

EMPIRICAL STUDY OF THE DESIGN OF MOUTHPIECES FOR A THREE-HOLE PIPE

M C Hutley Duffield UK

1 INTRODUCTION

The *raison d'être* of three-hole pipes is that they may be played with one hand, leaving the other hand free to operate some percussion instrument¹. The principle of operation is the same as that of many orchestral brass instruments. Rather than have a different length of tube for each note, the overtones of each tube generate a range of notes. The frequencies of the overtones of a perfect cylinder and a perfect cone form a harmonic series so a combination of different lengths of tube and their overtones may be used to generate a musical scale as shown in figure 1. The fundamental is generally discarded and the scale starts with the first overtone one octave higher.

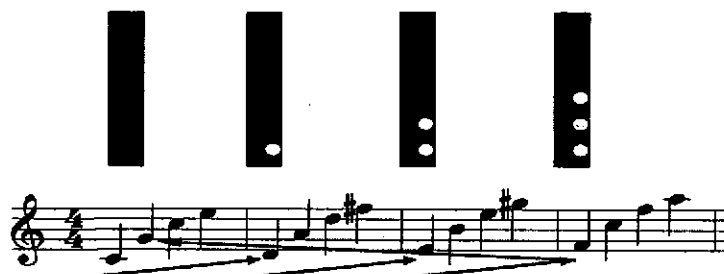


Figure 1 the generation of a musical scale from the overtones of four different lengths of pipe.

The purpose of the present study is to investigate which are the important parameters of the whistle used to excite the vibrations and to determine their optimum values for a given instrument.

2 CONSTRUCTION

In the initial studies the head joints of recorders were mounted on wooden tubes of the appropriate design. The assumption was that the appropriate head joint would be that of a recorder which had the same range of notes as the instrument in question. Thus, a three hole pipe with the same length as a descant recorder would have the same range of notes but one octave higher. So the desired mouthpiece would be that of a "garklein flötlein". The function of the mouthpiece is to generate a jet of air which is manipulated by a standing pressure wave at the end of a resonator tube. It was assumed that the jet would not "recognise" whether this wave was the fundamental oscillation of a short tube or a higher overtone of a longer tube.

In practice it was found that the garklein mouthpiece did not perform very well but that that of a sopranino recorder gave the desired result.

For more detailed studies it was necessary to use mouthpieces in which one parameter at a time could be varied and its effect studied. There is a variety of different configurations of mouthpiece.

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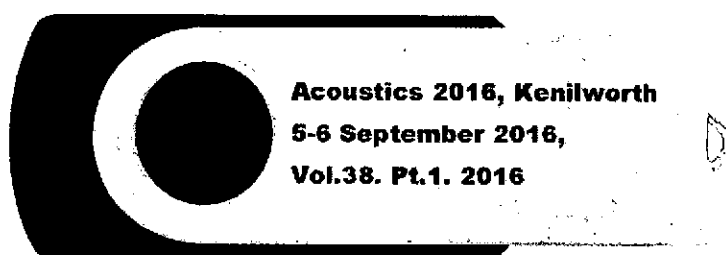
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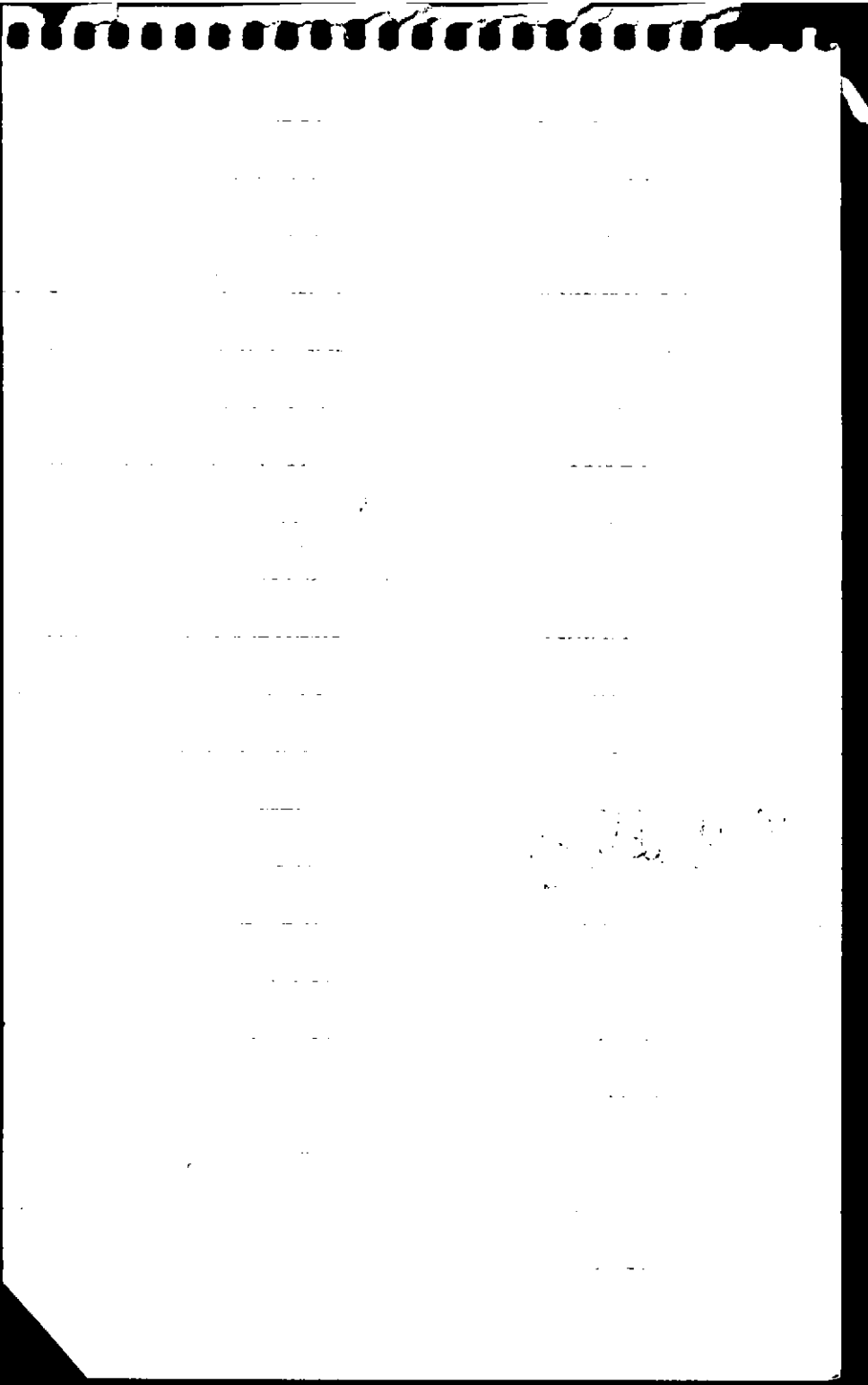
~~Alan Taylor~~ NO

Victor ✓

David Huller ?

Jonathon Sims ✓

M H Utley ✓



Annual Proceedings

Linda Canty

From: David Hiller <David.Hiller@arup.com>
Sent: 20 July 2016 23:01
To: Linda Canty
Subject: RE: Annual Proceedings

Friday
12th August

Dear Linda

Good to see you last week in Athens; I trust you had an uneventful return journey. Two things if I can:

1. I am struggling to get my paper completed to a standard that I am happy with, before going on holiday at the weekend. Would it be possible to submit a little late, without causing too much inconvenience? I am away until 7th August, so should be able to complete it during the week commencing 8th.
2. I mentioned to you my interest in chairing a session at ISCV24. I am still potentially interested so would appreciate if you could let me know what you require from me. However, due to the later dates of next year's congress, I may need to withdraw depending on how it would fit with school holidays.

Best regards
David

From: Linda Canty [mailto:Linda.Canty@ioa.org.uk]
Sent: 29 June 2016 16:39
Cc: Linda Canty
Subject: Annual Proceedings

Dear Authors

You have recently given a paper at an Institute of Acoustics one day meeting and you expressed interest in submitting a full paper for the annual proceedings.

Please find attached the details for the abstract and paper.

ABSTRACTS

Please send me your abstract in Word for inclusion in the proceedings by email to linda.canty@ioa.org.uk by Friday 29 July 2016 (please see example - up to 150 words but please do not include diagrams or photographs in the abstract as these are also compiled into one document for handout at the conference).

PAPERS

Please find attached instructions for the layout of the Paper. Please note the header and footer should appear on each page. If you find it difficult to keep to the 8-12 page limit please contact the Institute office. Please send your paper by email as a PDF document to: linda.canty@ioa.org.uk by Friday 29 July 2016. (please see example)

Also, you are invited to present a poster at the Acoustics 2016 conference, if you would like to do this, please confirm and I will make the arrangements.

If you have decided not to submit a paper for the proceeding, please confirm as soon as possible
We look forward to hearing from you.

Best regards
Linda

Institute of Acoustics
3rd Floor, St Peter's House
45-49 Victoria Street

Linda Canty

From: Linda Canty
Sent: 29 June 2016 16:39
Cc: Linda Canty
Subject: Annual Proceedings
Attachments: Abstract.example.doc; Acoustics 2016 paper template.doc

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Best regards

Linda

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