 664
Illegible Signature
Serie A.

The instrument, shown left, is what Heron-Allen would patronizingly call a "vagary." It combines the neck and peghead of a mandoline with the body of a tiny quasi-viol. Each table is one-piece and singly purfled; the back is perfectly flat, and the belly slightly arched. Both tables are barred with pine. The blocks and linings are also of pine. The fingerboard is made of rosewood, fretted with brass, and studded with bone. The nut is also of bone. Each course consists of a single length of string looped around an ebony button at the bottom. A violin-type button (not shown here), whose purpose eludes me, sits behind the four string-holding buttons. This button too is of ebony; so are the rest and the peg-discs, at their lower extremities the strings hold in place an ornament of tortoiseshell inlaid with mother-of-pearl. The maple bridge is 12mm high, and tapers in thickness from 6mm at the bottom to 3mm at the top.

If anyone can tell me what this instrument was, where it was used, how it was strung and how it should be tuned, I'd be very grateful. The sounding string length, by the way, is exactly that of a violin.

David Z. Crookes
A few days ago I was leafing through Alexander Buchner’s Musical Instruments through the Ages (London, 1964), and noticed for the first time an instrument described there as ala bohemica, or Bohemian wing. I couldn’t recall having heard or read anything about it before, so I thought I’d mention and figure the wing in this quarterly for the benefit of those who are as unfamiliar with it as I am. I hope I’m not merely making a great display of my own ignorance.

The wing is an aliform psaltery, but the ala can take a number of forms, as my figures indicate. Fig. 1 is obviously wingoidal; so with a little imagination are the two instruments of fig. 6; but fig. 5 can only be described as calciform. Even when allowance is made for inaccurate depiction, there must be a considerable variety of shapes.

All the wings shown here (actually in figs. 1, 2, 3, 5 and 6) are being played with both hands. Now there is nothing remarkable about a 14th century psalterist playing bicinia with two hands on an instrument all whose strings run in one direction, as in fig. 2. But the Bohemian wing is characterized by two sets of strings, one long and the other short, which run in different directions. There is no doubt about this in figs. 1 and 5; I wonder how accurate figs. 2 and 3 are in this regard; and I can’t believe the hand-positions of fig. 6 unless they denote two separate sets of strings.

Now look at fig. 4, which shows an instrument not clearly identified by Buchner (helicon in his caption may refer to it, but I’m not sure). This seems to me to be a wing with a harpified body. There are definitely two sets of strings, but unless the lower set actually runs from the curved base to the swan neck there’s no point in having a swan neck at all. It is only possible to believe that the peghead relates to strings set on the curve of the neck, that the long set of strings runs fanwise from base to neck, and that the short set runs as shown from crosstie to top. I see no reason to dismiss this instrument as fantastic; of all the instruments in the picture (of which fig. 4 is only part) it is the most confidently drawn. The artist was capable of getting his strings wrong, witness the neck-to-pillar strings of his harp, but he is unlikely to have fantasized the entire instrument. At least I hope not, because I’m going to make one.

For those who want to chase up the wing (and the helicopter or whatever you call it) my figs. 1 to 6 come respectively from Buchner’s plates 97, 128, 104, 122, 117, and 133.
What was the Bohemian wing? cont'd
Response to Crookes’s Comms. 589 and 590

In Comm 589, Crookes’s attack on scholars is too woolly to be interesting. Who says that the use of instruments didn’t survive the end of the Roman empire? I’m sure he is aware of Crane’s book “Extant Medieval Musical Instruments”, U. of Iowa Press (1972), which describes seven lyres and seven lyre bridges that have been excavated. And what about the many cultures in which crafted musical instruments do not play an important role? They still have music because the most exquisite musical instrument always has been the human voice. The creative needs to craft things and to make music can be amply fulfilled without the necessity of making musical instruments.

There is a problem with looking for evidence from the past in a surviving unbroken tradition. Because unrecorded changes accumulate steadily, one cannot tell how far back each element of the tradition goes. German instrument making is a traditional craft with an unbroken history going back to the Renaissance, with lute and viol making still part of the teaching tradition. But a lute or viol made now in the traditionally-taught way shows only superficial resemblance to the instruments made by their forefathers in museums nearby. Recreating history out of surviving traditions is a tremendous opportunity to create whatever history one likes. Perhaps this is what makes this attractive to creative researchers. Maintaining objectivity is difficult enough while just recording a tradition as it stands. Cecil Sharp and his contemporaries produced a distorted picture of the English folksong simply by recording only that part of each singer’s repertoire which fitted the style they were looking for.

No one can seriously object to a speculative reconstruction of something of which there is very little surviving evidence. But scholars will object if one omits the ‘speculative’ part of the label attached to the activity, and they will object if that little surviving evidence is not respected. So I would object to the proposal by Crookes that the kithara soundboard and back were jointed like those of a lute (specifically, held together by glue). Boat-like construction would be reasonable. The medieval lyres were carved, with the soundboard nailed on. Where no evidence survives on construction, as seems to be the case with the relevant Roman instruments, the evidence closest in time and place is better than conjecture based on more modern experience. My objection to glue would disappear if the type of instrument is known to have been regularly kept in the part of an affluent person’s house where damp was always avoided by heating. It is difficult for us today to visualize musical life before dry homes and dry transport, and before the invention of the instrument case. Some day I’m going to write a Comm blaming much of the musical Renaissance and baroque on the instrument case.

Crookes asked for dialogue in Comm 590. To save him from the despairing thought that no one cares, I’ve jotted some quick notes:

Points 1, 2, 6, 7, 10, 20 and 21 are, to me, too frivolous to be worth comment.

Points 3 and 4: Scholars are not afraid of medieval fiddles and rebecs. There just isn’t much to go on. Should we make it up? Players reinterpret these instruments so that they can be exploited, and makers make what the players want. The problem with pursuing an historical approach to these instruments centers on what to do with them. Page has pointed out that because of size, medieval instrument pitch ranges tend to be an octave higher than vocal ranges. An accompaniment with drones (constant or slowly moving) and runs, all above the voice with nothing below, is rather unfamiliar to us today. One needs a lot of imagination and experimentation to make up the notes and make this work musically. It looks too much like the result will be hard to sell to the musical public. We’ve also had other problems, having made an historical medieval fiddle or two. Modern early musicians find a thick soundboard with no bars too quiet and a thin soundboard with cross bars too nasal (they already have rebecs and need a different sound). They also don’t like to have to play more than one string at a time. We’ve
concluded that medieval fiddles are not yet commercial.

Point 5: Crookes seems not to have noticed the financial takeover of the early-music movement by the baroque fiddle band.

Points 8, 9, and 24: Find the customers with cash and the makers won't hesitate. Not enough instrument makers have making unpopular instruments as a hobby. Djilda made two lyre da braccio in the white for an Intermedii performance a few years ago; they worked fine but are now still unfinished; it takes dedication to generate your own repertoire; problems with this type of instrument are very similar to its parent medieval fiddle.

Point 11: I wish him luck.

Points 12, 17, 18, 19, 22 and 23: OK

Point 13: Would Crookes have only artists be art experts, royals analysing the history of royal families, and no biographies except autobiographies? Was Einstein no use as a physicist because he didn't do experiments?

Point 14: What's wrong with prostitution and anachronism? It's dishonesty that I object to.

Point 15: Not true – Wright and Page have been doing very good work.

Point 16: In the modern music world, superior intonation, timing, technique and reading, plus knowing the conventions (eg in phrasing) are the criteria for public acceptability. Imagination and flexibility can be more of a hindrance than a help. Have pity and give them a chance. Ability in improvisatory practices needs memorization of the cliches before it can come 'naturally'.

Point 19: With the exception (temporarily) of recordings, the musical performer's communication with the audience is visual as well as auditory. Communication success requires fulfilling expectations of both types.

Comm 620 continued from p. 61
For mappings of pressures in the musical scale, one needs frequency calibration with should not be done by any superficious pitchmeter scale. The best is to "calibrate" the instrument to musical consonance with an artistically tuned string instrument on a specified and relevant historical piece of music, a Largo or Andante movement, and then to catch the main tones audically in the state of adequate musical function. Consonance is a very strict criterium of frequency, better than stupid glancing at a dancing needle in a musically remote situation. What ought to be mapped is not diatonic scale, but pressures in the main tones of AEOLIAN, functioning musical keyes. Frequencies can then be noted by pitchmeter. What's also very relevant is initial pressures of notes, that is the pressure when the note starts, when blow pressures are raised carefully from zero, and pressures at the points of overblow. Another important information (but not so easily obtained because it would require 3 observations in 3 different points, both on manometer and pitchmeter) is the Frequency/pressure curve through the tone focus at correct intonation. But all this would also be very useful information in dimensions that are more close to qualitative musical function. I could have drawn an electronical pressure transducer and pitchmeter galvanometric voltage to an x,y servograph, which would have been phantastic, but that can hardly be repeated and used in common workshops.

continued on p. 43
Mini-reviews of Grove’s dictionary of musical instruments have been invited, so here’s one on something that caught my eye. The entry under chekker was substantially written by Ripin, and gives his chekker = clavichord theory that was published posthumously in GSJ. Curiously though, in the middle of the flow of Ripin’s argument their appears the sentence “Page (1979), argued convincingly that the term may well have been applied to stringed keyboard instruments generally.” This sentence was obviously not written by Ripin, and yet the article is signed “Edwin M. Ripin”. The preface promises to advise us of editorial revision of an author’s entry with “/R”, but regrettably this was omitted in this case. Seeing this sentence reminded me that I was unhappy about the outcome of this controversy, and I re-read the articles concerned. In fact, Grove has referred only to Page’s ‘demolition job’, but not to two subsequent observations in Early Music where Meeus sprang to Ripin’s defence and Page answered back. (Early Music April 1980, p222) The reason for this, is I suspect, that Meeus starts his contribution by indicating agreement with Page’s central thesis, that the term ‘Checker’ meant ‘stringed keyboard instrument’. But Meeus does mention, almost as an aside, that it is difficult, at such an early date to imagine what else the chekker could have been other than a clavichord. Page replied that he could see no reason for it not being a harpsichord or proto-piano. No more was said after this, and the result is the rather unsatisfactory entry in Grove.

I don’t know what Nicholas’s reasons were, but my argument is as follows. In (virtually‘) all cases of the emergence of successful (in the sense of having long usage) musical instruments, a new instrument is made which is conceptually an old instrument with some new feature(s). Thus the clavichord was invented as a monochord with a keyboard, and the harpsichord was a plucked psaltery with a keyboard (1). Consequently at first the shape is associated in people’s mind with a type of mechanism. Later, it becomes apparent that there is no special reason to restrict the rectangular instrument to the struck action, which eventually resulted in the invention of what today we call the virginals (2). Arnault’s description reflects the situation at this later stage, so that he first describes the long established usage, and then says that a quilled action can be installed in a rectangular instrument. From which one would conclude that it is likely (no more than that) that “rectangular instrument circa 1360” = “clavichord”, and hence chekker = clavichord.

(1) This derivation may also have a bearing on the early appearance of upright harpsichords; simply that psalterys were played upright.
(2) Actually, first attempts at making what we now call virginals could have gone by two routes, this one, and the application of the keyboard to the pigs snout shaped psaltery (see dia. 2). The obstacle to the development of the design could have been that it required more strings than the clavichord, and until some genius thought of compressing the string band by turning half the jacks around, it would have been bulky. The 16th century Italian and Flemish virginals have the appearance of having developed via the pig’s snout psaltery, vide their non-rectangular shape and the fact that some examples have incurved sides. The 17th c. rectangular virginals are presumably developments of these, rather than resurrection of the 15th century design; the Ruckers in particular qualifying for the description ‘false inner-outer’, which for some curious reason has always been described as a strictly Italian phenomenon. The last major development in layout was to apply the reversed jack trick to the harpsichord, giving the bentside spinet; this didn’t get underway until the mid 17th century, even though it is the most compact design.
I am attempting to produce a catalogue of all surviving historical clavicytheria (upright harpsichords). The accompanying list gives outline details of those I have identified so far. The list as it stands will, I hope, be of some use to students of the subject as a quick reference aid. However I continue to seek information about other clavicytheria, particularly those in private ownership, in order to make it more complete. I therefore invite any FoMRHI member who knows of an upright harpsichord not listed here to contact me at the address given below. My warm thanks, naturally, to those who have already supplied information.

If anyone requires fuller details of the instruments listed or sources of information I shall be happy to share what details I have. I am also compiling a checklist of documentary references to clavicytheria which will be communicated to FoMRHI later.

Falsified Instruments

A number of surviving clavicytheria (particularly those in group V) have probably passed through the hands of manipulators such as Franciolini. However only those which, in my view, can be said with fair certainty to be forgeries have been omitted from the list. One quite well-known example, now in the custody of Yale University, was formerly in the Belle Skinner Collection (no. 7). Another, which bears an inscription attributing it to Angiolus Migliai is in the Musikhistorisk Museum, Copenhagen. Both these are adaptations of votive shrines. All the clavicytheria listed here do at least seem to have started life as musical instruments, if not perhaps in every case quite in their present form.

Arrangement of the list

Since most surviving clavicytheria are anonymous and undated it is impracticable to list them neatly in chronological order. Instead I have arranged them in groups or "families" which share some common features. This may or may not suggest a common origin. Remarks on each group follow.

Group I: Instruments with "partial" or "incomplete" soundboards. Instead of covering the whole area between bentside, spine and belly-rail, the soundboard extends from the bentside to where (in a normal harpsichord) the four-foot hitch-pin rail would be. There is an open triangular gap between this edge and the spine. In one instrument (no. 2) there is a corresponding opening in the back so that one can see right through the instrument. These are the only extant clavicytheria
bearing even a superficial resemblance to the instruments depicted by Virdung and Mersenne.

Group II: A mixed-bag of (probably) German instruments. Kircher remarked that the upright harpsichord was common in Germany. There does seem to be some corroborative evidence for this since examples have survived from the 16th, 17th and 18th centuries and they are quite a number of German sources mentioning the upright instrument.

Group III: Pyramid-shaped instruments with roller-boards. A symmetrical instrument is produced here by placing the longest bass strings in the centre and progressively shorter strings alternately to left and to right. A roller-board like that of an organ is required to connect the appropriate key with the plucking mechanism for its string, which may lie at the other side of the instrument. For another type of pyramid-shaped instrument, see note to Group IX.

Group IV: These are just like ordinary Italian harpsichords stood on end and at least one (no. 11) is an eighteenth-century conversion from a harpsichord.

Group V: A group of closely similar instruments which are like very small Italian harpsichords upended. They correspond rather too closely for comfort with an item in an illustrated catalogue issued by Franciolini. Like the illustration, they have three soundboard roses.

Group VI: The familiar bentside-and-tail shape of the harpsichord has here been fitted into a foursquare cupboard with legs and double opening doors.

Group VII: Horizontally-strung clavicytheria. The strings run horizontally from left to right across the vertical soundboard. Two, three or four strings are provided per note and these are plucked in one sweep by a single vertically rising jack. Both these instruments were at one time in the Kraus collection in Florence. They are probably by the same maker, perhaps an amateur. No. 21 was shown in the travelling exhibition "The Look of Music" in 1980.

Group VIII: The upright instruments by Delin are deservedly well-known. Perhaps the most sophisticated and skilfully-made uprights to have survived.

Group IX: Late 18th. century Dublin was a flourishing centre for piano and harpsichord makers. Their work is very much in the English tradition. Similar upright harpsichords were made in England (by Thomas Barton and Thomas Haxby among others) but none have survived. Both nos. 26 and 27 are symmetrical in form like those in Group III but here the pyramid shape is achieved simply by sloping all the strings to the right without changing their usual order. No. 26 is one of the very few harpsichord-type instruments originally made with three sets of strings all at 8 foot pitch. No. 28 is an upright claviorganum.
### Group I: Instruments with "partial" soundboards:

<table>
<thead>
<tr>
<th>Date</th>
<th>Maker/Nationality</th>
<th>Compass/Disposition</th>
<th>Present location</th>
</tr>
</thead>
<tbody>
<tr>
<td>11490</td>
<td>Anon., South German</td>
<td>C/E-g^2 1x8'</td>
<td>London, Royal College of Music Museum, RCM.1</td>
</tr>
<tr>
<td>2 1657</td>
<td>Henning Hake Swedish or German</td>
<td>45 notes: C/E-c^3 1x8'</td>
<td>Stockholm, Musikhistoriska Museet, 1774</td>
</tr>
<tr>
<td>3 17 C?</td>
<td>Anon., Scandinavian?</td>
<td>C/E-c^3 1x8'</td>
<td>Oslo, Norsk Folkemuseum, 382-97</td>
</tr>
</tbody>
</table>

### Group II: Miscellaneous Germanic instruments:

<table>
<thead>
<tr>
<th>Date</th>
<th>Maker/Nationality</th>
<th>Compass/Disposition</th>
<th>Present location</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 17 C?</td>
<td>Anon., German?</td>
<td>C/E-f^3 2x8', 1x4'</td>
<td>Nuremburg, Germanisches National-Museum, MIR-1080^3</td>
</tr>
<tr>
<td>5 17 C?</td>
<td>Anon., German?</td>
<td>C-c^3 1x8'</td>
<td>Nuremburg, Germanisches National-Museum, 1-271</td>
</tr>
<tr>
<td>6 1740</td>
<td>&quot;M.C.&quot;, German?</td>
<td>C.D-c^3 2x8'</td>
<td>The Hague, Gemeentemuseum^4</td>
</tr>
<tr>
<td>7 18 C</td>
<td>Anon., German?</td>
<td>FF-f^3 2x8'</td>
<td>New York, Metropolitan Museum, 1981-477</td>
</tr>
</tbody>
</table>

### Group III: Pyramid-shaped instruments with roller-boards:

<table>
<thead>
<tr>
<th>Date</th>
<th>Maker/Nationality</th>
<th>Compass/Disposition</th>
<th>Present location</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 1675</td>
<td>Martinus Kaiser German</td>
<td>GO.AA-c^3 2x8'</td>
<td>Vienna, Kunsthistorisches Museum</td>
</tr>
<tr>
<td>9 17 C</td>
<td>Anon., Italian</td>
<td>C/E-c^3, 2x8'</td>
<td>Rome, Museo degli Strumenti Musicali, 2741</td>
</tr>
</tbody>
</table>

### Group IV: Full-size Italianate clavicytheria:

<table>
<thead>
<tr>
<th>Date</th>
<th>Maker/Nationality</th>
<th>Compass/Disposition</th>
<th>Present location</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 c1600?</td>
<td>attr. Vincentius Pratensis, Italian</td>
<td>C-f^3</td>
<td>Paris, Museum of the Conservatoire de Musique, 325</td>
</tr>
<tr>
<td>11 17 C?</td>
<td>Anon., Italian</td>
<td>C/E-c^3 2x8'</td>
<td>Leipzig, Karl-Marx-Universität, Musikinstrumentenmuseum, 72.</td>
</tr>
</tbody>
</table>
12 17 C ? Anon., Italian C/E-c\(^3\) 2x8'
13 18 C ? Anon., Italian C/E-c\(^3\) 2x8'

Group V: Small Italianate clavicytheria:
14 17 C ? Anon., Italian C/E-c\(^3\) 2x4'
15 17 C ? Anon., Italian C/E-f\(^3\) 2x4'(?)
16 17 C ? Anon., Italian C/E-c\(^3\) 1x4'
17 17 C ? attr. Sigismondo Maler, Italian B-e\(^3\) 1x8'
18 17 C ? Anon., Italian 1 set of strings

Group VI: Cabinet-shaped instruments:
19 17 C ? Anon., Italian C/E-c\(^3\) 2x8'
20 17 C ? Anon., Italian GG/BB-d\(^3\) 2x8' 1x4'

Group VII: Horizontally-strung clavicytheria:
21 18 C ? Anon., Italian? C/E-c\(^3\)
22 1730? Joseph Meschita? C/E-e\(^3\)
Italian?

Group VIII: Clavicytheria by Albertus Delin:
23 1751 Albertus Delin French1 GG.AA-e\(^3\) 2x8'

(continued)
Group VIII (continued):

<table>
<thead>
<tr>
<th>No</th>
<th>Year</th>
<th>Maker</th>
<th>Serial Number</th>
<th>Current Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>1752</td>
<td>Albertus Delin</td>
<td>GG.AA- e³ 2x8'</td>
<td>Berlin, Musikinstrumentensammlung, 2237.</td>
</tr>
<tr>
<td>25</td>
<td>c1768</td>
<td>&quot; &quot;</td>
<td>6AA-f³ 2x8'</td>
<td>The Hague, Gemeentemuseum.</td>
</tr>
</tbody>
</table>

Group IX: Anglo-Irish instruments:

<table>
<thead>
<tr>
<th>No</th>
<th>Year</th>
<th>Maker</th>
<th>Serial Number</th>
<th>Current Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>1764</td>
<td>Ferdinand Weber, Irish</td>
<td>GG-g³ 3x8'</td>
<td>Dublin, National Museum.</td>
</tr>
<tr>
<td>27</td>
<td>1774</td>
<td>Henry Rother, Irish</td>
<td>FF.GG-g³ 2x8' 1x4'</td>
<td>Dublin, National Museum.</td>
</tr>
<tr>
<td>28</td>
<td>1785</td>
<td>Robert Woffington, Irish</td>
<td>FF.GG-f³ 2x8' 1x4'</td>
<td>Dublin, National Museum.</td>
</tr>
</tbody>
</table>

**Notes**

1. By "Nationality" is here meant the cultural and linguistic community to which the maker belonged rather than his legal or political status.
2. Present (non-original) compass. For the original compass, see William Debenham, FoMRHI Comm 112.
3. Has an unusual truncated tail and diverging registers to give different plucking positions. These two unusual features are also found (i) on the harpsichord in the Courtauld Institute Galleries, London and (ii) on a harpsichord in the National Museum of Hungary, Budapest. It is intriguing to speculate that these may all have a common origin.
4. Found 1978 in an antique shop in Maastricht. The initials "M.C.h" were found underneath the paint on the inside of the front cover.
5. Formerly Belle Skinner Collection, no. 8.
6. Present (non-original) compass; originally was GG.AA- e³.
Oil & Varnish

With regard to George Bowden's query about best pale drying oil, I think that linseed oil would be the oil required in this case, though there are other oils which will dry to form solid, elastic or semi-elastic films when exposed to the air. The best known of these are walnut, poppy, tung and soya bean oil.

Briefly, linseed oil can be extracted from flax seeds by three methods: cold pressing, which produces the least amount, but the best quality oil, and this is mostly used by artists; hot (steam) pressing, which is the method used for extracting most of the oils used in commerce; and solvent extraction, which yields a very inferior grade of oil.

Hot pressed oil may be refined and bleached using sulphuric acid or by heating the oil until it throws down impurities known as the 'break', and then treating the resulting oil with alkali. The product is known as 'varnish linseed oil'. Acid refined oils used to be used for making paint, but since the introduction of alkyd resins in the paint industry the position may have changed. Alkali refined oils are the ones usually found in artists supply shops because they are pale in colour and show little tendency to darken again. I suggest that this would be the most suitable type of oil for George Bowden to get if he can. This is not least because when one buys oil in a tin from a polishers' sundriesman or a ships' chandler one usually cannot find out what one is buying beyond the fact that it is labelled 'Raw Linseed Oil'.

I have been trying to ignore comm 506 on copal varnish because I never thought anyone would take it seriously. But the other day someone wrote to me about it. The recipe reproduced typically claims to be a recipe for vernis martin, and just as typically would be unworkable. Neither copal nor amber will dissolve in hot turpentine or oil; both would need to be fused before they could be brought into solution. It is also typical that amber -- the fossil resin which is probably the most difficult to dissolve, but which has the most cachet, is called for as one of the resins. Modern experiments have shown that amber is not only difficult to dissolve, but it also produces a very dark, slow drying varnish. In the past resins were not always accurately distinguished, and there is some reason to believe that 'amber', when it occurs in an otherwise workable seventeenth or eighteenth century recipe, meant fossil copal.

With due respect, I do wish instrument makers would desist from egging each other on to make up recipes that require materials, such as fossil copal, which are no longer available; using methods which are extremely dangerous, can only be carried out satisfactorily on a reasonably large scale with specialized equipment, and always required a considerable experience of varnish making to produce satisfactory results.

Ann MacTaggart
PALE DRYING OIL.

The January 1985 issue of the FoMRLI Quarterly was not delivered to me until Feb. 22nd. In Bulletin 38, the question was asked, "What is pale drying oil?" To put it succinctly, pale drying oil is a very light colored siccative linseed oil.

The old varnish makers used several different kinds of drying oils including walnut oil, hempseed oil, poppy oil and linseed oil, but mostly linseed oil. The other siccative oils have certain characteristics which render them unsuitable for use in high grade and color stable products. Essential oils were used for thinning which include oil of turpentine, oil of lavender (spike), and oil of rosemary. The formulas or recipes for musical instrument varnishes should be made only from linseed oil, properly processed. Pale drying oil refers to the color of the siccative linseed oil, which is a light transparent yellow. Before use, all linseed oils must be purified and made siccative (drying). This is done by heat treatment (boiling) or by the addition of chemical driers to the raw refined (unboiled) oil, or both.

Today, much of the so-called "boiled" linseed oil is of low quality and has not actually been subjected to the heat treatment such as one might expect when the oil is marketed as "boiled" and labeled as such. Driers, such as manganese naphthanate or lead resinsates are added to the raw oil. Siccative oils made with the above additives, have the property of turning dark eventually. The above named driers are known as "progressive driers", i.e., a pronounced action continues long after the film has dried to the touch. This leads to brittleness and cracking.

Cobalt driers are now used more and more since the lead and manganese products have been banned (in the US) for use in the preparation of linseed oil and their products as well as paints, due to the poisonous nature and the resulting harmful effects of the chemicals. The use of cobalt linoleates in linseed oil is best as it is less progressive than the other driers, and darkens less with age.

Linseed oils are graded colorwise by the Gardner Color Scale, which is well known to chemical engineers working in the paint and varnish industry. The Gardner Scale ranges from 1 to 16, one being "water white" and sixteen, black, with the numbers between ranging from light straw color, light yellow, pale yellow, then shading into the browns to almost black.

A high grade "boiled" linseed oil is formulated by subjecting the raw oil to a specialized high-heat treatment to remove the impurities and to render it siccative. Some "driers" are usually added, BUT NOT ALWAYS! Cobalt compounds are now widely used as they are far superior to the older lead and manganese
driers. The Gardner rating on most boiled linseed oils are in the range from 12 to 14, a very dark brown. This type of oil would not qualify as "pale drying oil".

Another class of linseed oils is "varnish oils" which are alkali refined. This refining process includes heating it to 500°F, which removes all impurities and mucilaginous sediments and it then becomes a "break free" oil, which means that when again heated in the preparation of varnish, it will not "break" i.e., precipitate any more sediments. Boiled oils are acid refined. I have used such an oil made by the Spencer-Kellogg Co. (US), called "Superior". It is a light yellow colored oil, No. 5 on the Gardner Scale. These varnish oils, being alkali refined, have a very low acid content, 0.3% as compared to 4 to 6% for the boiled oil. Alkali refined oils have the all important attribute of color stability.

Linseed oil is pressed from the seeds of the flax plant. Each plant-growing region has its own characteristics and is rated in quality accordingly. The flax seed is crushed and the oil is extracted from it by pressing in special machinery, usually with the aid of steam. Steam is used to increase the production of oil from the seeds, but the quality of this oil is inferior to that extracted by cold pressing. No cold pressed oil has been available in the US since 1938. Cold pressed linseed oil, properly aged, processed and filtered, has a medium or pale golden color. It is the finest and highest quality, and if it is a true "boiled" oil without any "driers", it is the best for varnish making. All cold pressed oils now sold in the US are imported from Scotland, made by Caledonian Oil Mills, Blackacroft, Dundee, Scotland. The next best choice is the alkali refined varnish oil, such as Spencer-Kellogg's "Superior". This linseed oil HAS cobalt driers added. Procurement of varnish makers linseed oil might not be so easily accomplished as it is usually sold to the large varnish makers in 55 gallon drums or in tank car lots. Purchase of a small quantity, such as a gallon, therefore must be made from a local varnish factory or chemical supply house.

To conclude this article, I will quote from Sir Charles Lock Eastlake, on a fifteenth century process of cleansing and purifying the raw linseed oil. "Half fill a glass bottle with pure rain water: add half the quantity of oil, some well washed and sifted sand, and some torrefied common salt. The bottle being stopped, the whole is to be shaken for a quarter of an hour, and then suffered to settle. As soon as the oil is separated from the water, the ingredients should be again agitated, and again allowed to separate. This is to be repeated till the oil has entirely lost its dark color. It should then be separated from the water by means of a siphon or other contrivance, and poured into another bottle. Fresh sand and water, in the same quantities as before, are to be added: the whole being shaken and allowed to settle as before, six times. The oil is then again to be transferred to another bottle. This series of operations
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</thead>
<tbody>
<tr>
<td><strong>RAW LINSEED OILS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RAW</td>
<td>4 Max</td>
<td>170-195</td>
<td>926-930</td>
<td>12 *</td>
<td>50</td>
<td>A 7.72</td>
<td>Paints, etc. Raw linseed oil is well settled and double filtered. It conforms to Federal Specification TT-L-215c and ASTM D244-66T.</td>
</tr>
<tr>
<td>RAW X</td>
<td>4 Max</td>
<td>165-185</td>
<td>930-934</td>
<td>13 *</td>
<td>65</td>
<td>B 7.75</td>
<td>Paints, etc. Raw X is Raw linseed oil containing treated linseed oil. It offers improved wetting and leveling.</td>
</tr>
<tr>
<td><strong>BOILED LINSEED OILS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DOUBLE BOILED</td>
<td>5-7</td>
<td>165-180</td>
<td>932-937</td>
<td>14 *</td>
<td>65</td>
<td>B 7.78</td>
<td>Paints containing blacks and other dry retardant pigments. Dries in 8 hours. Meets ASTM D260-61, Type II.</td>
</tr>
<tr>
<td><strong>SEMI-OXIDIZED LINSEED VARNISH OILS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AGED</td>
<td>2-5</td>
<td>150-170</td>
<td>944-947</td>
<td>11 *</td>
<td>1.0</td>
<td>D 7.87</td>
<td>A slightly oxidized, heat break-free oil for litho varnishes, patent leather, and linoleum. Fast kettle polymerization. (TS AGED I.O.)</td>
</tr>
<tr>
<td>PATENT LEATHER SPECIAL</td>
<td>4-6</td>
<td>165-175</td>
<td>936-941</td>
<td>12 *</td>
<td>65</td>
<td>B 7.81</td>
<td>Used in patent leather finishes.</td>
</tr>
<tr>
<td>DIAMOND &quot;K&quot;</td>
<td>6-9</td>
<td>115-130</td>
<td>968-993</td>
<td>10 *</td>
<td>36-46</td>
<td>22-23 8.24</td>
<td>For mixing with vehicles for both interior and exterior grinding. Diamond &quot;K&quot; dries in 15-20 hours. Improves wetting, flow and leveling. PALE BODIED VARNISH same as DIAMOND &quot;K&quot; except no drier.</td>
</tr>
<tr>
<td>PALE BODIED VARNISH</td>
<td>6-9</td>
<td>115-130</td>
<td>988-992</td>
<td>10 *</td>
<td>36-46</td>
<td>22-23 8.24</td>
<td>House paints, vehicle blending. Mineral spirits tolerance of 100 to 1 Excellent wetting, flow and leveling.</td>
</tr>
<tr>
<td>HEAVY BODIED BOILED</td>
<td>6-9</td>
<td>115-130</td>
<td>978-993</td>
<td>11 *</td>
<td>36-46</td>
<td>22-23 8.24</td>
<td>For light-colored varnishes and alkys, white enamels, etc. Superior is alkali refined and offers excellent heat bleaching. Conforms to TT-L-1155.</td>
</tr>
<tr>
<td>HEAVY BODIED RAW</td>
<td>6-9</td>
<td>115-130</td>
<td>978-993</td>
<td>11 *</td>
<td>36-46</td>
<td>22-23 8.24</td>
<td>A general purpose alkali-refined oil for alkys, varnishes, enamels, exterior house paints and printing inks.</td>
</tr>
<tr>
<td><strong>OXIDIZED LINSEED OILS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUPERIOR</td>
<td>0.3 Max</td>
<td>170-190</td>
<td>926-930</td>
<td>6</td>
<td>50</td>
<td>A 7.72</td>
<td>For light-colored varnishes and alkys, white enamels, etc. Superior is alkali refined and offers excellent heat bleaching. Conforms to TT-L-1155.</td>
</tr>
<tr>
<td>SUPERIOR &quot;C&quot;</td>
<td>0.8 Max</td>
<td>170-190</td>
<td>926-930</td>
<td>7</td>
<td>50</td>
<td>A 7.72</td>
<td>This is Superior plus catalyst. Polymerizes to 25 viscosity in 65% of the time required for Superior.</td>
</tr>
<tr>
<td>K. V. O.</td>
<td>2-3</td>
<td>170-190</td>
<td>926-930</td>
<td>7</td>
<td>50</td>
<td>A 7.72</td>
<td>A general purpose alkali-refined oil for alkys, varnishes, enamels, exterior house paints and printing inks.</td>
</tr>
<tr>
<td>NEUTRAL K. V. O.</td>
<td>0.3 Max</td>
<td>170-190</td>
<td>926-930</td>
<td>6</td>
<td>50</td>
<td>A 7.72</td>
<td>K.V.O. with lower acid value.</td>
</tr>
<tr>
<td>NON-BREAK</td>
<td>4 Max</td>
<td>170-190</td>
<td>926-930</td>
<td>12 *</td>
<td>50</td>
<td>A 7.72</td>
<td>A mechanically-refined, heat break-free oil for alkys, varnishes, enamels, etc., when color is of secondary importance.</td>
</tr>
<tr>
<td>KELLIN</td>
<td>8-14</td>
<td>120-145</td>
<td>960-966</td>
<td>8</td>
<td>6.3-11</td>
<td>U/W 8.01</td>
<td>Chemically-treated linseed. Polymerizes rapidly, dries fast, excellent water resistance. For painting inks. Available also at 5, 7 viscosity. (TS Kellin).</td>
</tr>
<tr>
<td>MODIFIED LINSEED OILS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CYKELIN</td>
<td>4 Max</td>
<td>150-162</td>
<td>974-978</td>
<td>10</td>
<td>46-64</td>
<td>23-24 8.12</td>
<td>Varnishes, enamels, aluminum paint trim and treads, cold cut varnishes, re enforcement oil. Dicyclopentaene copolymers of linseed oil that produce vehicles of quick hard dry and excellent water and alkali resistance. Cykelin 70 at 70% solids in mineral spirits. (TS 5-6-98)</td>
</tr>
</tbody>
</table>

*Approximately. Because of natural variations in oil seed types, chemical and physical constants given in this book cannot be guaranteed at all times.*
should be repeated at least four times. Every time, a quantity of mucilage separates itself, subsiding in the bottle together with the sand. In the separation of the oil from the water during this purification, it is not necessary to be very exact, as the oil is to be mixed with water afresh; but in last operation it requires to be separated more carefully, and the salt should be omitted in the last washing. The author adds: 'No method is fitter than this for refining oil. The most turbid oil is thus reduced to a great degree of purity; all mucilage is separated from it, and its colour becomes so light and clear that it is fit for the manufacture of a varnish of the choicest kind.'

DO NOT attempt to use this method to try and lighten the color of any ready made "boiled" linseed oil, IT WILL NOT WORK! The linseed oil has been darkened in the boiling process. I am enclosing a copy of a page from the Spencer-Kellogg brochure which gives all the information on the various oils.

FoMREH Communication 618
Start lean, finish fat.

Eph Segerman reported (Comm. 500) on the occurrence of cracks in a varnish test-piece prepared by Michael Lowe from varnish made to a recipe given by John Duncauf and E.S. in Comm. 302.

The test-piece is of figured sycamore about 2" by 8", with 12 coats of varnish arranged so that each subsequent coat is slightly smaller than the previous one. It was made in the summer of 1930 and was OK in spring '31. The colour is a golden-brown of a medium tone - neither particularly light nor dark. On examination I came to the conclusion that the cracking was due to the incomplete drying of previous layers. This is shown in two ways. Firstly, the majority of cracks are at ninety degrees to each other - this suggests a rigid layer over an expanding flexible one. (Oils dry by taking up oxygen, hence expanding. ) Cracks in a homogeneous body such as drying mud occur at 120 degrees(l). Secondly by the much larger number of cracks (smaller in size) in the thinner areas of varnish, implying greater flexibility in the layers below the thicker areas. I could not see any cracking in the first two layers. I believe that if the varnish, throughout its depth, had remained, or subsequently become flexible, and shrunk, that the appearance would have been very different from the sample here.

Several instruments by Tielke (2) do show this other appearance - cracks at 120 degrees, enlarging to leave small, approximately hexagonal islands of varnish - possibly caused by the use of bitumen as a colouring agent (bitumen was a popular and apparently very useful colour for painters at this time, but its propensity to cause cracking subsequently led to its abandonment) Michael told me that the test-piece was made and kept in a sunny workshop but dried without artificial ultra-violet light.

I have to admit that my efforts to duplicate it have been unsuccessful. I used my own varnish to a similar recipe, but using pine resin instead of rosin. Two pieces of wood were coated in a similar manner, one was dried using ultra-violet light, the other 'naturally'. They were then aged by transference between a heating cupboard and a freezer compartment at intervals of a day or two over a period of several months. A year after their initial preparation neither show any sign of cracking. The 'naturally' dried one has sunk into the wood rather more than the other.
There are similarities between varnish layers on an instrument and paint layers on a canvas. It has long been recommended amongst artists that a painting should "start lean, finish fat" in order to discourage cracking. This usually means starting with paint diluted with turpentine, adding more oil in subsequent coats. The traditional house-painters' system follows the same pattern. The oil-rich primer fills the grain but most of the oil is absorbed by the wood. The subsequent undercoat is 'less 'fat' but gives body to the colour. The final 'fatty' gloss coat protects the previous layers. ( A very good description, with much more detail, is given in Peter and Ann MacTaggart's 'Painting and Marbling Harpsichord Cases'). This system ensures that the lower coats quicker than the upper; or at least, if not completely dry, will be less rather than more flexible, and thus less likely to cause cracking. ( That paintings should dry for a minimum of one year before varnishing is a normal precaution ). To completely prevent cracking an ideal situation would be for the top layer to not dry at all - impracticable on a musical instrument perhaps - but attempted by the regular application of a wax polish on furniture and cars.

Earlier layers of varnish should be completely dry, drying quicker and being less flexible than the final coat. In practice darker colours dry quicker and usually contain less oil than lighter ones. Some extant traditions in violin making point to a previous usage. Sydney Evans' catalogue contains a short account of a recommended system of varnishing. The first two coats are clear and act as sizing coats ( primer ) followed by many thin coloured coats ( thin layers dry more completely ) and two final clear coats. Here the same varnish is used throughout colour being only an additive to the clear varnish. A non-drying oil is usually recommended in the polishing process. Heron-Allen's (3) use of a gamboge in spirit oil under the oil varnish follows the same principle and is sound practice.

A sizing coat such as a spirit varnish, animal or fish glue -size, etc. substitutes for a primer where grain-filling is not required. In paintings a size protects the canvas from the acidity of the oil (4).

Heron-Allen states that varnishing "must not be commenced till the end of May, or the beginning of June at the latest, when we can be sure of a spell of fine hot weather in which to do our work". The Hills, in their book on Stradivari, refer to a letter of 1649, "the violin cannot be brought to perfection without the strong heat of the sun". Also Stradivari himself, in a letter of 1703, apologises for lateness in delivery because of the non-drying of the varnish. The excuse, even if not factual, must have been reasonable. The introduction of spirit varnishing must have largely occurred as a result of slow drying oil varnishes. It would be interesting to know whether spirit varnishes became common more quickly north of the Alps (?) ( Perhaps also at what time of year Luten "died, leaving behind so many lutes""). Heron-Allen again, "when this ( first ) coat is laid on, hang up the fiddle to dry in the lightest, hottest, driest, sunniest place you can; in the hottest weather it will take at least 24 hours". Stradivari seems to have used a sort of open shed or attic on the roof of his house for varnishing.

Of light and heat as catalysts to aid drying, light, especially ultra-violet, is the more important. It can be dangerous to an instrument to use direct sunlight, because of heat, but any shed,
loggia, or similar place shaded from direct rays, but open, without
glass, to indirect sunlight, will even on cloudy days provide
probably quicker drying than U.V. tubes. However, U.V. tubes are
more convenient for most of us, and some have built a cabinet to
house them. (I'm afraid I still just use the spare bedroom.)
After a few thousand hours they become less efficient (advice from
Zph) and I have just replaced mine after seven years' use. Although
dark varnish seems to be dry in two-three hours, my own
practice is to give it twenty-four; two or three days for pale
colours. Heat is less important than U.V., however it helps in
applying the varnish, making it easier to spread evenly, obviating
thicker, slow-drying areas.

I should perhaps add that so far I have never had any difficulty
with my own varnishes. Samples made in 1978 show no signs of
cracking. These also were made of several layers and have been on
the wall of my workroom since making. Most of them used a recipe
similar to Comm. 302, but others are as described in my earlier
Comm. 240, where the weight of resin was reduced a much smaller
amount, by not more than half. These too seem perfectly OK and
their paler colours and higher oil content seem to make a good top
coat. I have not risked using varnishes made from different
materials for subsequent layers on one instrument. It could be
safe theoretically, but I would hate to get a bunch of irate
customers suddenly in a few years time. Quite definitely ageing
for some months or longer after making improves the clarity and
handling quality of the varnish, and speeds drying.

    pages 72, 171, etc.
(3) Heron-Allen. Violin making as it was and is. Ward Lock 1934.

Comm 620 continued from p. 64

Glass which looks red. It is not so easy to soften in common
flames. Tube A and B ought to be very equal, 5-7 mm will do.
The water goes down at A and rises equally in B, thus readings
on A must be multiplied with 2. That gives pressure in cm of
water, equal to millibar, because 1 bar is 10 m of water.

I have never used this device, and have no accurate ideas of
mouth pressures connected to recorder notes in these terms, but
I believe 5-20 cm water is near the truth. But the tubes
should be at least 60 cm long, and even much longer for reed
instrument examination. If the mounting of A is a bit loose,
one can adjust zero very easily by taking tube A up and down
a bit.

This device should be used in combination with the quartz crystal
galvanometer pitchmeter, whenever there is any doubt about slow-
pressures, and it is quite essential for that kind of calibration.

Let me state quite clearly that equal pressures in any note on a
wind instrument is hardly ideal, its rather a false idea. Greatly
deviating pressures is also wrong of course. But what may be
quite interesting is musters of small deviations from equal blow
pressures in historical instruments. I am quite convinced that
most recorder makers would like to have mappings of that from
original instruments, so I hope that somebody will make the flute
manometer and support us with that kind of measurements. We have no
great collection of recorders in Norway, so I cannot do it.
Method for drilling the hinge pin-hole in the foot of a traverso.

A traverso usually has one key, fixed to the foot of this instrument. But how does one drill the hole for the hinge pin—in the foot as well as in the key—without it going oblique? To solve this problem I decided to make a special drilling vice.

Construction of the drilling vice.

The drilling vice (see drawing) serves to hold foot and key firmly in the right position, so that the hole for the hinge pin can be drilled accurately. Therefore the vice consists of four clamps (k) mounted on a piece of wood by means of self-tapping screws and an extra clamp (e).

Further construction details:
- Clamps (k) are made of aluminium angle section.
- Pieces of cloth glued to these clamps prevent damage to the foot and key.
- The holes in clamps (k) have been drilled 1-2 mm too large so that they become slightly adjustable.
- Clamp (e) you can buy in every hardware shop.

Drilling procedure.

The drilling procedure is as follows: first fasten foot and key between clamps (k). The leather pad must be present too. Only then the key will be in the correct position. Be sure the foot is exactly horizontal (check this with a try square). After that, clamp (e) must be fastened.

When foot and key have been firmly fixed, the hole for the hinge pin can be marked and drilled. To prevent the hole from going oblique after all, drill it rather slowly and use a drill press. However, a small deviation will be no disaster because the key will remain close tight.

This method for drilling hinge pin-holes is probably useful too for other wood-wind instruments (with keys of course), though some modifications may be necessary.
Drilling vice
Dear FOMRHI and colleagues,

I have tried to inform you and the historical music movement about an alternative procedure of Recorder-making, that is a very interesting and fundamental alternative to Arnold Dolmetsch’s surface increment repetition procedure (AAdo called “The material and measurement copy”, but due to early 20th century ideas of matter and metrics, its actually Henry Fords procedure of how to employ ignorant workers in car-production and to keep them ignorant. Henry Ford sold all in black).

An effort to publish this alternative wave-morphological and soundcolour harmonical basis of historical instrument construction and examination in this eminent magazine gave me quite a shock. Your very qualified and open minded editor did cut my questions about the forms and possibilities of such a presentation into small pieces by scissors at the breakfast table. And he glued it up in small pieces among other documents, obviously because of some digestive problems with his eggs and bacon, that was also commented.

So, for a second time, I do not dare to write about the morphology and harmonics of oscillating air and the principles of exploring it in historically responsible terms of metrical observation. I have to see first, whether your editor is capable of swallowing a very simple classical procedure of musical instrument metrics that even has its readings in a linear and decimal scale of metrical mathematics. That’s also more equal to current material and metrical thought in historical instrument reconstruction, and should give no philosophical problems, or needs for revision of material and metrical belief.

Fig. 1 shows a water manometer that consists of 2 glass tubes A and B that are mounted on a wooden board. They communicate through a rubber tube c which has an adjustable, damping choke. B is equipped with a centimeter scale that can be made of any centimeter ruler with a zero point. A is bent 90° at its top (butane flame) and equipped with another rubber tube with a fipple at its end.

I recommend a so-called cooping saw and wood for all this kind of scientific and technical devices. Mounting of the glass is best made with double beddings of soft popple-wood and screws. The choke can be improvised the same way. The fipple may be a cigarette mouth-piece or a fine boxwood construction. One can also try and make a "thermometer magnifying effect" of the scale, by the cylindrical water lens.

Water is filled up and adjusted to zero by a Sasteur-pipette or maybe even an improvised pipette that is controlled at the top by a finger. Eden things are easily made by a flame and a file from some glass tubes which are green at the ends. Avoid pyrex-

continued p. 61