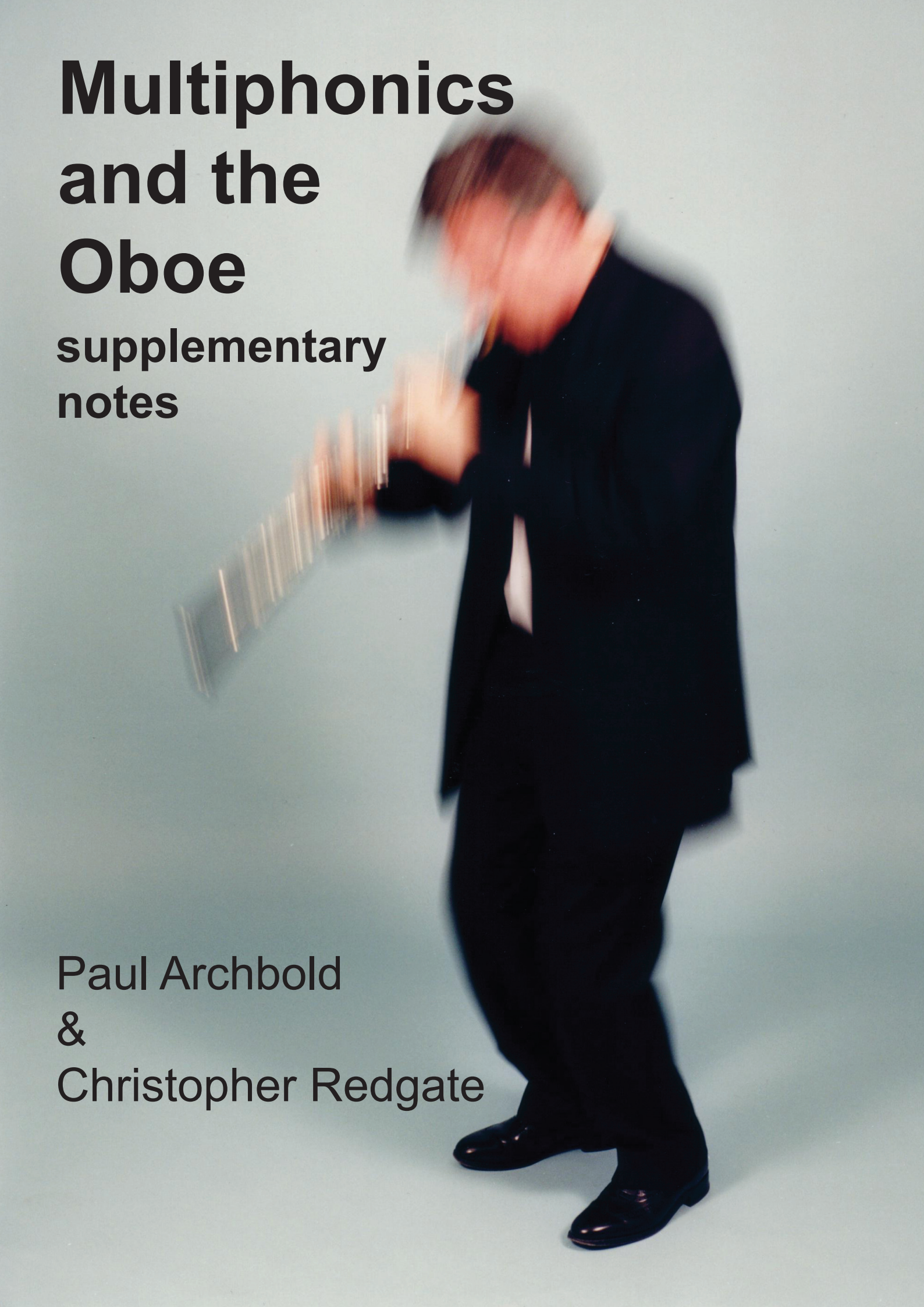
Multiphonics and the Oboe

supplementary notes



Paul Archbold
&
Christopher Redgate

Multiphonics and the Oboe: supplementary notes

1. What is a multiphonic?

A multiphonic is a sonority produced on a wind instrument, which is perceived as a mixture of several tones.

When a wind instrument produces a note perceived as a single pitch, a spectral analysis[1] of the note will reveal several partials. The frequencies of these partials will be regularly spaced and will form part of a harmonic series: i.e. the frequencies of the partials will all be integer multiples of a 'fundamental' frequency.

With a multiphonic, the sonority is perceived as several pitches.

In the case of a dissonant multiphonic, a spectral analysis will reveal several partials, the frequencies of which are not integer multiples of a common fundamental frequency. The ear groups the partials, with each group suggesting a different fundamental frequency. So a dissonant multiphonic with say 20 prominent partials may be perceived as a mixture of three distinct pitches.

In the case of a consonant multiphonic, a spectral analysis will reveal several partials, the frequencies of which are integer multiples of a common fundamental frequency. However, the amplitudes of some of the partials are greater than usual, so the ear interprets the sonority as a combination of more than one pitch - e.g. a consonant interval such as a perfect fifth.

In the case of a beating multiphonic, the ear cannot discriminate the partials that are very close together. However, the ear does perceive an overall periodic fluctuation in amplitude of the sonority which is interpreted as a 'beat'.

Multiphonics are not predicted by simple models of conical tubes excited by a reed. However, more recent scientific investigations have revealed non-linearities in the behavior of the double-reed and more complex physical models of the oboe have suggested complex interactions between bore shape, hole design, keywork and the double reed[2]. Some recent computer synthesisers implementing physical models can produce multiphonic-like sonorities[3].

1. All the spectral analyses included in these notes were processed with the IRCAM software program Audiosculpt (v 2.9.2). The settings used were: audio sampling rate 44.1kHz, window size 2048 samples, adaptive oversampling 8*, window type Blackman, FFT oversampling 1*
2. For a mathematical analysis of the complex interactions in a double-reed instrument see André Almeida, Christophe Vergez, René Caussé, Xavier Rodet 'Physical model of an oboe: comparison with experiments'
3. The Yamaha VL-1, a monophonic physical-modelling digital synthesiser launched in 1994, was one of the first commercially available synthesisers able to produce multiphonic-like sounds using a physical model of the flute, controlled with a short piano keyboard and a breath controller. Sophisticated virtual instruments can be created in the IRCAM software package Modalys using physical models which can create multiphonic-like sonorities. However, it is not clear that these models produce the same sound as a professional woodwind instrument and player using equivalent virtual fingerings.

2. Different types of multiphonics

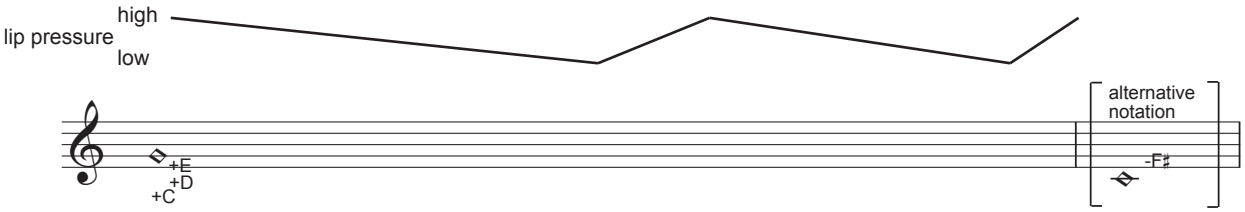
The video file “What is a multiphonic?” illustrates four types of multiphonics:

Example 2.1 Spectrogram of a consonant multiphonic and a dissonant multiphonic

A single pitch (F4) becomes a consonant multiphonic (C5) by slightly venting the second finger of the left hand. Further sliding the finger to make a half-hole produces a dissonant multiphonic which is perceived as a chord (we hear the four pitches: A4, E♭5, C6, F♯6).

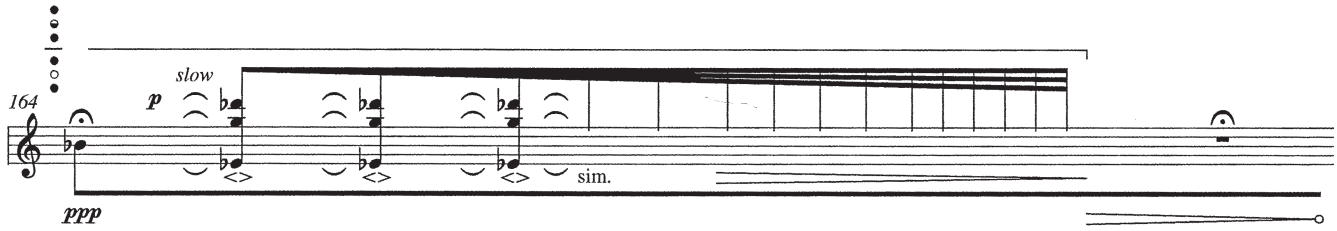
Example 2.2 Spectrogram of a beating multiphonic

A single pitch becomes a beating multiphonic by a change in embouchure pressure. The speed of the ‘beat’ is controlled by lip pressure: high lip pressure creates a fast beating. The ‘beat’ frequency is not revealed in the spectrogram, but the periodic fluctuations can be clearly seen in the amplitude of the waveform.



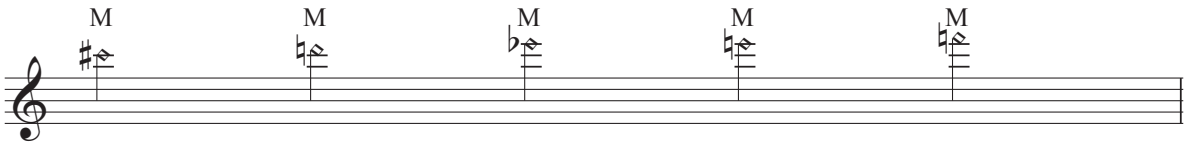
Example 2.3 Spectrogram of emerging multiphonic

In *Antares*[4], Edwin Roxburgh employs an unusual fingering for the pitch B♭4, which changes into a multiphonic with an increase in breath pressure.



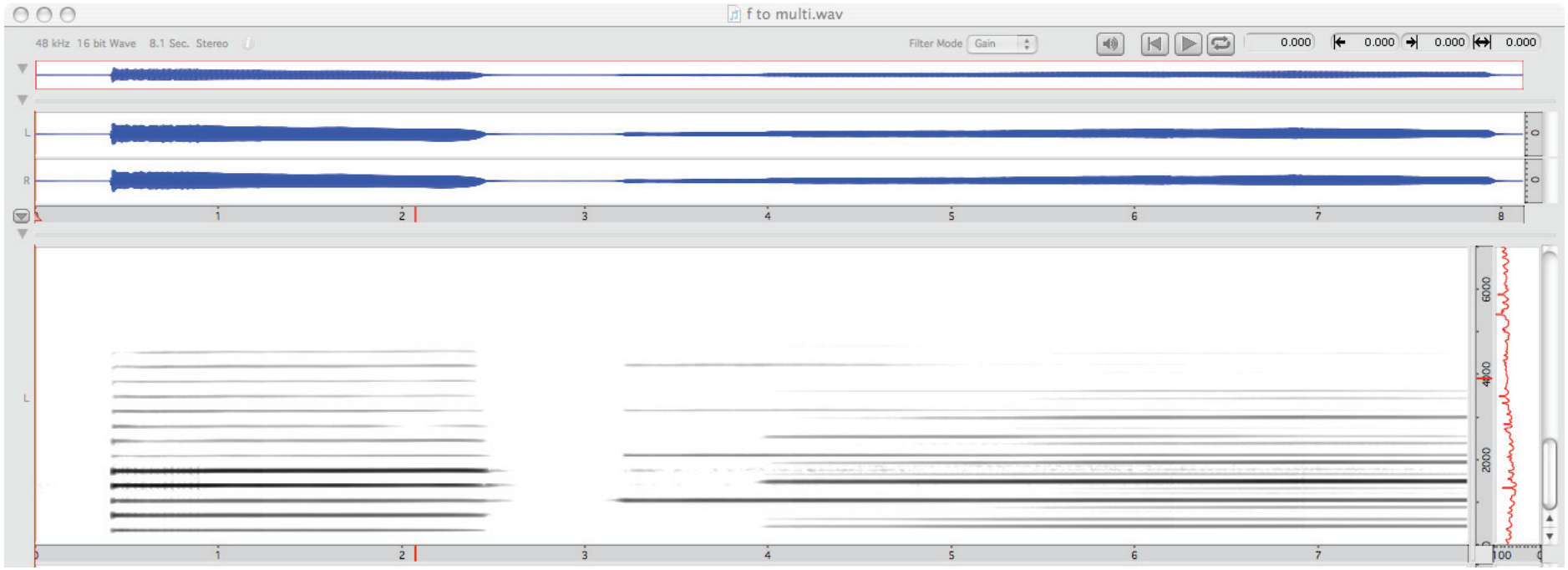
Example 2.4 Spectrogram of five multiphonics, created with a modification to the top b key

These multiphonics are created by a modification suggested by Heinz Holliger[5]: the top b key (left hand, first finger key) is unscrewed slightly offering three ways in which the key can be used: closed, half-open and open. This opens up the possibility for a significant number of multiphonics that otherwise are not available. In this example, it alters the way in which particular high note fingerings respond. The spectrogram shows five multiphonics created from the normal fingerings for high C♯, D, E♭, E♮ and F.



4 See Edwin Roxburgh *Antares*

5 Holliger’s suggestion can be found in the Appendix to ‘Studies for playing avant-garde music’ in the instructions for Berio *Study to Sequenza VII* and in his notes to *Studie über Mehrklänge.* See Holliger *Pro musica nova: Studien zum Spielen Neuer Musik für Oboe*



Oboe F4

Partials		
1	F4	346
2	F5	692
3	C6	1050
4	F6	1409
5	A6	1755
6	C7	2101
7	E♭7	2447
8	F7	2805
9	G7	3130
10	A7	3501
11	B7	3835
12	C8	4193

sound F4

Oboe multiphonic

consonant

Partials		
1	C6	1050
2	C7	2101
3	G7	3152
4	C8	4208

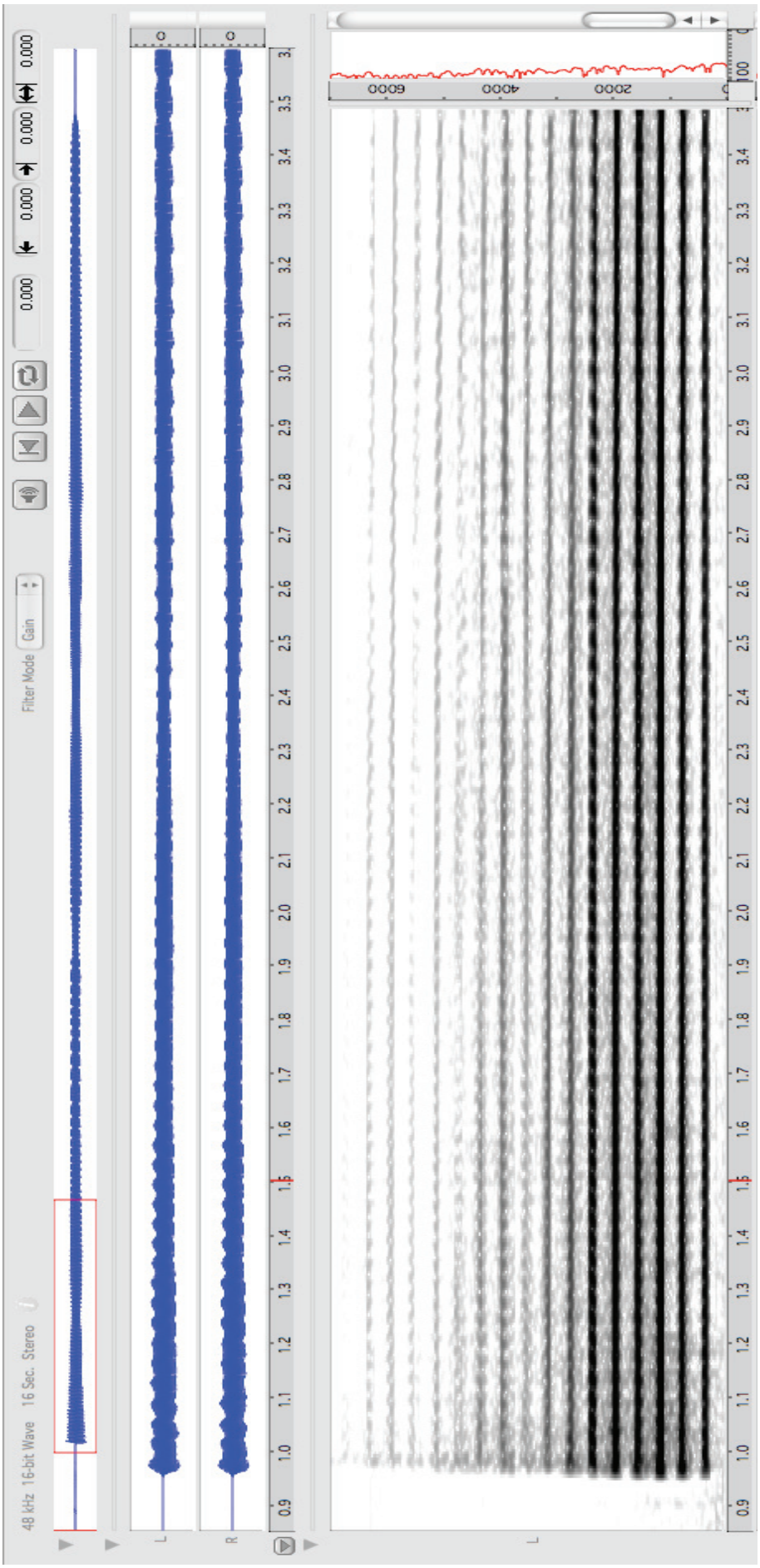
sound C6

dissonant

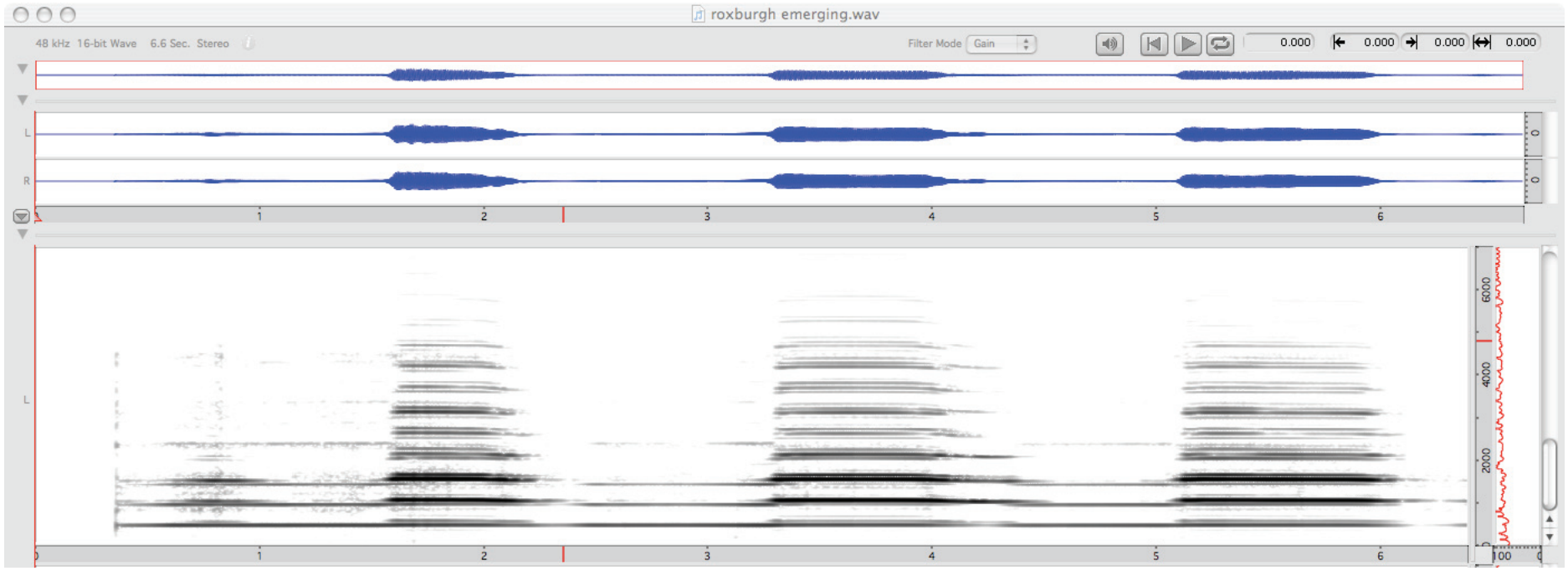
Partials	
A4	445
E♭5	618
A5	890
C6	1050
G♭6	1496
A♭6	1681
B6	1953
C7	2138
D7	2385
E♭7	2583
G♭7	3016
G7	3182
A♭7	3442
B♭7	3627

sound A4, E♭5, C6, G♭6
(slightly sharp)

Example 2.1 Spectrogram of a consonant multiphonic and a dissonant multiphonic



Example 2.2 Spectrogram of a beating multiphonic



Oboe B♭4

Partials

1	B♭4	478
2	B♭5	956
3	F6	1450
4	B♭6	2405

sound B♭4

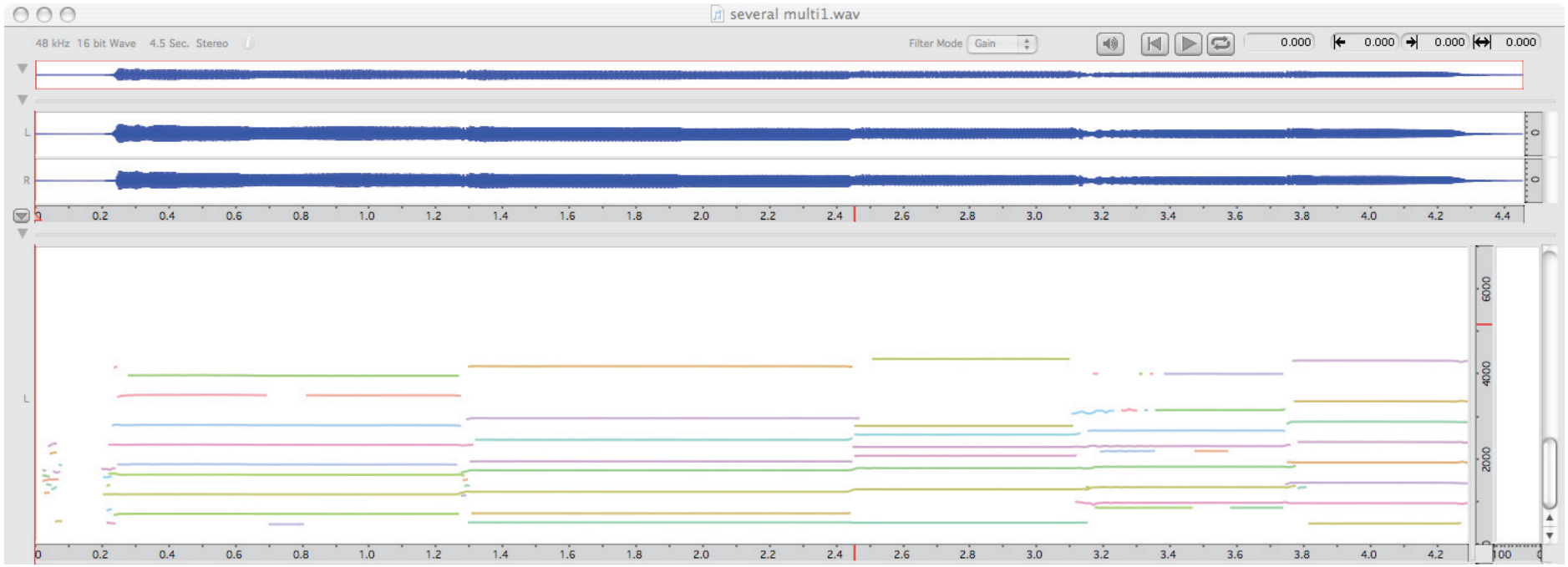
Oboe multiphonic

Partials

B♭4	477
D5	593
B♭6	955
D♭6	1087
G6	1565
A♭6	1859
C7	2059
D♭7	2158
E♭7	2274
E7	2653
F7	2752

sound E♭4, B♭4, G5, D♭6

Example 2.3 Spectrogram of an emerging multiphonic (Roxburgh *Antares)*



Multiphonic 1 Partials		Multiphonic 2 Partials		Multiphonic 3 Partials		Multiphonic 4 Partials		Multiphonic 5 Partials	
F5	691	C5	519	C5	519	A5	864	B4	500
D6	1171	G♭5	730	E6	1306	B5	980	B5	960
A♭6	1651	E♭6	1229	A6	1805	E6	1344	F♯6	1460
B♭6	1862	A6	1748	C7	2074	B♭6	1824	B6	1901
D7	2342	B6	1959	D7	2285	D7	2304	D♯7	2419
F7	2823	E♭7	2458	E7	2592	E7	2669	F♯7	2899
A7	3495	G♭7	2976	F7	2784	G7	3168	A7	3379
B7	3936	C8	4186	C♯8	4359	B7	3994	C♯8	4320
sounds B♭4, F5, D6		sounds C5, G♭5, E♭6		sounds C5, F5, E6		sounds B4, A5, F6		sounds B4, B5, F♯6	

Example 2.4 Spectrogram of five multiphonics, created with a slight modification to the top b key (indicating the eight most significant partials for each multiphonic)

3. Different instruments- different multiphonics

It is possible to produce multiphonics on any oboe with any system of fingering, including the baroque oboe; the central issue however, is how far it is possible to replicate, on a wide range of different instruments, the same multiphonic.

The Conservatoire System
It is easy to speak of the oboe as if there was only one type of instrument, produced identically by every manufacturer, using one style of reed, one keywork system and with no personal variations in the way keywork is used by oboists worldwide. This is, of course, not the case. There is one design of instrument keywork which is favoured by many players worldwide, commonly known as the Conservatoire system. This is the system for which many of the great works of the latter part of the 20th century were written, including Berio's *Sequenza VII* and Holliger's various compositions. It is also the system that is used by the writers of almost all of the current literature concerning multiphonics and contemporary oboe techniques. It is however not the only system available today nor is it uniform in manufacture. There are a number of significant differences that affect contemporary oboe playing.

Other systems
The second most widely used system available today is the English or Thumb-plate system which is used extensively and almost exclusively in the United Kingdom[6]. In addition, there is also a Prestini system[7] (Italy), which is a modification of the Conservatoire system and a Viennese system which is played by only a very few performers today.

Other considerations

Octave keys
In addition to the different systems available there are a number of other differences that have a bearing upon the production of multiphonics. Some of these occur at the manufacturing stage and some are choices made by the performers. Of particular note is the situation with octave keys. The majority of oboes (across the systems) use what is known as a semi-automatic octave key system. This system automates some of the octave key choices: the performer can use either the first or second octave key but not both together. There is also a fully-automatic system which changes the octave keys automatically leaving no choice to the performer. This system does inhibit the performance of quite a number of multiphonics[8]. It is worth noting that there is a 3rd octave key which is independent of the 1st and 2nd. This key is used for high notes and quite a few multiphonic fingerings.

6 There are historic reasons why the thumb-plate system is used in the UK and nowhere else in the world which are beyond the scope of this article. For further details of the history of the oboe, Burgess and Haynes *The Oboe* is a very good starting point.

7 The Prestini system is no longer widely used. Edwin Roxburgh, the eminent British oboist, tells the story of an early edition of Bruno Bartolozzi's *New Sounds for Woodwind* in which the fingerings were based on this Prestini model – a number of the fingerings apparently did not work on other oboes.

8 There is also a simple octave key system but this tends only to be seen on student or older models.

Left hand top finger key
The left hand top finger key is very significant in the production of multiphonics. In general performance there are two techniques involved in the use of this key and these vary from oboist to oboist; either rolling the finger on the key or lifting the finger off the key. In the centre of the key is a small hole which acts as a vent. When this hole is opened it has the effect of lifting the pitch an octave on the notes c♯, d and e♭. The key is also important in the top register. However this key also plays a significant role in the production of multiphonics. Holliger suggests[9], in his directions to his *Studie über Mehrklänge* (*Study in Multiphonics)*, that the key be slightly unscrewed. The act of unscrewing the key opens up a wide range of multiphonics not normally readily available. To take advantage of this however requires the oboist to both lift their finger off the key as well as to roll it. Libby van Cleve[10] suggests that the design of the hole under this key (she calls it the b key) is different on a Rigoutat oboe and that this design specifically facilitates the performance of double harmonics (a form of multiphonic).

B-C link
A third area of consideration and, as with the simple unscrewing of the key above, one which can be adapted by the performer is what is known as the B-C link at the lower end of the instrument. In essence when the link is active the performer can put the low b key down and this will automatically take down the low c key as well, thus closing the c hole. This can be a great help in many performances. However it is a major problem when performing many of the contemporary techniques and especially when playing multiphonics. The c hole needs to able to be closed and opened independently of the b hole for quite a number of multiphonics.

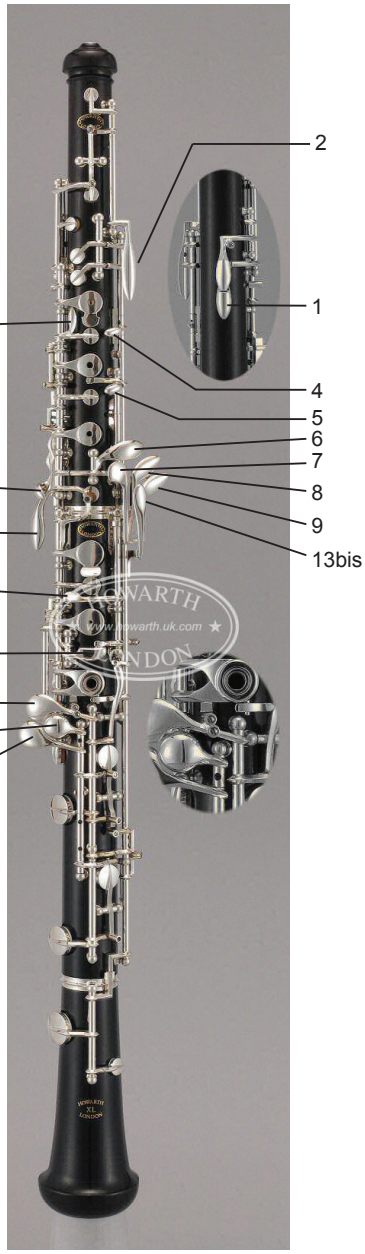
The differences in systems
The two main systems in use today, Conservatoire and thumb-plate are in fact very similar. The significant difference is the thumb-plate: on a Conservatoire system middle and top B♭ and C are produced by fingering A or B respectively (first two fingers of the left hand) and putting down the first finger of the right hand; while on the thumb-plate system it is the lifting of the left hand thumb off the thumb-plate that changes the pitch. Obviously these differences are significant and also affect a number of the upper octave fingerings. From the point of view of the multiphonics the fingering differences (which of course represent differences in the design of the keywork) can have a marked effect upon the fingerings of multiphonics both in terms of what is written down as a fingering and also on some occasions what will respond as a multiphonic.

Given the range of possible differences, both in terms of systems available and the more detailed issues surrounding performer preferences and differences available within the design of each oboe, it is perhaps not surprising that there are sometimes problems when trying to notate an exact multiphonic.

It is perhaps encouraging to note that while these problems exist some can be overcome by the oboist considering some of the issues above (perhaps trying other oboes or considering making the small alterations mentioned) or, through knowledge of oboe keywork, considering changes to fingerings that may accommodate the multiphonic.

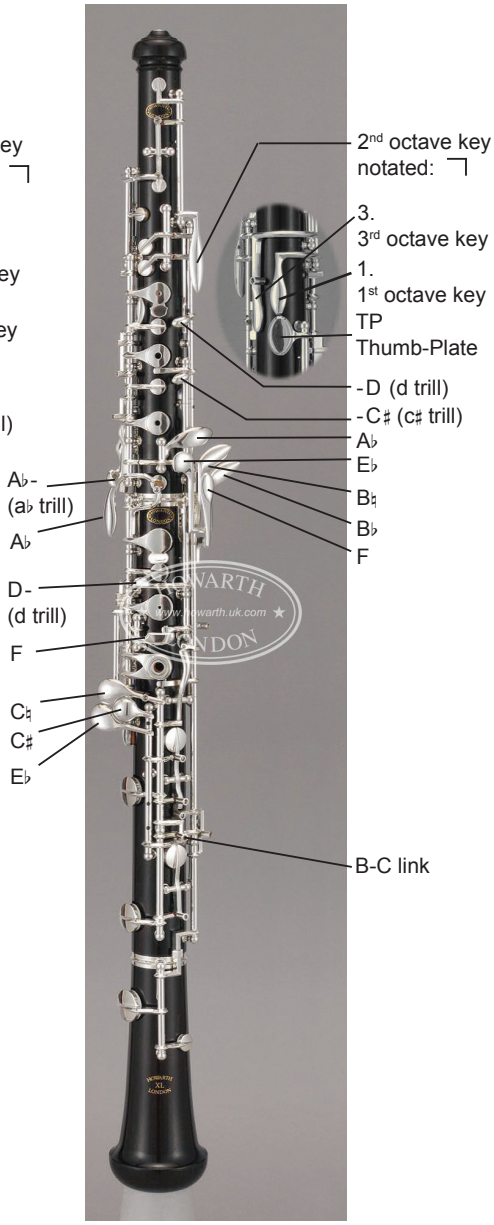
9 Holliger's suggestion can be found in the Appendix to 'Studies for playing avant-garde music' in the instructions for Berio *Study to Sequenza VII* and in his notes to *Studie über Mehrklänge.*
See Holliger *Pro musica nova: Studien zum Spielen Neuer Musik für Oboe*

10 See Libby van Cleve, *Oboe Unbound*



Conservatoire system (French)
fingering system from:
Bruno Bartolozzi
new sounds for woodwind (1982)

Conservatoire system (French)
fingering system from:
Peter Veale & Claus-Steffen Mahnkopf
The techniques of oboe playing (1988)



Thumb-plate system (English)
note-name fingering system

Different fingering systems

Photographs:
Howarth XL Conservatoire (French) System Oboe
Howarth XL Thumb-plate (English) System Oboe

Images kindly supplied by Howarth of London Ltd,
www.howarth.uk.com

4. Commentaries on music extracts

The video examples of music offer a range of approaches to the use of multiphonics.

Roger Redgate's *Ausgangspunkte* employs a sophisticated compositional approach to the use of multiphonics. The opening of the work utilises six different musical ideas including flutter-tonguing, trills and quarter-tones (see the opening example performed on the video). The trills take on a specific significance in that during the course of the piece they are developed and ultimately transformed into multiphonics (the second fragment of the work on video demonstrates the development of the trilled material). The first multiphonic, a beat multiphonic, occurring about half-way through the piece is a development of the trill material (see example 3 on the video). The use of a beat multiphonic in this context is an excellent demonstration of the way in which multiphonics can be integrated compositionally into a work without their becoming simply interesting sound effects. An important aspect of *Ausgangspunkte* is the attempt to turn the oboe into a polyphonic instrument: this can be seen occasionally in the notation where, as in example 4, the music is written on two staves, but is also evident in the use and notation of the multiphonics.[11] Example 4, with its use of multiphonics, trills and two staves, is a further example of the link between the trilled passages and the developing use of the multiphonics in the work. As the work moves towards its climax (see example 5) multiphonics, multiphonic trills, multiphonic trills which have 'ordinary pitches' woven into them take centre stage becoming the prime focus of the development of the work. The moment of climax is a combination of three distinct multiphonic trills playing against each other as each demonstrates its independence through tempo variations. In addition to this the trills are interrupted by extra trilling on other keys (these interruptions being the development of other material from the first part of the work). Redgate's use of notation is mostly modelled on Bartolozzi (but modified by the use of key names rather than numbers) and the work is written for a thumb-plate oboe.

Edwin Roxburgh's *Antares* is also written with a thumb-plate system in mind and uses the multiphonics in the context of the harmonic world of the work. The opening of *Antares* (example 1 on the video) sets the scene for the work and introduces the first multiphonic at a dramatic moment. Note the way in which the piano 'picks out' some of the pitches in the multiphonic. Examples 2 and 3 demonstrate the careful interplay which is developed between the piano and the oboe multiphonics. The multiphonics in this work were chosen for their specific content and sound. Notationally, Roxburgh uses a similar method to that employed by Redgate and supplies a great deal of useful information for the performance of the multiphonics in the form of embouchure directions.

Paul Archbold's *a little night music* employs multiphonics to create an aural perspective: the multiphonics are recorded into several delay lines and gradually create a continuous background layer of shifting sonorities. However, the multiphonics are also of harmonic importance; the perceived pitches from each multiphonic are employed to create short arabesque figures which are performed as a foreground layer, suggesting exotic birdsong.

Heinz Holliger's *Studie über Mehrklänge* (*Study in Multiphonics)* takes a different approach in its composition and notation. The composition unfolds as a series of long phrases of continuously changing multiphonics, an intense, broiling sound-world where the sonorities are in continual flux. For this work Holliger has developed a notation system which is rather more akin to tablature notation: what is written down gives the oboist a very clear understanding of what should be fingered but leaves some leeway as to the exact sounds that will be heard.

The multiphonic possibilities of the oboe are enormous, ranging from the double harmonics to very complex pitch combinations. As can be seen in the examples there is a great deal of potential for creative composition. The range of colour and texture, the potential for use in rich contrapuntal writing, the combination of multiphonic with monophonic sounds etc. all offer the composer an extensive palette with which to work.

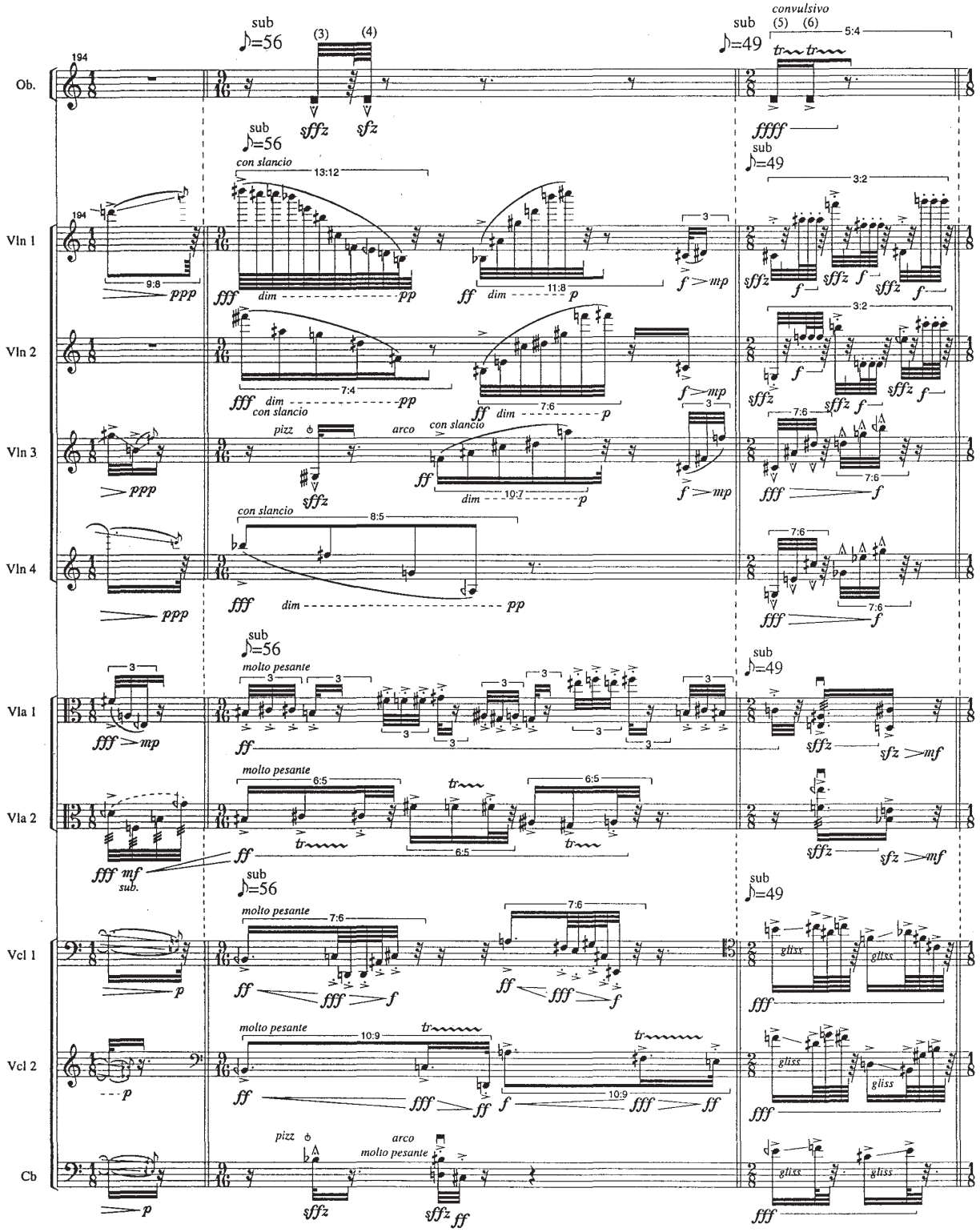
11 Even the extreme speed of some of the passages and the way in which the various layers come and go also gives the effect of an instrument trying to escape its traditional bounds and become a polyphonic instrument.

5. Notation strategies

The notation of multiphonics is a complex and difficult area and depends upon what the composer intends to do. The notational options range from simple instructions that leave the performer free to choose multiphonics that will work (sometimes stipulating certain parameters) through to complex lists of fingerings.

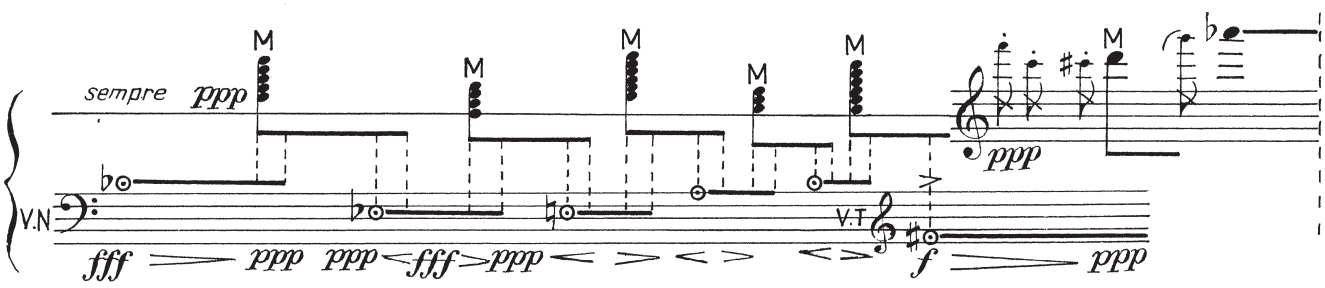
In *Allgebrah,* Brian Ferneyhough gives the following instructions:

> 2
>
> Multiphonic sonority. Six multiphonics are required, of unspecified pitch content, although they should all be selected with a view both to their timbral distinction and their ease of execution with the dynamic and articulative configuration indicated. Multiphonics (5) and (6) should, in addition, provide the possibility of rapid trilling between main and secondary multiphonics.



Brian Ferneyhough *Allgebrah,* b194-196

Vinko Globokar's notation in *Atemstudie* suggests the number of pitches that should be included in a given multiphonic.



Vinko Globokar *Atemstudie*, line 7

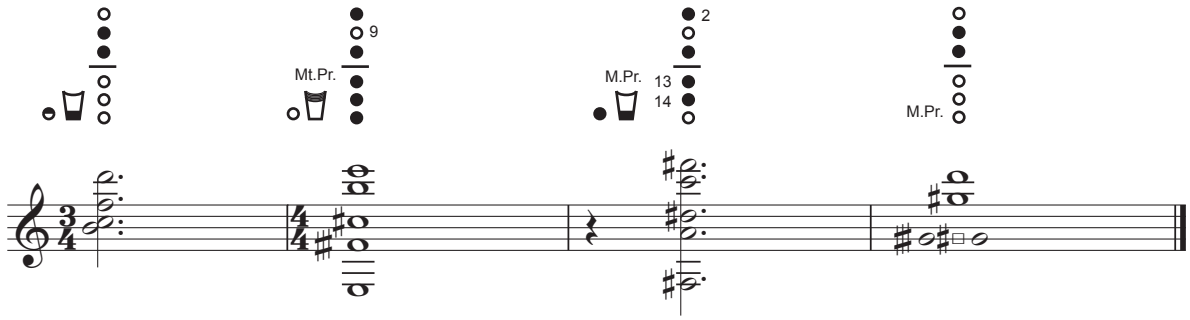
Occasionally composers give more poetic instructions such as 'dark sounding' or 'strident'. This is a very practical approach but leaves pitch/texture choices to the oboist. It guarantees that the multiphonic will speak which is the essential point here.

5.1 Some observations on the various methods of notating multiphonics

There have, throughout the history of the oboe, been charts that define the fingerings of the instrument. These range from charts for beginner oboists through to fully fledged charts for professional instruments and performers and, specialist charts to compare a variety of different fingerings perhaps for the same note.

A range of methods of communicating fingerings has also been developed in order to demonstrate how to finger specific multiphonics. These are often very sophisticated, including not only fingerings but also lip positions and breath pressures. The examples chosen for the video offer a range of more sophisticated approaches to the notation of multiphonics including very precise pitches and complex fingerings for the oboist.

Bruno Bartolozzi[12] uses a method of notating multiphonics which with some modification has been used by many composers. Typical examples would be:



Bruno Bartolozzi *New Sound for woodwind* "Multiphonic Possibilities" p. 47

Notice the use of numbers for the side keys. The numbers are a bit problematic since no performer ever refers to the keywork in this way. It is therefore not that helpful when it comes to reading the fingering.

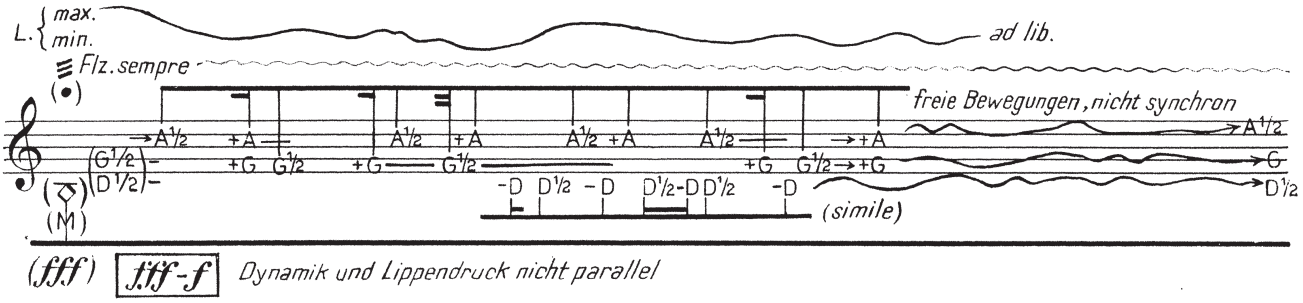
Nora Post[13] suggests a more useful method simply by giving the keywork the names used by oboists – thus making reading a great deal easier. This method has been adopted by most composers today and is a much better way of notating the fingerings. However, in Post's pictorial diagram she refers to 'tr 1, tr 2': it would be better to use 'D tr' and 'C♯ tr' respectively.

Peter Veale and Claus-Steffen Mahnkopf[14] use the now more generally accepted form of notation which employs letter names rather than numbers for the fingerings and incidentally labels the trill keys with a dash followed by the letter (-c♯ or -d). The dash indicates that it is one of the trill keys.

In both the Veale/Mahnkopf and Bartolozzi instrument charts there are keys that do not seem to be used in multiphonic fingerings. In the Bartolozzi *14 bis* is indicated, (which appears to be a key at the back of the instrument and presumably played by the right hand thumb) while in the Veale/Mahnkopf the *clé gille*t (*aux C* in van Cleve[15]) is noted. A small spatula key (*3*), by the left hand index finger, is shown in Bartolozzi but not in Veale/Mahnkopf. This key is very useful for quartertones but we have never seen it used in a multiphonic and indeed there is no use of it in Bartolozzi for multiphonics.

Heinz Holliger's *Studie über Mehrklänge* (*Study in Multiphonics)* is worth looking at in some detail. He notates the fingerings very specifically: the notated pitch indicates a basic fingering which is modified by the addition, subtraction or half-holing of specified keys (e.g. '½A') and changes of breath pressure. However, the pitches to be heard are not normally notated. This method of notation is very helpful for the performer and easy to reproduce. The overall effect is a stunning example of what can be achieved using multiphonics. One word of warning about this study; it is very easy to miss the instruction to the oboist to unscrew one of the keys before performing this work. The change to the oboe is small but it facilitates a number of the multiphonics which otherwise would not speak properly.

Holliger's notation system is very useful for oboists but more difficult for the non-oboe playing composer. However, we consider that some modification of this system might be a useful way forward in this area, especially for passages where the multiphonics change rapidly.



Heinz Holliger *Studie über Mehrklänge* (*Study in Multiphonics),* line 6

If you are writing for a thumb-plate system instrument but have available only literature which uses the Conservatoire system it will be best to talk with your oboist if at all possible. The most significant differences in fingerings will concern the use of the right hand first finger. This finger on the Conservatoire system (and on many modern thumb-plate systems that incorporate Conservatoire fingerings as well) changes the pitch of the A and B fingerings (LH 1 and 2 fingers) whereas on the thumb-plate system the thumb-plate itself makes these changes. Therefore when the first finger right hand is marked open 'o' you may need to consider the position of the thumb-plate as this will make a difference to the pitches created.

13 Nora Post 'Multiphonics for the Oboe'
14 Peter Veale and Claus-Steffen Mahnkopf, *The Techniques of Oboe Playing*
15 Libby van Cleve, *Oboe Unbound*

6. Some general advice to composers

When using reference books such as Veale/Mahnkopf it is vital to copy into the oboe part all the details given in the book such as breath pressure, lip position on the reed and of course the fingering itself. Don't just rely on the reference number of the fingering in the book or simply write out all of the pitches. Many oboists do not own all of the available books and will feel frustrated by the lack of information. Remember also to state in the copy what you mean by the various positions of mouth, breath pressure etc.

If you are using several multiphonics in a row then consider the implications of the change of teeth position or embouchure – some changes are very difficult to achieve under certain conditions. For example a multiphonic that requires the performer to place the teeth on the reed followed by a standard embouchure position is going to be very difficult to execute legato. A similar problem can occur with rapid changes from one fingering to another.

Do not presume that fingerings that work on the oboe will necessarily work on the other instruments in the family: e.g. a multiphonic fingering on the oboe may not work on the cor anglais, or may work but produce quite a different multiphonic and not simply the same pitches transposed down a 5th.

In addition to the finger indications many of the multiphonic diagrams include symbols for lip pressure, air pressure and the position of the reed on the lip. The most comprehensive list can be found in L. Singer *Method per Oboe*.

Our general advice for oboists in this matter is simply to remember that there are a number of possible options that should be tried when trying to find a specific multiphonic. As with other areas what is suggested by a composer may not work as written and, hopefully through a study of the literature, other options should be tried.

The options range from very light breath pressure through to very strong pressure, extreme lip pressure (which could go as far as to place the teeth on the reed) through to very light pressure and also the position of the lips on the reed (once again this can be extreme; from a position where the reed is almost out of the mouth through to the lips being down almost on the binding). And don't forget that you may need to use a combination of the above for the best effects!

We suggest that composers copy carefully the indications in the chosen literature and then allow the oboist to experiment if problems arise. You may need to encourage the experimentation.

7. Bibliography

Books and articles:

André Almeida, Christophe Vergez, René Caussé, Xavier Rodet
'Physical model of an oboe: comparison with experiments'
in *Proceedings of the International Symposium on Musical Acoustics,* (ISMA2004), Nara, Japan

Bartolozzi, Bruno trans. & ed. R S Brindle.
New Sounds for Woodwinds
London: Oxford University Press 1982 (2nd edition)

Burgess, Geoffrey & Haynes, Bruce
The Oboe
London: Yale University Press, 2004

Chenna, A & Salmi, M
Manuale Dell' Oboe Contemporaneo
Milan: Rugginenti Editore, 1994

van Cleve, Libby
Oboe Unbound: contemporary techniques
Lanham, Md: Scarecrow Press, 2004

Singer, Lawrence trans. R S Brindle
Method per Oboe
Edizioni Suvini: Zerboni, 1969

Redgate, Christopher
'Performing Berio's Sequenza VII' in
Contemporary Music Review Volume 26 Part 2, 2007, pp 219-230

Redgate, Christopher
'Re-inventing the Oboe' in
Contemporary Music Review Volume 26 Part 2, 2007, pp 179-188

Redgate, Christopher
'A Practical Approach to Complex Music'
Contemporary Music Review Volume 26 Part 2, 2007, pp 141-149

Veale, Peter & Mahnkopf, Claus-Steffen
The Techniques of Oboe Playing
London: Bärenreiter, 1998

Web Article:

Post, Nora
'Multiphonics for the Oboe'
http://www.idrs.org/publications/journal2/jnl10/multi.html
accessed 5th February 2009
(originally published in *Interface.* Vol. 10 (1981), pp 113-136)

Printed Music:

Archbold, Paul	*a little night music* (2004) (available from the composer or http://eprints.kingston.ac.uk/528)
Holliger, Heinz	*Studie über Mehrklänge* (Study in Multiphonics) in *Pro musica nova: Studien zum Spielen Neuer Musik für Oboe* Wiesbaden: Breitkopf & Haertel, 1980
Redgate, Roger	*Ausgangspunkte* Paris: Edition Henri Lemoine, 1982
Roxburgh, Edwin	*Antares* Waltham Abbey: United Music Publishers, 1988
Ferneyhough, Brian	*Allgebrah* London: Edition Peters, 1996
Globokar, Vinko	*Atemstudie* in *Pro musica nova: Studien zum Spielen Neuer Musik für Oboe* Wiesbaden: Breitkopf & Härtel, 1980

Discography:

Roger Redgate *Ausgangspunkte*
Oboe +: Berio and beyond Oboe Classics (2006) CD15

Edwin Roxburgh *Antares*
Edwin Roxburgh: Oboe Music Metier/Divine Art (2008) MSV 28508

Brian Ferneyhough *Allgebrah*
Ferneyhough Chamber Music Metier/Divine Art (2009) MSV 28504

Heinz Holliger *Studie über Mehrklänge* (Study in Multiphonics)
The Artistry of Heinz Holliger Denon (1996)

Paul Archbold *a little night music*
Paul Archbold: Impacts and Fractures Metier/Divine Art MSV 28502 (forthcoming)

Credits

Christopher Redgate	oboe
Paul Archbold	piano and laptop
David Lefeber	sound
Sam Collins	editor
Colin Still	director & photography

An OPTIC NERVE production
for Kingston University, London

Acknowledgements:

United Music Publishers
33 Lea Road
Waltham Abbey
Essex EN9 1ES, UK

Edition Lemoine
27, boulevard Beaumarchais
F-75004 Paris, France

Breitkopf & Härtel KG
HR 886 Amtsgericht Wiesbaden
Deutscher Verlag für Musik GmbH
Walkmühlstraße 52
65195 Wiesbaden, Germany