

# **An Infinite Circle is a Straight Line**

For solo piano

**Ian Percy**

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... a thousand sounds of Pi ...

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Duration ca. 12' 22"

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**Prelude:** When in doubt, just keep walking forwards ...

I. Cycle Four (a fourth of seven): Let's just go for it ...

II. Cycle Five (a fifth of seven): The hills are growing steeper ...

III. Cycle Six (a sixth of seven): Wake up, there are mountains to climb and things we can believe in ...

**Interlude:** There are, and will always be, just causes to fight ...

IV. Cycle Seven (the seventh of seven at eight forty-six): In leaps and bounds – a mission impossible ...

**Postlude:** There are, and will always be, vast oceans to explore ...

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## An Infinite Circle is a Straight Line

... a thousand sounds of pi ...

The majority of this multiple movement work for solo piano was composed systematically from the first 1,000 decimal digits of Pi during the summer of 2012. Using a combination of Arnold Schoenberg's dodecaphonic technique and Arvo Pärt's extended tone rows, the piece started life as an analytical exercise, a theoretical study into the musical possibilities of composing with the linear properties of eternal numbers. The Prelude and Postlude were composed in an instinctive manner during the summer of 2014 through a desire to bookend the systemised cycles with music formed from a more 'philosophical' approach to the use of Pi and musical 3s, 1s and 4s. The Interlude was added during final realisation of the performance score in late 2020, when three of the original cycles were removed and the phrases were articulated within the boundaries of the system to enhance the inherent musicality of the statements and subtly sculpt the textural contours that emerged.

Pi is an eternal number; it is infinite and linear but is part of the equation used to calculate the circumference of a circle; a cyclic and self-contained shape. The composer was attracted by this contradiction and was intrigued by the realisation that if Pi is an 'infinite decimal', it could also be argued that the precise circumference of a circle is an unobtainable pursuit (an infinite elusive). Whilst researching the fundamentals of Pi, one stumbled across an area of research (or mode of thinking) referred to as 'philosophical mathematics', which, until then, one would have considered to be an oxymoron. A quotation accredited (with some dispute) to Johannes Kepler (1571-1630) stating that 'an infinite circle is a straight line' offered just 'a splash' of external narrative (and a title for the piece). Others have mused how, therefore, the maximum triangle must also be a straight line ...

### **The Rules of the Game:**

1. The cycles are a systematic setting of the first one thousand decimal digits of Pi.
2. Numbers are translated to musical pitch via Schoenberg's 12-tone system. C was chosen as 0, but the system is transposable.
3. Whenever 1, 0 or 1, 1 appear in the sequence, they are treated as 10 and 11. Without this anomaly (referred to as the 10/11 anomaly), Cycle One would outline a decachord (10-tone language) instead of the total chromatic (12-tone language).
4. Instead of returning to 0 at the octave (as in Schoenberg's method), the system was extended at each cycle (e.g. 0 = C2, 12 = C3 and 24 = C4 etc.), which expanded the registral span at each iteration and introduced an architectural sense of textural and timbral development.
5. Cycle One uses 0 – 11 (one chromatic octave), Cycle Two uses 0 – 23 (two chromatic octaves) and Cycle Three uses 0 – 35 etc.
6. Every single digit (1 – 9) is equal to the duration of a semi-quaver.
7. Every double digit (10 – 83) is equal to a quaver (two semi-quavers).
8. There are many repeated digits in the infinite decimal of Pi, which led to a lot of semi-quaver reiterations, so repeated numbers are given the durational value of the combined digits: 8, 8, 8 equals a dotted-quaver (three semi-quavers) and 9, 9, 9, 9 equals a crotchet (4 semi-quavers)

### **Simply Systematic:**

One recalls exploring a variety of initial approaches whilst trying to uncover fragments of music within this linear eternal and the processes were excessively time consuming to document in score form, but once the 'rules of the game' were established, it was literally a case of 'inputting the data' and sitting back to let the systems and cycles unfold, entertained by the musicality one had discovered. The articulation and dynamics added during final realisation of the performance score simply enhanced the phrases that were already present; like applying oil to wood to emphasise the grain and preserve its natural beauty. One could pose the question: Whose music is this? Perhaps it belongs to the Akashic Record? Perhaps it is mine?

### **Variable Form:**

This is a virtuosic piece. Cycle Seven borders on a 'mission impossible' and is perhaps more practical for performance as a duo for two players at one piano. Cycle Six demands elite acrobatics from the pianist and Cycle Five requires a high level of stamina, technique and agility. The music clearly belongs to the same evolutionary strand as George Antheil's *Ballet Mécanique* (1924) and Conlon Nancarrow's mid-twentieth-century studies for automated player pianos, and this collection was initially conceived as a theoretical exercise (not for the concert hall), but it is difficult to deny the inherent musicality in these cycles (and the capabilities of the modern pianist), so, for this reason, the piece can be performed in variable forms with as little as three movements: Prelude – Cycle Four – Postlude. Simply keep adding cycles to taste (or technique). The Interlude should only ever be observed if one is attempting a performance of the whole piece.

**Notation:** This is an extremely chromatic score, so in order to dilute the number of accidentals, the following rules were strictly observed:

- a. The barline cancels all accidentals.
- b. Both staves are considered separate, so no cautionary naturals are offered.
- c. Accidentals (and their cautionaries) only apply to notes in that specific register.
- d. Whenever there are cross-staff beamed notes, no rests are given in either stave.

### **In Conclusion:**

The emotive and flamboyant Prelude was composed through inverted mirror symmetry and transposed palindromic retrogrades of musical 3s, 1s and 4s (intervals and interval-classes). The introverted and reflective Postlude was composed from a reductive linear sequence of dyads (3s, 1s and 4s). The Interlude is composed from silence. The Cycles were composed through systematic translation of the first one thousand decimal digits of Pi into musical pitch, and, when using these rules, sounds like a form of contemporary chromatic Jazz. One is left wondering how the next 1,000 digits would sound if new rules were conceived in the context of a plainchant setting for SATB, or perhaps a modernist work for pitched percussion ...

# An Infinite Circle is a Straight Line

... a thousand sounds of pi ...

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## Prelude: When in doubt, just keep walking forwards ...

$\text{♩} = 76$  ... watching the curved horizon as the sun sets on another summer ...

*molto rubato, molto espress.*

Musical score for piano, page 1, measures 1-10. The score consists of two staves. The top staff is in treble clef and the bottom staff is in bass clef. The key signature changes from G major (no sharps or flats) to A major (one sharp) at measure 10. Measure 1 starts with a dynamic of *pp*. Measures 2-3 show eighth-note patterns with grace notes. Measure 4 begins with *mf*. Measures 5-6 continue the eighth-note patterns. Measure 7 starts with *f*, followed by *ppp*. Measures 8-9 start with *pp*, followed by *ppp*. Measure 10 starts with *mf*. Measure numbers 1-10 are indicated below the staves. Measure 10 also includes a tempo change to  $\text{♩} = 66$ .

... watching the sun melt into a million brilliant colours ...

poco rit.

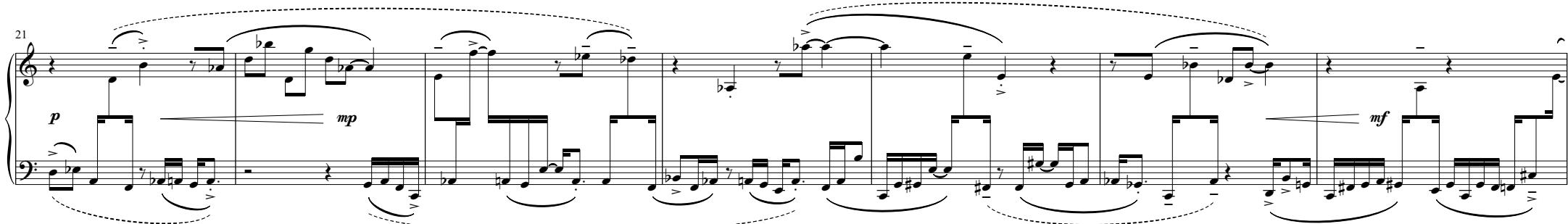
**B**  $\text{♩} = 60$

poco rit.

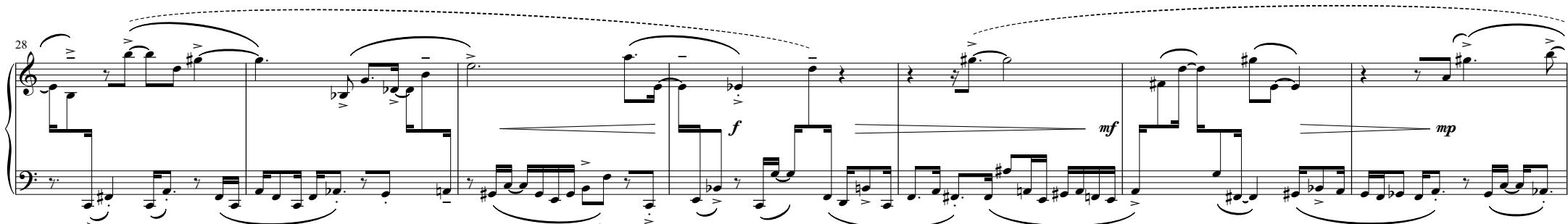
$\text{♩} = 40$

*cresc.*

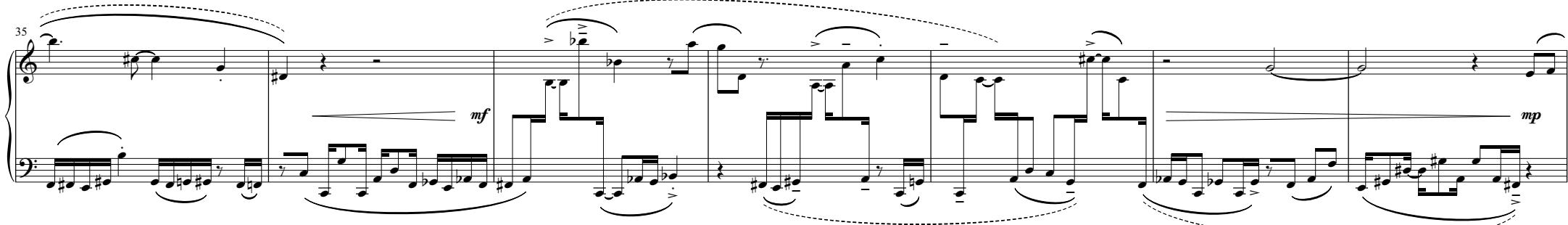
Musical score for piano, page 2, measures 11-20. The score continues on two staves. Measure 11 starts with *ppp*. Measures 12-13 show eighth-note patterns with grace notes. Measure 14 starts with *mf*, followed by *ppp*. Measures 15-16 continue the eighth-note patterns. Measure 17 starts with *pp*. Measures 18-19 show eighth-note patterns with grace notes. Measure 20 starts with *f*, followed by *ppp*. Measure numbers 11-20 are indicated below the staves. Measure 20 includes a tempo change to  $\text{♩} = 40$  and a dynamic instruction of *cresc.*

**Cycle Four (a fourth of seven): Let's just 'go for it' ...****1** ♩ = 120 ... relentless (but rewarding) ...*senza rubato, molto espress.*

Musical score for piano, page 21. The score consists of two staves: treble and bass. The key signature is one flat. Measure 21 starts with a dynamic *p*. The melody is primarily in the treble staff, with eighth-note patterns and grace notes. The bass staff provides harmonic support with sustained notes and eighth-note chords. The dynamic changes to *mp* at the end of the measure. The score features a continuous line of eighth-note patterns with grace notes, separated by measure lines.



Musical score for piano, page 28. The score consists of two staves: treble and bass. The key signature changes to one sharp. Measure 28 begins with a dynamic *f*. The melody continues with eighth-note patterns and grace notes. The bass staff provides harmonic support. The dynamics change to *mf*, *mf*, and *mp* in sequence. The score maintains its characteristic eighth-note pattern with grace notes throughout the measure.



Musical score for piano, page 35. The score consists of two staves: treble and bass. The key signature changes to one sharp. Measure 35 begins with a dynamic *mf*. The melody continues with eighth-note patterns and grace notes. The bass staff provides harmonic support. The dynamic ends with *mp*. The score concludes with a final eighth-note pattern and a fermata over the bass staff.

Musical score page 1, measures 42-48. The score consists of two staves: treble and bass. Measure 42 starts with a dynamic *mf*. Measures 43-48 show a continuous pattern of eighth-note pairs and sixteenth-note chords, primarily in the treble staff, with dynamics *mf*, *mp*, and *mf*. The bass staff provides harmonic support with sustained notes and eighth-note patterns.

Musical score page 1, measures 49-55. The pattern continues with eighth-note pairs and sixteenth-note chords in the treble staff, with dynamics *mf*, *mp*, *mf*, and *mp*. The bass staff maintains its harmonic function with sustained notes and eighth-note patterns.

poco rit..

[♩ = 116]

poco accel..

♩ = 120

poco rit..

Musical score page 1, measures 56-62. The pattern changes to a more rhythmic and dynamic section. Measure 56 starts with a dynamic *p*. Measures 57-62 feature eighth-note pairs and sixteenth-note chords in the treble staff, with dynamics *p*, *mf*, and *mf*. The bass staff provides harmonic support with sustained notes and eighth-note patterns.

[♩ = 116]

poco accel.

C [♩ = 120 ... beginning of an end ...]

63

poco rit.

[♩ = 116]

70

poco rit.

[♩ = 112]

poco rit.

[♩ = 60]

77

Cycle Five (a fifth of seven): The hills are growing steeper ...

5

[2] ♩ = 120 ... in perpetuam ad infinitum (and beyond) ...

poco rubato, molto espress.

poco rit.

Musical score for piano, page 84, measures 84-88. The score consists of two staves. The top staff uses a treble clef and the bottom staff uses a bass clef. Measure 84 starts with a dynamic *mf*. Measures 85-88 show a continuous pattern of eighth-note chords and sixteenth-note figures, primarily in the right hand, with some bass support from the left hand. The dynamics change to *mp* in measure 88.

[♩ = 116]

poco rit.

[♩ = 112]

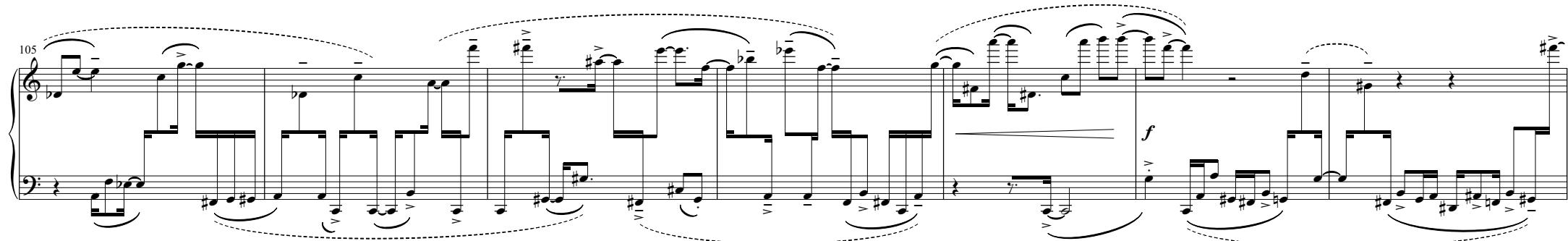
Musical score for piano, page 91, measures 91-95. The dynamics are *p*, *pp*, and *ppp*. The score features eighth-note chords and sixteenth-note patterns, with the bass line becoming more prominent in measure 95.

poco accel.

[♩ = 116]

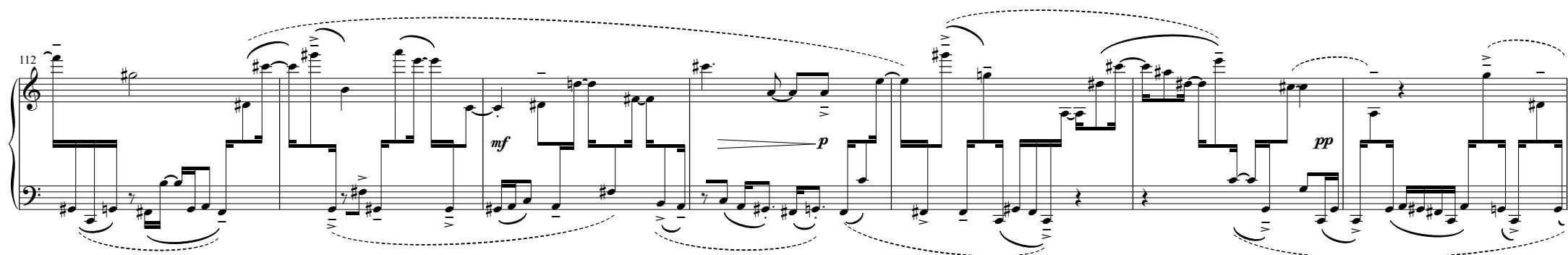
poco accel.

Musical score for piano, page 98, measures 98-102. The dynamics are *p*, *mp*, and *mf*. The score continues the pattern of eighth-note chords and sixteenth-note figures, with the bass line providing harmonic support.

$\text{♩} = 120$ 

Musical score page 1. The score consists of two staves: treble and bass. The key signature is one sharp. Measure 105 starts with a dynamic of  $\text{♩} = 120$ . The music features eighth-note patterns with grace notes and slurs. Measures 106-107 continue this pattern. Measure 108 begins with a dynamic of  $f$ , followed by measures 109-110. Measure 111 concludes the section.

poco rit.

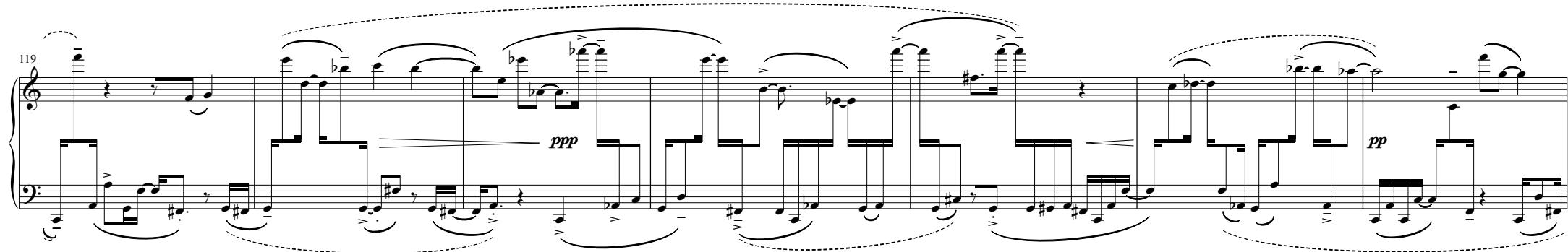
 $\text{♩} = 116$ 

Musical score page 2. The score continues with two staves. Measure 112 starts with a dynamic of  $\text{♩} = 116$ . The music includes eighth-note patterns with grace notes and slurs. Measures 113-114 follow. Measure 115 begins with a dynamic of  $p$ , followed by measures 116-117. Measure 118 concludes the section.

poco rit.

 $\text{♩} = 112$ 

poco accel.

 $\text{♩} = 116$ 

Musical score page 3. The score continues with two staves. Measure 119 starts with a dynamic of  $\text{♩} = 112$ . The music includes eighth-note patterns with grace notes and slurs. Measures 120-121 follow. Measure 122 begins with a dynamic of  $pp$ , followed by measures 123-124. Measure 125 concludes the section.

D  $\text{♩} = 120 \dots \text{a beginning of an end} \dots$

poco accel.

126

$\text{♩} = 116$

poco rit.

133

$\text{♩} = 69$

poco rit.

140

$\text{♩} = 69$

pp ppp

## Cycle Six (a sixth of seven): Wake up, there are mountains to climb and things we can believe in ...

3] ♩ = 126 ... in energetic continuum (a marathon not a sprint) ...

*più rubato, molto espress.*

147

154

poco rit.

♩ = 120

161

poco accel.

$\text{♩} = 126$

Musical score for piano, page 9, measures 168-174. The score consists of two staves: treble and bass. The treble staff has a key signature of one sharp (F#). Measure 168 starts with a dynamic *p*. Measures 169-174 show a continuous pattern of eighth-note pairs and sixteenth-note chords, primarily in the right hand, with some bass support. Measure 174 ends with a dynamic *mf*.

poco rit.

$\text{♩} = 120$

poco accel.

$\text{♩} = 126$

Musical score for piano, page 9, measures 175-181. The score continues with two staves. The treble staff now has a key signature of three sharps (C major). Measure 175 begins with a dynamic *mp*. Measures 176-181 show a continuation of the eighth-note and sixteenth-note patterns, with measure 181 concluding with a dynamic *f*.

poco rit.

$\text{♩} = 120$

poco accel.

$\text{♩} = 126$

Musical score for piano, page 9, measures 182-188. The score continues with two staves. The treble staff has a key signature of one sharp (F#). Measure 182 begins with a dynamic *p*. Measures 183-188 show a continuation of the eighth-note and sixteenth-note patterns, with measure 188 concluding with a dynamic *mf*.

poco rit.

 $\text{♩} = 120$ 

189

poco rit.

$\text{♩} = 120$

$\text{mp}$

$\text{p}$

$f \text{ } mf$

$ff \text{ } mf$

$ff \text{ } mf$

poco accel.

**E**  $\text{♩} = 126$  ... beginning of an end ...

196

$f$

$ff \text{ } mf$

$ff \text{ } mf$

$ff \text{ } mf$

$ff \text{ } mf$

poco rit.

 $\text{♩} = 72$ 

203

$mp$

$p$

$pp$

$ppp$

**E**

*Rit.*

**Interlude: There are, and will always be, just causes to fight ...**

$\text{♩} = 120$  ... with reverence (and in silence) ...

attacca

210

8' 46"

**Cycle Seven (the seventh of seven at eight forty-six): In leaps and bounds - a mission impossible ...**

**4** ♩ = 126 ... a mission impossible, but who dares wins (some would say) ...

*molto rubato, molto espress.*

215

*mp*

*f*

*mf*

222

*mp*

*mf*

*f*

*mf*

*f*

*mf*

Musical score for piano, featuring three staves of notation:

- Staff 1 (Top):** Treble clef, key signature of one sharp (F#). Measure 236 starts with a dynamic *mf*. Measures 237-240 show eighth-note patterns with various dynamics (*mf*, *mp*). Measures 241-244 continue the eighth-note patterns. Measures 245-248 show eighth-note patterns with dynamics (*mf*, *mp*, *f*). Measures 249-252 show eighth-note patterns with dynamics (*mf*, *f*).
- Staff 2 (Middle):** Bass clef, key signature of one sharp (F#). Measures 236-252 provide harmonic support with sustained notes and bass lines.
- Staff 3 (Bottom):** Bass clef, key signature of one sharp (F#). Measures 236-252 provide harmonic support with sustained notes and bass lines.

Measure numbers 236, 243, and 250 are indicated above their respective staves. Measure 243 includes measure number 242 above the first measure. Measure 250 includes measure number 249 above the first measure. Measure 236 includes measure number 235 above the first measure. Measure 243 includes measure number 242 above the first measure. Measure 250 includes measure number 249 above the first measure.

**F** ... a beginning of the end ...

257

8va

8va

ff

mf

261

8va

8va

f

mf

8va

8va

8va

8va

poco rit.

[♩ = 72]

271

8va

mp

p

pp

ppp

Led.

**Postlude: ... there are, and will always be, vast oceans to explore ...**

$\downarrow = 40$  ... watching the sun set on the final summer (nothing lasts forever) ...

poco rit.

molto rubato, molto espress.

8<sup>va</sup>

8<sup>vb</sup>

Ped.

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