

Andrew Nathaniel McIntosh

# Four Diffractions

*for two trombones with violin obligato*

*(2009)*

PLAINSOUND MUSIC EDITION

*for Douglas Wadle and Matt Barbier*

based on the *Tractus* from the *Missa pro defunctis* of Johannes Ockeghem  
composed c. 1480

cents values are given only for double microtonal accidentals and are shown as  
deviations from Pythagorean tuning (in fifths) rather than from equal temperment

duration around 7 minutes



↑  
♯

↓  
♯

notate an alteration of the 5-limit accidental by one 29-limit comma  
 $(29/16) \cdot (5/9) = (145/144) \approx \pm 12.0$  cents

-  
♯

+  
♯

notate an alteration of the 11-limit accidental by one 31-limit schisma  
 $(32/31) \cdot (32/33) = (1024/1023) \approx \pm 1.7$  cents

**PRIMES IN THE HARMONIC SERIES OCTAVE 32 - 64** (5-limit signs are given here relative to "A")

{  
} ↑  
♯

{  
} ↓  
♯

notate an alteration of the 11-limit accidental by one 37-limit schisma  
 $(36/37) \cdot (33/32) = (297/296) \approx \pm 5.8$  cents

{  
} ↑  
♯

{  
} ↓  
♯

notate an alteration of the 5-limit accidental by one 41-limit schisma  
 $(32/41) \cdot (81/64) \cdot (81/80) = (6561/6560) \approx \pm 0.3$  cents

{  
} ↑

{  
} ↓

notate an alteration by one 43-limit comma  
 $(43/32) \cdot (3/4) = (129/128) \approx \pm 13.5$  cents

{  
} ↑  
♯ or {  
} ↑  
♯

{  
} ↓  
♯ or {  
} ↓  
♯

notate an alteration of the 7-limit accidental by one 47-limit schisma  
 $(32/47) \cdot (48/49) \cdot (3/2) = (2304/2303) \approx \pm 0.8$  cents

{  
} ↑  
♯

{  
} ↓  
♯

notate an alteration of the 5-limit accidental by one 53-limit comma  
 $(32/53) \cdot (5/3) = (160/159) \approx \pm 10.9$  cents

{  
} ↑  
♯

{  
} ↓  
♯

notate an alteration of the 13-limit accidental by one 59-limit schisma  
 $(32/59) \cdot (24/13) = (768/767) \approx \pm 2.3$  cents

{  
} ↑  
♯

{  
} ↓  
♯

notate an alteration of the 7-limit accidental by one 61-limit schisma  
 $(61/32) \cdot (21/40) = (1281/1280) \approx \pm 1.4$  cents

**IRRATIONAL AND TEMPERED INTERVALS**

♭

♭

♯

♯

×

notate the respective Equal Tempered Semitone;  
may be combined with a cents indication to notate any pitch

**NOTE ABOUT CENTS INDICATIONS**

optional cents indications may be placed above or below the respective accidentals and are always understood in reference to Equal Tempered semitones, as implied by the Pythagorean accidentals

# Four Diffractions

## I.

Andrew Nathaniel McIntosh

$\text{♩} = 50$

Trombone

*f*

Trombone

*f*

5

-38 c

Tbn.

Tbn.

-38 c

9

-38 c

-38 c

Tbn.

Tbn.

-38 c

-38 c

13

Tbn.

Tbn.

17

Tbn.

Tbn.

21

-38 c

Tbn.

Tbn.

25

Tbn.

Tbn.

-38 c

29

Tbn.

Tbn.

-38 c

+81 c

32

Tbn.

Tbn.

-38 c

# II.

$\text{♩} = 75$

Trombone

*mp*

Trombone

*mp*

39

Tbn.

Tbn.

43

Tbn.

Tbn.

47

Tbn.

Tbn.

51

Tbn.

Tbn.

55

Tbn.

Tbn.

59

Tbn.

Tbn.

63

Tbn.

Tbn.

66

Tbn.

Tbn.



# III.

$\text{♩} = 65$

Violin *mf*

Trombone *mf*

Trombone *mf*

Vln. *mf*

Tbn. *mf*

Tbn. *mf*

73 +25 c +75 c +15 c

Vln. *mf*

Tbn. *mf*

Tbn. *mf*

77 +15 c -43 c

Vln. *mf*

Tbn. *mf*

Tbn. *mf*

81 +15 c -43 c +15 c

Vln. *mf*

Tbn. *mf*

Tbn. *mf*

85

89

Vln. *+75 c* *+15 c*

Tbn. *13*

Tbn. *13*

93

Vln. *+25 c* *+75 c* *-44 c* *6 c* *-43 c*

Tbn. *13*

Tbn. *13*

97

Vln. *-7 c* *-49 c*

Tbn. *13*

Tbn. *13*

100

Vln. *+75 c* *+75 c* *+75 c* *+15 c*

Tbn. *13*

Tbn. *13*

# IV.

♩ = 55

Violin *f* -38 c -31 c -38 c -55 c

Trombone *f*

Trombone *f*

107

Vln. +6 c +61 c -38 c

Tbn. -38 c

Tbn. -38 c

111

Vln. +6 c +31 c -38 c +6 c -60 c -38 c

Tbn. -38 c -38 c

Tbn. -38 c -38 c

114

Vln. -15 c +34 c

Tbn.

Tbn.

117

Vln. -38 c

Tbn.

Tbn.

121

Vln. *-38 c* *-38 c* *-38 c* *+3 c* *+6 c* *+61 c*

Tbn. *-38 c* *-38 c* *-38 c* *+3 c* *+6 c* *+61 c*

Tbn. *-38 c* *-38 c* *-38 c* *+3 c* *+6 c* *+61 c*

125

Vln. *-38 c* *+38 c* *-38 c* *-38 c*

Tbn. *-38 c* *+38 c* *-38 c* *-38 c*

Tbn. *-38 c* *+38 c* *-38 c* *-38 c*

129

Vln. *+34 c* *+31 c* *+44 c* *+81 c* *+6 c* *-38 c* *-16 c* *-38 c*

Tbn. *-38 c* *-38 c* *-38 c* *-38 c* *-38 c* *-38 c* *-38 c* *-38 c*

Tbn. *-38 c* *-38 c* *-38 c* *-38 c* *-38 c* *-38 c* *-38 c* *-38 c*

133

Vln. *+61 c* *-60 c* *-38 c* *-38 c*

Tbn. *-38 c* *-38 c* *-38 c* *-38 c*

Tbn. *-38 c* *-38 c* *-38 c* *-38 c*

135

Vln. *+6 c* *+61 c*

Tbn. *-38 c*

Tbn. *-38 c*