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Acoustic Composition 4

Natural Causality (2006/09)
[Phenomenon Explored]
Two Movements for Ensemble and Percussion (15 musicians)

This is a two-movement work for ensemble and five-piece percussion (15 musicians), originally completed in September 2006, but extensively revised during 2008/09. It continues the study of preconceived methodology to control elements of pitch structure, but this time these principles also apply to form, proportion and rhythm.

The evolution of composition began within extra-musical inspiration based upon naturally occurring causalities: phenomenon generated by and relationships between a cause and its effect.

Cause:

One mused as to what would happen if one could take middle C (weight and mass suggested by pitch register) and drop it into a 'musical pond'? The height of the fall and velocity of impact could be related to dynamics and the effect should produce ripples through the ensemble. Some ripples would be individual to a specific event as a branch finally breaks from a tree and lands in the water, but others could be repeated, e.g. the consistent motion of waves.

Effect:

Having established a cause, one required a way to generate and control the effect. After some deliberation, the Fibonacci sequence was utilised:

0 – 1 – 1 – 2 – 3 – 5 – 8 – 13 – 21 – 34

This infinite pattern of integers, which literally reads like an expanding ripple and can be used to describe many proportional elements of natural growth and evolution, provides a basis for pitch development, a way to determine the length of compositional units and the number of repetitions (events) in each section.

Middle C is the cause: Fibonacci sequence is the effect

Method and Form

The following Method Table shows how the Fibonacci sequence was translated into musical components. It is labelled by factors because this is a measurement used within the study of probabilities (original working title).

Middle C	**Relative Pitch and Interval**	**Character and Transposition**	**Length and Rhythm Value**	**Dynamic**
Factor 1: [1 event]	Semi-tone [C♯]	Chromatic [Dissonance]	Semi-quaver	**PPP**
Factor 2: [2 events]	Tone [D]	Whole-tone [Limited x2]	Quaver	**PP**
Factor 3: [3 events]	Minor third [E♭]	Diminished [Limited x3]	Dotted quaver	**P**
Factor 5: [5 events]	Perfect fourth [F]	Floating chromatic	Crotchet plus semi-quaver	**mp**
Factor 8: [8 events]	Augmented fifth Minor sixth [G♯]	Augmented [Limited x4]	Minim	**mf**
Factor 13: [13 events]	Minor ninth Semi-tone [C♯]	Leap chromatic [repetition]	Dotted minim plus semi-quaver	**f**
Factor 21: [21 events]	Major thirteen Major sixth [A]	Inversion Minor third	Semibreve crotchet & semi-quaver	**ff**
Factor 34: [34 events]	2 x Octave plus minor seventh [B♭]	Inversion Whole-tone	Breve plus quaver	**fff**

i. Using 0 as a reference for middle C, the sequence was converted into semi-tones to calculate a relative pitch and interval.

ii. The central column lists a basic character for the materials and observations on transposition.

iii. The penultimate column lists rhythmic value, where the sequence was converted into semi-quavers.

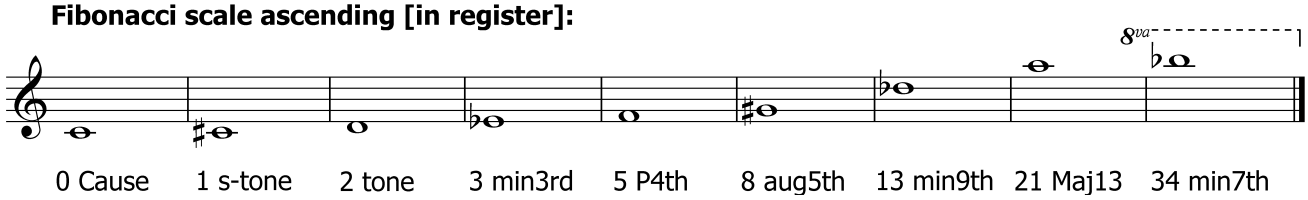
iv. Unfortunately, systemising dynamics proved unsuccessful, and so the score dynamics were edited instinctively and extensively for a more sympathetic pacing and shaping of the music during 2008/09 revisions.

v. As listed in the first column, the sequence also applied to the number of events in each Factor (section). This suggested that their approximate lengths should be consequential: Factor 1 contains one event and repeats in variation, Factor 2 holds two events and is twice as long and so on (see Form Chart PDF).

Compositional Material

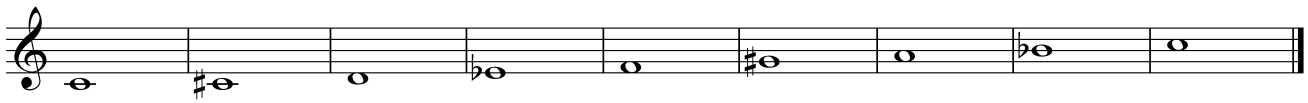
When applied to pitches above middle C, the method translates into the following sequence:

Fibonacci scale ascending [in register]:



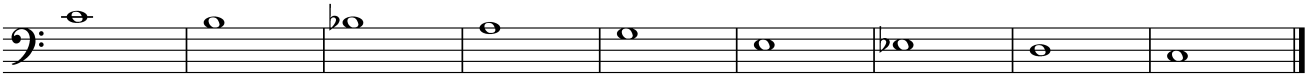
The sequence was then re-notated to span within an octave, resulting in the following Fibonacci Ascending Scale:

Fibonacci scale ascending [reduced within an octave]:



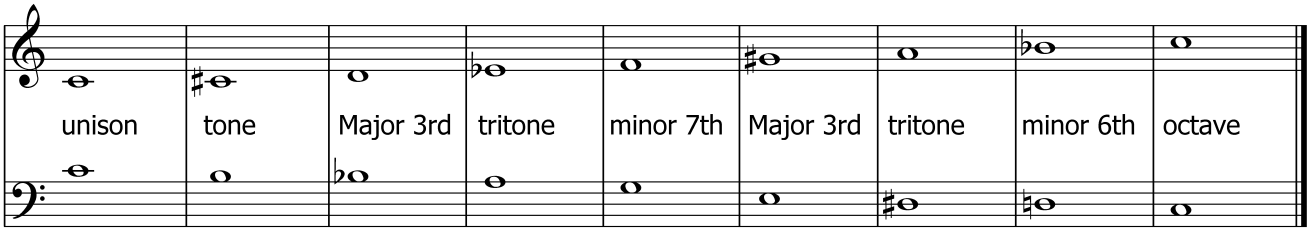
With reference to the extra-musical concept, the composer wanted to emulate symmetrical ripple effects within the ensemble and so inverted the process to produce a Fibonacci Descending Scale (below middle C):

Fibonacci scale descending [reduced within an octave]:



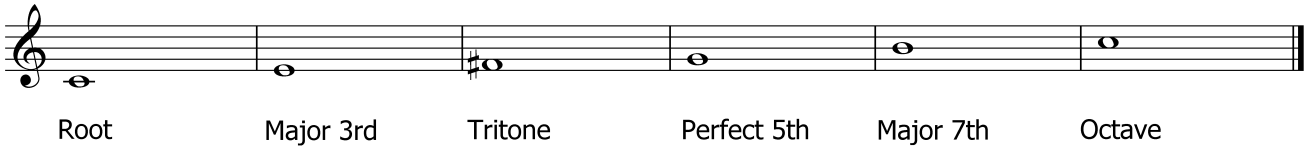
These scales can interact or be treated as Paired Intervals for generating further material:

Paired Fibonacci scales:

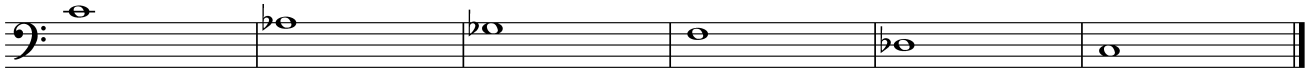


Applying similar principles to the intervals not listed in the Method Table, and for contrasting pitch materials, one conceived a pair of 'alternate' Excluded modes:

Excluded mode ascending:



Excluded mode descending:



The Ascending Excluded mode suggests E minor (C Lydian) and the Descending Excluded mode suggests C♯/D♭ Major (C Locrian), in a reversal of the relative major/minor key relationship. Transposition and inversion of these modes offered access to fragments of tonality. The Fibonacci scales would eventually be used primarily for melodic and thematic material, whilst the Excluded modes were more often used for motivic statement.

Interval Types: Flexible Routes

Although the planning generates modes and scales, it is important to emphasise that the individual interval-types were still the primary source. The composer wanted to represent their specific qualities quite literally within the relative factors (sections) and events, but allowed for three flexible parameters:

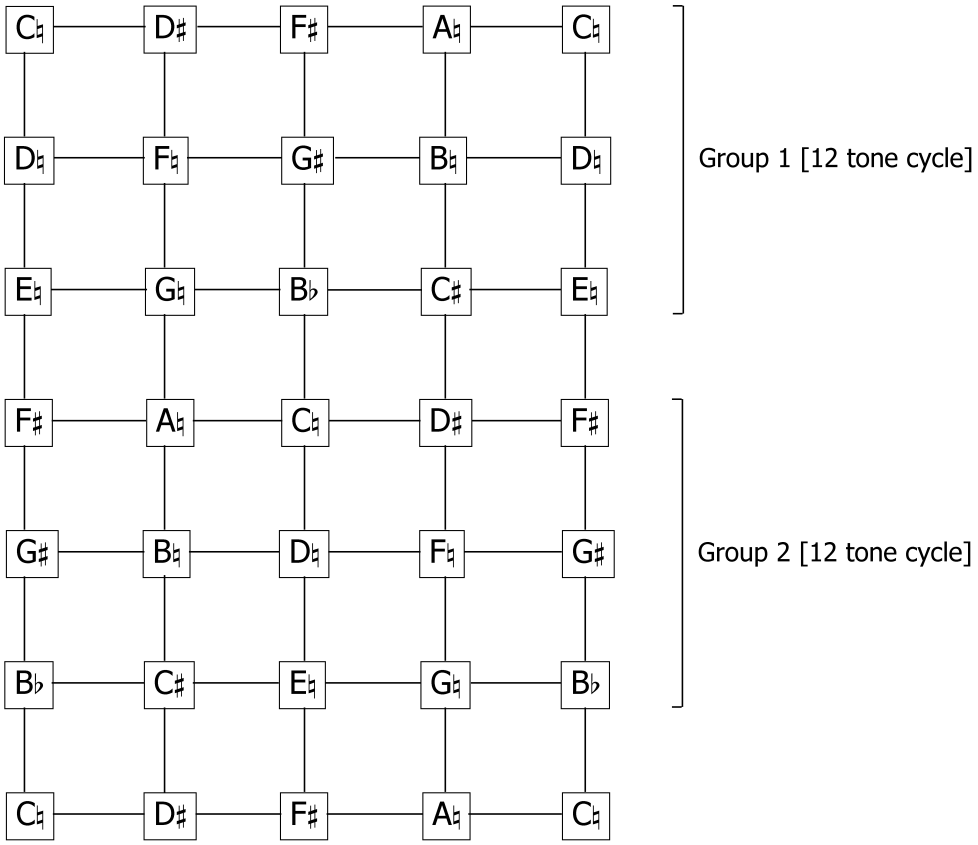
1. Consecutive pitches could be any multiplication of the primary interval:
   Tone intervals: x2 = Major 3rd, x3 = tritone, x4 = minor 6th, x5 = minor 7th
   Minor third intervals: x2 = tritone, x3 = Major 6th

2. Groups (or pairs) of adjacent pitches could be equal to the primary interval:
   2 semi-tones = tone
   3 semi-tones = minor 3rd
   Tone + semi-tone = minor 3rd

3. Elements of the method produced intervallic scales of limited transposition, which could render the material repetitive, so a set of flowcharts were compiled in order to reduce the probability of direct replication. These flowcharts dilute the blatant presence of the primary interval and provide a way to navigate through chromatic inflections. The pitch direction in the following examples must travel in stepwise motion, but can move left or right, up or down at any time.

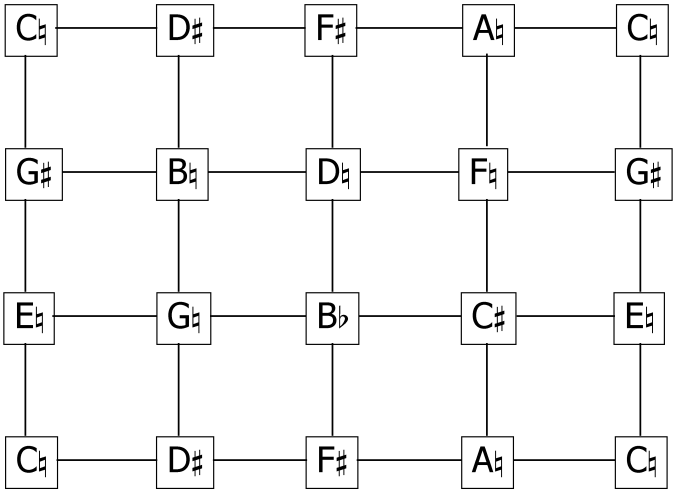
Causality Factor 3 - minor third flow-charts

Diluting the minor 3rd interval via whole-tone steps provides a connection with previous material:



These flowcharts helped to maintain a flexible consistency to the pitch-motion within the micro materials of the score and, when combined with the other two flexible parameters, provided a plethora of potential pitch-paths for the emerging material.

Diluting the minor 3rd interval through leaps of a minor 6th/augmented 5th:



Brief Reflection on Preconceived Form and Proportion:

By the time the end of the first movement had been sketched, the composer had recognised that the formal parameters of the planning for this research could not possibly be fully realised within one piece, as the resulting length would be of epic proportion. Therefore, the second movement was composed with the intention of balancing and completing this score (from a musical perspective) within two movements: This resource could be used again (Factors 5, 8, 13, 21 and 34).

Realisation of this piece had informed the composer that when mapping formal proportion in advance, it should ALWAYS be considered in relation to real-time temporal schemes: Preconceived proportion and form therefore MUST always be conceived relative to the intended length of the piece. Adjusting tempi can essentially alter the perception of 'musical time', so the rate of distribution of materials could and perhaps should be considered when preconceiving temporal and formal proportional schemes in future practical research (See *Natural Causality Brief Synopsis and Analysis* PDF).

During composition, the cohesion of the initial compositional planning, pre-conceived structure, process and pitch organisation actually allowed the liberating freedom to be able to work within the various sections of the score in relative isolation. Factor five (perfect fourth interval) developed quickly and became a piece in its own right as the composer instinctively seemed to know exactly what to do with the evolving material. One had experienced the *Instant Conception* that would lead to the next score in the portfolio, an immediate effect from this *Natural Causality*.

Causalities:

Manufactured Idols (2021)
[and boxes full of secrets]
Two Movements for string quintet

Manufactured Idols (and boxes full of secrets) is a string quintet arrangement of *Natural Causality* (2006/09) realised during 2021. This very enjoyable exercise in transcription and instrumentation has produced an exciting work for an unusual ensemble and provided the catalyst for a series of solo pieces composed from micro-elements of *Natural Causality* material. The collection of works (which are all individually titled) fall under the collective banner of *Causalities*.

Every Negative Has a Positive (2021)
[no good deed goes unpunished]
Single movement for solo violoncello

Every Negative Has a Positive (no good deed goes unpunished) is a single-movement work for solo violoncello composed from a handful of gestures, motives and phrases taken from preexisting materials in *Natural Causality* (2006/09). This material was then arranged into formal units and used as the basis for elongation and development. The single movement retains a coherent consistency whilst offering the soloist plenty of freedom for expression and personal interpretation.

Opposites Attract (2021)
Three movements for solo contrabass

First Movement: Oh, That Was *so* Cool
Second Movement: Within and Without
Third Movement: Let's go for a walk …

Opposites Attract is a three-movement work for solo contrabass composed from preexisting materials in *Natural Causality* (2006/09). The first movement uses a couple of the original motives as the basis for adaptation, elongation, and development, but the second and third movements use whole phrases and sections almost in verbatim from the original score, interwoven with new material and treated with the dynamic and temporal contours that solo performance can allow. The *arco* central movement is framed by, and contrasted against, the outer movements in 'walking' and 'groove' *pizzicato*. If you are a contrabass player; try it, you just might like it …

Who would pluck the wings from a butterfly? (2021)
Single movement for solo flute (B extension)

Who would pluck the wings from a butterfly is a single movement work for solo flute composed from two motives and three phrases taken from *Natural Causality* (2006/09). Some of the material has been used in verbatim from the original score, but displaced from its original context. Most of the material is new and developed out of these primary units. *Who would pluck the wings from a butterfly* is an expressive work, highlighting a range of timbral variations from the instrument without being overtly abstract in gesture or unreasonably virtuosic in technique.

Contact:

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