

# We Doubled Down The Base Camps

for violin and cello

for Mira Benjamin and Gregor Riddell

by David Pocknee

## General

This work involves two performers listening to each other.

In the first half of the piece, listening to pitch is prioritised.

In the second half of the piece, listening to rhythm is prioritised.

The first half of the piece is in 7-limit just intonation.

The second half of the piece is in equal temperament.

The first half of the work uses conventional rhythmic notation, tempi and simple metric modulations to notate a series of very slow polyrhythms between the two instruments.

When the speed of these polyrhythms become too fast for conventionally-notated metric modulation in the second half of the work, the two players start performing these polyrhythms through an alternative notation.

The change between the first and second half of the piece should be imperceptible to a listener i.e. it should sound like the work is one continuous movement, rather than being in two halves.

The work moves through a sequence of 47 chords.

Each of these chords is based on a set of 10 chords and their inversions (see fig. 3).

These base chords are in 7-limit tuning and are generated using Golomb rulers of order 4 (see fig. 2).

The transition between each chord in the sequence is done by changing one note at a time.

The points in the piece where one of these 47 chords occur are indicated in the score by an italicized letter in brackets above the staff, showing which of the ten source chords (fig. 2) it is based on. This information may help in tuning certain chords.

Most chords in the sequence have two notes in common with the previous one.

There are several simple processes at work over the course of the piece:

(loud=>soft)(low=>high)(slow=>fast)(normale=>sul tasto)(just intonation=>equal temperament)

Changes in bow placement are indicated by a number in a box above the top staff.

Imagine the distance between extreme sul tasto and normale bow positions divided into 8 equal sections, numbered 1 to 8.

**1** = extreme sul tasto      **8** = normale

Extreme sul tasto should be at the point just before double-stopping becomes impossible, or at the point just above where the left hand would be at its highest position at the end of the piece.

It is suggested that each new rhythmic attack should be accentuated using a change in bowing direction and a small, short increase in dynamics.

This piece has no programme note and none should be printed for performance.

This score should ideally be printed on B4 size paper.

## First half of the piece

Equals signs (=) underneath staves indicate that the duration of this note is the same as in the previous bar. This may aid understanding some of the metric modulations.

In the first half of this piece, each new note played should not be tuned in equal temperament, but tuned in just intonation in relation to an already-sounding pitch.

When a new note occurs, it is notated in red, the note it should be tuned to is notated in blue, and the ratio between the pitches of the two notes is written above the red note.

Tuning to another pitch should always be the method of playing - digital tuners should not be used.

This way of tuning means that, over the course of the piece, the tuning of the notes will slowly fluctuate to and from equal tempered pitches.

It also means that the pitch notated in the score may not be the closest pitch to the one that sounds. e.g. a middle C in the score may sound closer to a C#, D or B, due to the way in which all of the tuning is relative and not absolute.

## Second half of the piece

In the second half of the piece, the rhythmic notation changes to mirror the relational approach to pitch seen in the first half, whilst the pitch content moves to equal temperament.

This section of the work is in proportional rhythmic notation.

In the notation in this section, each tuplet is used to establish a new tempi, leading to tuplets nesting inside tuplets inside tuplets etc.

One player will play a pulse, the other player will perform a tuplet over this, which then becomes the new tempi. The first player then plays a tuplet over this new tempi etc.

Due to the difficulty performing these continually changing rhythms, this section of the piece is split into a series of small sections delimited by repeat marks.

These repeat marks indicate that the section within them can be repeated as many times as needed to effectively establish a new tempi such that the bar that follows can be played correctly.

dp (revised 11-09-2017)

The image shows a musical score for Violin (Vln.) and Cello (Vcl.). The Violin part is in treble clef and the Cello part is in bass clef. The tempo is marked as (125.59bpm). A box containing the number '1' is placed above the Violin staff. A bracket labeled '4:3' spans a group of notes in the Violin staff, with a note above it stating 'this 4:3 tuplet now becomes the new tempo'. Another bracket labeled '4:5' spans a group of notes in the Cello staff, with a note below it stating 'this 4:5 tuplet now becomes the new tempo'. The score includes repeat marks and dynamic markings.

Commissioned by Mira Benjamin and Gregor Riddell for nu:nord 2016. First performed on 5 August 2016 at University of Huddersfield and then on 7 August 2016 at Union Chapel, London.

Fig 2. Ratios between the frequencies of each note of the ten chords used in this work, based on Golumb rulers of order 4

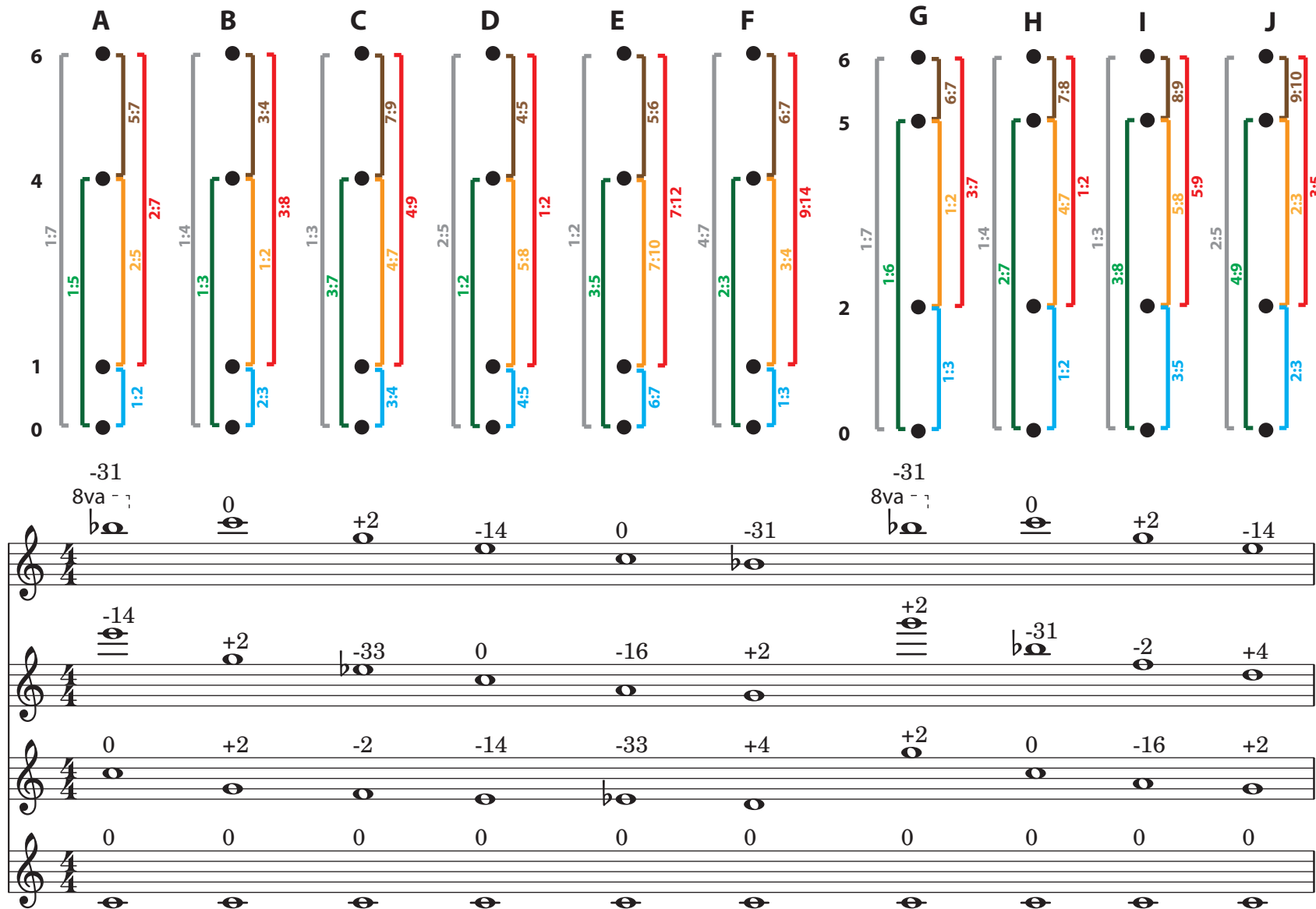


Fig 3. The 10 chords in their original inversions and transpositions.

Interval name	Ratio	Cents	Deviation
Perfect octave	2 / 1	1200	0
?	27 / 14	1137	+37
?	40 / 21	1116	+16
Maj 7th	15 / 8	1088	-12
Large min 7th	9 / 5	1018	+18
Small min 7th	16 / 9	996	-4
Aug 6th	7 / 4	969	-31
dim 7th	12 / 7	933	+33
Maj 6th	5 / 3	884	-16
Neutral 6th	80 / 49	849	+49
min 6th	8 / 5	814	+14
Aug 5th	14 / 9	765	-35
Perfect 5th	3 / 2	702	+2
dim 5th	10 / 7	617	+17
Tritone	7 / 5	583	-17
Perfect 4th	4 / 3	498	-2
dim 4th	9 / 7	435	+35
Maj 3rd	5 / 4	386	-14
Neutral 3rd	49 / 40	351	-49
min 3rd	6 / 5	316	+16
Aug 2nd	7 / 6	267	-33
dim 2nd	8 / 7	231	+31
Maj 2nd	9 / 8	204	+4
min 2nd	15 / 14	119	+19
?	21 / 20	84	-16
dim 2nd	50 / 49	35	+35
Unison	1 / 1	0	0

Fig 1. Reference chart of 7-limit tuning. Commonly used intervals in the piece are highlighted in light grey.

# We Doubled Down The Base Camps

for Mira and Gregor

David Pocknee

Violin  $\text{♩} = 75$

Violoncello

8  $2:1 (+0)$  *mf*

5:1 (-14) (A) 7:1 (-31)

7 Vln. 3:1

Vcl. 3:4 6:7

13 Vln. 5:3 (E) 2:3 (F) 3:1

Vcl. 1:2 7 3:8 5 3:4 5 5 5

21 Vln. 6:7 (G) 8:3

Vcl. 1:2 5 5 5 5

25 Vln. 5:3 (I) 3:4 (C)

Vcl. 7:9 *mp*

Detailed description: This musical score is for the piece 'We Doubled Down The Base Camps' by David Pocknee, composed for Mira and Gregor. It is written for Violin and Violoncello. The score is divided into five systems, each with a measure number at the beginning. The first system (measures 1-8) starts with a tempo of quarter note = 75. The Violoncello part begins with a *mf* dynamic. The second system (measures 7-12) features a 3:1 interval in the Violin and a 3:4 interval in the Violoncello. The third system (measures 13-20) includes intervals of 5:3 (E), 2:3, and 3:1, with a section marked (F). The fourth system (measures 21-24) includes intervals of 6:7 (G) and 8:3. The fifth system (measures 25-31) includes intervals of 5:3 (I) and 7:9, with a section marked (C). The score uses various musical notations including notes, rests, slurs, and dynamic markings. Interval ratios are indicated above notes, and some notes are color-coded in red and blue. The piece concludes with a *mp* dynamic.

29 7 3:2 (F) (G) 4:5

Vln.

Vcl.

37 (D) 3:2 6 3:4 (J) (C)

Vln. *mp*

Vcl. 1:2 2:3

42 (J) (F) 3:2 (J)

Vln.

Vcl. 3:4 3:8 1:2 6 3:10

50 7:12 (G) 3:2 (C) ♩=93.75 (♩ = ♩) 3:2

Vln.

Vcl. 1:2 3:4 5 5 5 5

58 (J) 2:1

Vln.

Vcl. 3:10 7:12

65  $\text{♩} = 62.5$  ( $\text{♩} = \text{♩}$ ) (F)  $\text{♩} = 50$  ( $\text{♩} = \text{♩}$ ) (J)

Vln.  $\text{♩} = 50$  ( $\text{♩} = \text{♩}$ )

Vcl. 5 12:7 5:12 1:3 4:5 *p*

70  $\text{♩} = 100$  ( $\text{♩} = \text{♩}$ ) 7:12 (J) 8:3 5:4 (I)

Vln.  $\text{♩} = 100$  ( $\text{♩} = \text{♩}$ )

Vcl. \*

81 3:2 (C)  $\text{♩} = 66.67$  ( $\text{♩} = \text{♩}$ ) (G)

Vln.  $\text{♩} = 66.67$  ( $\text{♩} = \text{♩}$ )

Vcl. 7:9 3:2 1:4 2:3

87  $\text{♩} = 111.11$  ( $\text{♩} = \text{♩}^3$ ) (C)  $\text{♩} = 74.07$  ( $\text{♩} = \text{♩}$ )

Vln.  $\text{♩} = 74.07$  ( $\text{♩} = \text{♩}$ )

Vcl. 7:9 3:2

97 (G) 3:2 (F)  $\text{♩} = 98.77$  ( $\text{♩}^3 = \text{♩}$ ) 3:4 3:2 (C) 3:2

Vln.  $\text{♩} = 98.77$  ( $\text{♩}^3 = \text{♩}$ )

Vcl. 4:5 3:2 *pp*

106  $\text{♩}=41.15$

Vln.  $\text{♩}=65.84$  (F)

Vcl. 4 1:3

109  $\text{♩}=98.77$  ( $\text{♩}^3 = \text{♩}$ )

Vln.  $\text{♩}=74.07$  ( $\text{♩}^3 = \text{♩}$ ) 4:3 (B) 12:7

Vcl. 3:4 5 5 5 5 5 5

113  $\text{♩}=92.59$  ( $\text{♩} = \text{♩}$ ) (B)

Vln.  $\text{♩}=41.15$  ( $\text{♩} = \text{♩}$ ) 1:2 (E)

Vcl. 5:8 7:12 *pp* 3:10 3 3:4

121 2:3 (E)

Vln.  $\text{♩}=49.38$

Vcl. 3:5 3:5 3:5 3:5 1:2

129  $\text{♩}=37.03$  ( $\text{♩}^3 = \text{♩}$ ) (l)  $\text{♩}=61.73$

Vln. 3 3

Vcl. 3:4 5 5 5 5 5 5 5:3 5:3

The following two pages are written in proportional notation and use a process of metric modulation whereby tuplets are nested within tuplets. Sections between repeat marks should be repeated as few times as possible to allow a successful modulation. Additionally each note changed from this point on should be in equal temperament. Tempi in brackets show the current speed of pulses and can be used for rehearsing this section.

3 (♩. = ♩)

Vln. Vcl.

(77.16bpm)

Vln. Vcl. *ppp*

2 (108.5bpm)

Vln. Vcl.

(120bpm)

Vln. Vcl. *ppp*

(85.73bpm)

Vln. Vcl.

(120.56bpm)

Vln.  $5:4$   $3:4$

Vcl.  $2:3$

This system shows the first two staves. The Violin staff (Vln.) has a  $5:4$  time signature bracket over the first five measures and a  $3:4$  time signature bracket over the last three measures. The Violoncello staff (Vcl.) has a  $2:3$  time signature bracket under the first three measures. Both staves feature complex rhythmic patterns with various dynamic markings such as  $\downarrow$ ,  $\uparrow$ , and repeat signs.

(90.42bpm)

Vln.  $5:4$   $2:3$

Vcl.  $3:2$   $4:3$

This system continues the musical score. The Violin staff (Vln.) has a  $5:4$  time signature bracket over the first five measures and a  $2:3$  time signature bracket over the last three measures. The Violoncello staff (Vcl.) has a  $3:2$  time signature bracket under the first three measures and a  $4:3$  time signature bracket under the last three measures. A first ending bracket labeled '1' is present at the beginning of the Vcl. staff.

(134bpm)

Vln.  $5:4$   $2:3$

Vcl.  $4:3$   $3:4$   $3:2$

This system features a tempo of 134bpm. The Violin staff (Vln.) has a  $5:4$  time signature bracket over the first five measures and a  $2:3$  time signature bracket over the last three measures. The Violoncello staff (Vcl.) has a  $4:3$  time signature bracket under the first three measures, a  $3:4$  time signature bracket under the last three measures, and a  $3:2$  time signature bracket under the final three measures.

(125.59bpm)

Vln.  $4:3$   $2:3$   $4:3$

Vcl.  $4:5$   $3:2$

This system has a tempo of 125.59bpm. The Violin staff (Vln.) has a first ending bracket labeled '1' at the beginning, followed by a  $4:3$  time signature bracket over the first five measures, a  $2:3$  time signature bracket over the last three measures, and another  $4:3$  time signature bracket over the final three measures. The Violoncello staff (Vcl.) has a  $4:5$  time signature bracket under the first three measures and a  $3:2$  time signature bracket under the last three measures.

Vln.  $3:2$

Vcl.  $5:4$

This system shows the final measures of the piece. The Violin staff (Vln.) has a  $3:2$  time signature bracket over the last three measures. The Violoncello staff (Vcl.) has a  $5:4$  time signature bracket under the first three measures. Both staves end with complex rhythmic patterns and dynamic markings.