

Symphony No. 9

The Virahāṅka-Fibonacci Numbers

Mvt. 4 (Finale)

14 Whole-tone Intervals

Scored for;
Picc., Fl., Ob., E. Hn., B♭ Cl., Bsn.,
F Hn., B♭ Tpt., Tbn., Tba.,
Timp., Cym., Vib., Pno., Hrp.,
Vlms. 1, Vlms. 2, Vlas., Vcs., Cbs.

Total Duration 21' 40"
Mvt. Duration 2' 20"
(00:02:20)

Nik Bizzell-Browning (2024)

Structure and Scales

Symphony No. 9 is comprised of four movements with an 'ABAB' structure. All movements are derived from various integer/interval (semitonal) configurations of the dodecapronic (mod 12, where $12 = 0$) Virahāṅka-Fibonacci* sequence (see; <https://oeis.org/A089911>). Combining the first 18 integers of this sequence (not including zero) in both ascending (prime) and descending (inverse) order produces an 85-STET (semitones of equal temperament) scale from (e.g.) A0 - B♭7; as follows.

$P\uparrow = [1, 1, 2, 3, 5, 8, 1, 9, 10, 7, 5, 5, 5, 10, 3, 1, 4, 5]$ - $I\downarrow = [1, 1, 2, 3, 5, 8, 1, 9, 10, 7, 5, 5, 5, 10, 3, 1, 4, 5]$

$\uparrow$ from A0 = {A0, B♭0, B0, C♯1, E1, A1, F2, F♯2, E♭3, C♯4, G♯4, C♯5, F♯5, B5, A6, C7, C♯7, F7, B♭7}

$\downarrow$ from B♭7 = {A0, D1, F♯1, G1, B♭1, G♯2, C♯3, F♯3, B3, F♯4, E5, C♯6, D6, B♭6, E♭7, F♯7, G♯7, A7, B♭7}

The complete centrosymmetric 85-STET P+I LIE scale (A0 - B♭7) is comprised of 36 “fixed” pitches:**

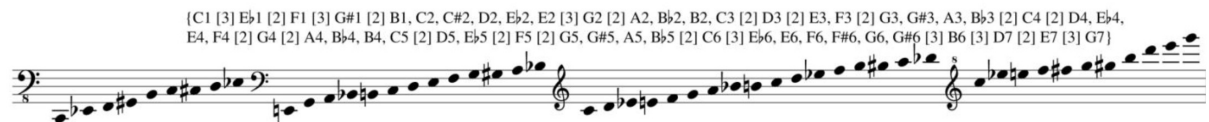
{A0, B♭0, B0, C♯1, D1, E1, F♯1, G1, A1, B♭1, F2, F♯2, G♯2, C♯3, E♭3, F♯3, B3, C♯4, F♯4, G♯4, C♯5, E5, F♯5, B5, C♯6, D6, A6, B♭6, C7, C♯7, E♭7, F7, F♯7, G♯7, A7, B♭7}

Intervals = [1, 1, 2, 1, 2, 2, 1, 2, 1, 7, 1, 2, 5, 2, 3, 5, 2, 5, 2, 5, 3, 2, 5, 2, 1, 7, 1, 2, 1, 2, 1, 2, 1, 1]



The first 5 integers of the mod 12 sequence (1, 1, 2, 3, 5) define the rhythmic pattern that underpins Movement No. 2, where the scalic harmony is introduced from the central tetrachord {B3, C♯4, F♯4, G♯4} [2, 5, 2] outwards. In Movements 3 and 4 the *Outographic* (OG; *anti* or *complimentary*) scale is employed. This scale contains a unique IC (Interval Class) doubling pattern within its 49 intervals; 7 x minor thirds, 14 whole tones, and 28 semitones.

79-STET (50-pitch) OG SCALE (C1 - G7):



IC Cardinality (1 = semitone, 2 = whole tone, 3 = minor third):

28 14 7

1 2 3

* See - Singh, P. (1985) 'The so-called fibonacci numbers in ancient and medieval India', *Historia mathematica*, 12(3), pp. 229-244. doi: 10.1016/0315-0860(85)90021-7.

**Nik's thesis title; LIE Scales (Scales of Linear Intervallic Expansion)

Movements (x4)

Mvt. 1 – (5' 40") Star Music

Mvt. 2 – (7' 40") From the Centre Outwards

Mvt. 3 – (6' 00") Golden Section

Mvt. 4 – (2' 20") 14 Whole-tone Intervals

Duration: (21' 40") approx.

Instrumentation

The following instrumentation is called for in all four movements; Picc., Fl., Ob., E. Hn., B♭ Cl., Bsn., F Hn., B♭ Tpt., Tbn., Tba., Pno., Hrp., Vlins. 1, Vlins. 2, Vlas., Vcs., Cbs.

The Timpani, Percussion and Harp requirements are as follows;

	Timpani (x4)	Percussion	Tuned Percussion	Harp
Mvt. 1	C#3, F#3		Glock.	
Mvt. 2	E♭3, B3	Cymbals	Marimba	Tuned to F# Major
Mvt. 3			Glock.	
Mvt. 4	C#3, E♭3, B3	Cymbals	Vibraphone	Tuned to F Major*

* brief entry at bar 5.

About the Composer

Nik was a *punk* singer/drummer in the 1970s, and made a living as an itinerant busker throughout the 1980s. As a session drummer (notably with *The Men They Couldn't Hang* 2011-2015) Nik has performed extensively throughout Europe; and continues to regularly perform at pubs and clubs across Wales. Under the pseudonym *Sputnik Weazel* Nik has also written and released over 200 songs to date. In the 1990s he studied composition with Jonathan Harvey and Martin Butler at Sussex University, and in 2017 he began a PhD in composition at Brunel University with a focus on composing with compound LIE Scales (Scales of Linear Intervallic Expansion) for acoustic instruments.

Mvt. 4 (14 Whole-tone Intervals) Performance Notes

This *finale* movement is scored at 80 BPM throughout, using a variety of 7/8 and 6/8 time signatures with one incidence of 7/16 at bar 33.

$\text{♩} = 80$

Piccolo

Flute

Oboe

English Horn

B♭ Clarinet

Bassoon

F Horn

B♭ Trumpet

Trombone

Tuba

Timpani

Vibraphone

Cymbals

Piano

Harp

Violins 1

Violins 2

Violas

Violoncellos

Contrabasses

1.

mf *f*

mf *mp*

arco

mf arco

mf arco

mf arco

mf

[illegible]

13 **A**

Picc. Fl. Ob. E. Hn. Bb Cl. Bsn. F Hn. Bb Tpt. Tbn. Tba. Timp. Vib. Cym. Pno. Hrp. Vlns. 1 Vlns. 2 Vlas. Vcs. Cbs.

mp *mf* *ff*

16

Picc. Fl. Ob. E. Hn. B♭ Cl. Bsn. F Hn. B♭ Tpt. Tbn. Tba. Timp. Vib. Cym. Pno. Hrp. Vlns. 1 Vlns. 2 Vla. Vcl. Cbs.

mf *mf* *mp* *f* *mf* *f* *f* *ff* *mf* *ff* *mf* *ff*

gliss. *gliss.* *gliss.* *gliss.*

19

Picc. Fl. Ob. E. Hn. B♭ Cl. Bsn. F Hn. B♭ Tpt. Tbn. Tba. Timp. Vib. Cym. Pno. Hrp. Vlins. 1 Vlins. 2 Vlas. Vcs. Cbs.

mf f mf f mf mp f mf f mf mf mf

22

B

Picc.

Fl.

Ob.

E. Hn.

B♭ Cl.

Bsn.

F Hn.

B♭ Tpt.

Tbn.

Tba.

Timp.

Vib.

Cym.

Pno.

Hrp.

Vlins. 1

Vlins. 2

Vlas.

Vcs.

Cbs.

[illegible]

29

Picc. *mf*

Fl. *mf*

Ob. *f*

E. Hn. *f*

B♭ Cl. *ff* 3 3 3 3 3 3 3 3

Bsn. *ff* 3 3 3 3 3 3 3 3

F Hn. *f*

B♭ Tpt. *f*

Tbn. *f*

Tba. *mp*

Timp. *f* *ff*

Vib.

Cym. *ff*

Pno. *f* *mf*

Hrp.

Vlns. 1 *ff* *f*

Vlns. 2 *ff* *f*

Vlas. *ff* *f*

Vcs. *ff* *f*

Cbs. *ff* *f*

(Rea.)

32 **D**

1. 2.

Picc. *ff* *f*

Fl. *ff* *f*

Ob. *ff* *f*

E. Hn. *ff* *f*

B♭ Cl. *ff* *f* (solo) *mf*

Bsn. *ff* *f*

F Hn. *ff* *f*

B♭ Tpt. *ff* *f*

Tbn. *mf* *f*

Tba. *f* *mp*

Timp. *f*

Vib. *f*

Cym. *ff*

Pno. *f* *mf*

Hrp. *f*

Vlins. 1 *ff* *f* *mf* *mp* *f*

Vlins. 2 *ff* *f* *mf* *mp* *f*

Vlas. *ff* *f* *mf* *mp* *f*

Vcs. *ff* *f* *mf* *mp* *f*

Cbs. *ff* *f* *mf* *mp* *pizz.*

36

Picc.

Fl.

Ob.

E. Hn.

B♭ Cl.

Bsn.

F Hn.

B♭ Tpt.

Tbn.

Tba.

Timp.

Vib.

Cym.

Pno.

Hrp.

Vlns. 1

Vlns. 2

Vlas.

Vcs.

Cbs.

mp