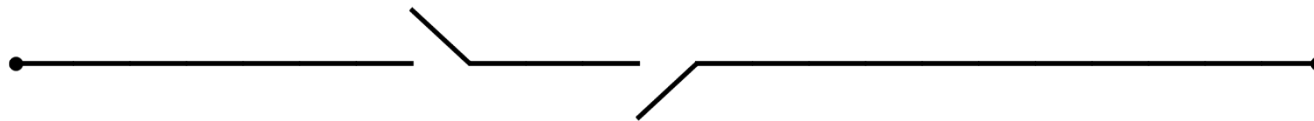


SONIC MECHANICS



for percussion, piano &
electronics



Hans Lennart Jonsäll

2023

Written for Norrbotten NEO in Piteå, Sweden (2022)
Durata: ca. 15'

Full score.

This work is an exploration of how electroacoustic music theory can be applied to notated music for both acoustic and electronic instruments.

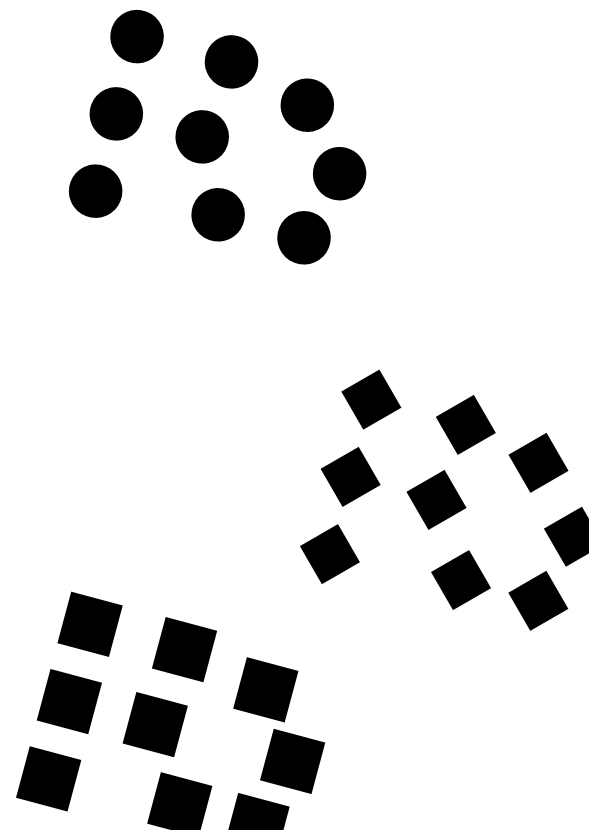
The setting and instrumental concept is partly inspired by Karlheinz Stockhausens iconic work *Kontakte* (1958-60) where percussion and piano parts are in conversation with electronic sounds (fixed media/tape), mimicking and/or responding to the pre-recorded material.

In the score for *Kontakte*, the electronics are intuitively transcribed in a graphic notation that Stockhausen devised himself together with a timecode, mostly for the musicians to be able to relate to the sonic gestures and textures. This suffices for the performance, but leaves a lot to be understood by someone studying the score...

What is specified, on the other hand, is an exceptionally detailed walkthrough of how the tape was conceived and how it should be recreated if needed. All of this is packed within the preface and requires meticulous study and an engineering skillset to be understood. For most electronic

musicians, this is esoterica that won't enable them to follow up this task and even less play the work live.

In *Sonic Mechanics*, the electronic part is played live and thus the notation needs to be understandable for a performer creating and manipulating sounds in real-time. I have based my notation on existing symbols created for spectromorphological analysis of primarily electroacoustic music by Lasse Thoresen and Andreas Hedman (2007).



●◆■ INSTRUMENTATION

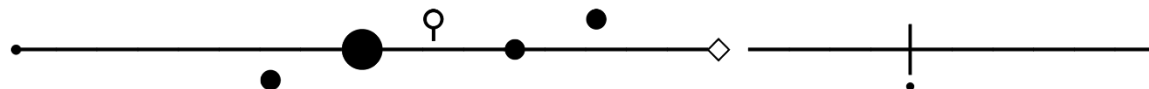
Percussion

- I. Auxiliary percussion
 - 3 Wood blocks (W.B.)
 - 2 Toms
 - Suspended cymbal (cym.)
 - Gran Cassa (G.C.)
 - Tam-tam (T.t.)
- II. Mallet instruments
 - Vibraphone (Vib.)
 - Glockenspiel (Glock.)
 - Tubular bells (T.b.)

Piano (extended/prepared)

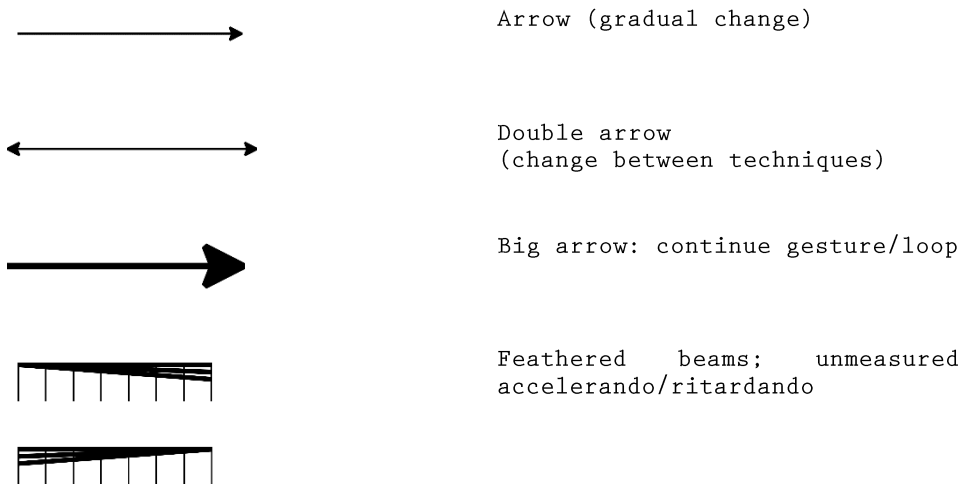
- I. Preparations
- II. Tools

Live electronics



●—○ PERFORMANCE NOTES

GENERAL



FORM AND STRUCTURE

The performance of the work is based around hitpoints (A1) and timecues (10'') rather than beats, bars and measures. Instead, the piece is divided into movements, each with a number of thematic sections. These sections consist of a series of events based on cues. This resembles an architect's blueprint.

The work may be performed with or without a conductor. The live electronics performer gives the cues and keeps time if the performance is done without conductor.

MOVEMENTS

Three movements make up the work:

- I. Momentum & Gravity
- II. Matter & Mass
- III. Energy & Force

These are merely the large structure of the work and are performed *attacca* with no interruptions in between.

SECTIONS

Sections are indicated with rehearsal marks (A) followed by subtitles. Within a section, hitpoints with the same letter is shown, divided by *full barlines*. Sections are divided by *double barlines*.

HITPOINTS/CUES & EVENTS

Within a section, there are several hitpoints/cues. These are indicated with numbered letters (A1). Each hitpoint/cue contain different *events* which are subdivided by *dashed barlines*. There are three types of events: *gestures*, *loops* and *one-shots/hits*.

The big arrows (→) show the length of each gesture or loop and is thus separated from small arrows (gradual change). The performer plays the given instruction until the end of the arrow.

TYPES OF EVENTS

Gestures are performed similarly (*sim.*) and thus not exactly as written. These boxes give a pictographic representation of what is to be played and the performer is free to improvise with the suggested technique throughout the cue.

Loops are repeated phrases that are to be played exactly as written as long as the box continues. These are always indicated by a repeat sign (ↄ) together with big arrows or repeat barlines. Repeat barlines are either used for individual parts or the entire ensemble.

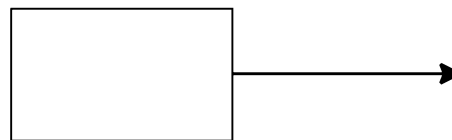
One-shots/hits are performed, as the name suggests, once and in the succession they are written. No special instructions are given to distinguish these from gestures or loops which are always followed by arrows and/or repeat signs/brackets.

TIMECODE

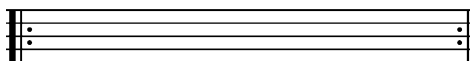
Approximate time is indicated in seconds (‘‘) within either 1) each event or; 2) an entire hitpoint/cue.

Timecodes are always approximate and contextual. Rather than asking for exact timing, the cues should give the performers and conductor a sense of space for each section and event.

Gesture box



Loop



One-shot/hit

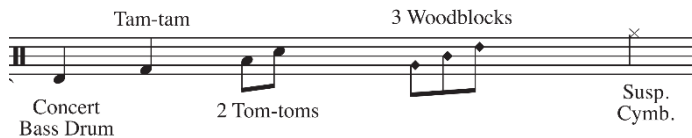


■ ◆ PERCUSSION

INSTRUMENTS

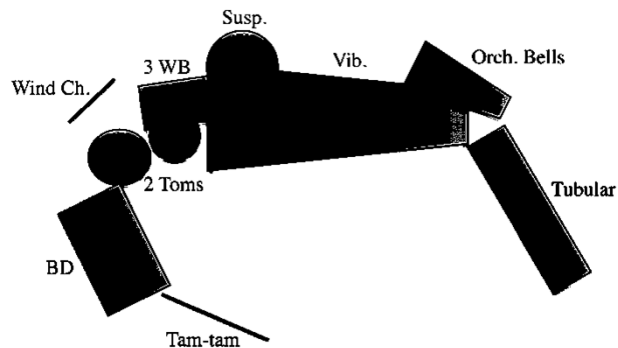
AUXILIARY PERCUSSION

3 Wood blocks (W.B.)
 2 Toms
 Suspended cymbal (cym.)
 Concert Bass Drum/Gran Cassa (G.C.)
 Tam-tam (Tam)

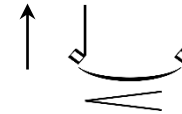


MALLET PERCUSSION

Vibraphone (Vib.)
 Orchestral bells/Glockenspiel (Glock.)
 Tubular bells (T.b.)



EXTENDED TECHNIQUES



Arco:

Bow on cymbal/vibraphone/Tam to produce a swelling tone or harmonically rich sound.



Superball:

Drag superball across given surface to produce a sustained tone or rumble (depending on instrument).



Superball on cymbal and tam-tam, creating drones w/ harmonics.



Gyro: Dragging superball in a circular motion around surface (tam-tam)



Varying motor speed (Vib.)

Change motor speed on vibraphone back and forth ad lib. to create a fluctuating effect.

•• PIANO

PREPARATIONS

screws/bolts (ad lib.)

15^{ma}

chopsticks/pencils

8^{va}

blu tack

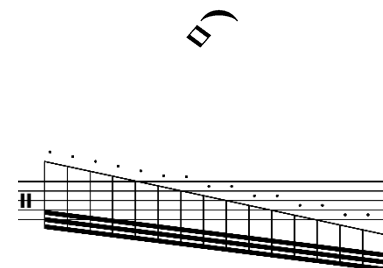
eraser/rubber wedge

15^{mb}

fishing line

15^{mb}

EXTENDED TECHNIQUES & TOOLS

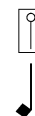


eBow:

Place eBow(s) on given string to produce a sustained tone. Remove gently to avoid rattle.

Scroll on keys (guero)

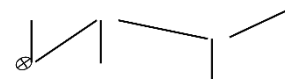
Scroll on keys with a credit card or a stick, producing unmeasured rattling percussive clicks similar to a guiro.



Mallet

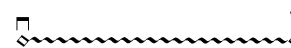
Strike strings with a soft or medium yarn mallet

approximate pitches



Gliss on strings:

Sweep across strings with fingers/nails/pick.



Fishing line/horsehair:

Pull a line/horsehair with resin (thread around the string), producing a metallic and harmonically rich drone.



Scratch string w/ nail

Scratch along the string slowly creating a textured drone.



Superball









Drag superball/flumi mallet along the string, producing a fluctuating and howling drone.

NOTATION

The notation in this work is based on and adapted from the spectromorphological symbols for analysis by Lasse Thoresen and Andreas Hedman (2007).¹ Here, they are used for interpretation and performance by a performer. Rather than denoting specific sounds, instruments or patches, the notation presents sonic *archetypes* which can be expressed in numerous ways using any equipment to acquire the musical gestures and textures suggested.

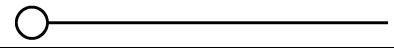

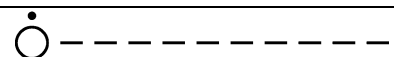
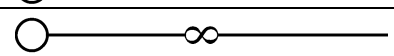
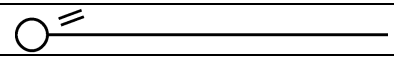
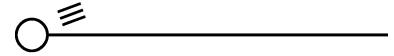
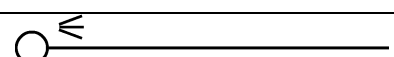
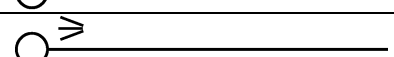
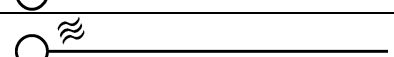
SYMBOLS

Mass/types

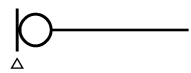
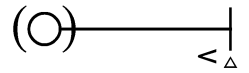
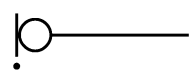
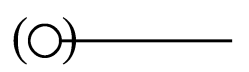
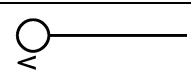
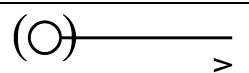
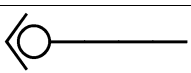
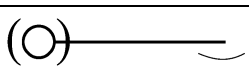
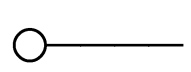
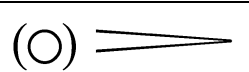
	Pitched/tonal		1.Sinusodial OR 2.undefined
	Dystonic/atonal (pitched elements)		Hollow/chiming (pitched elements)
	Complex/ unpitched		Noisy/breathy, unpitched
			White noise

¹ Thoresen, L., & Hedman, A. (2007). Spectromorphological analysis of sound objects: An adaptation of Pierre Schaeffer's

Duration

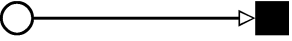
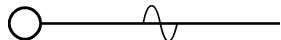
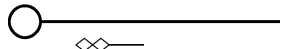
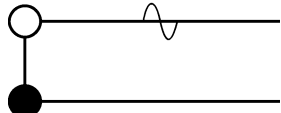
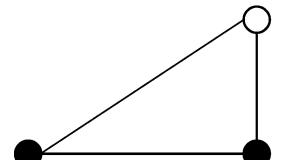
	Sustained/continuous
	Impulse (short)
	Iterative/discontinuous
	Ambient time
	Ripple time
	Flutter time
	Accelerating
	Decelerating
	Irregular

Articulation

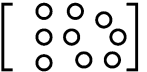
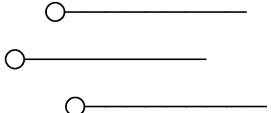
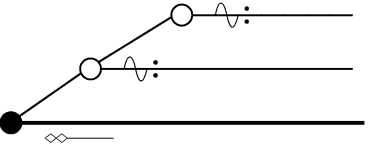

Onsets		Offsets	
	Brusque onset; aggressive attack		Abrupt ending
	Sharp onset; percussive attack		Flat ending
	Gradual onset; long attack/swell		Soft ending; long release
	No onset; sweeping/fading		Resonant ending
	Neutral/flat onset		Reverb

typomorphology. *Organised Sound*, 12(2), 129-141. <https://doi-org.proxy.lib.ltu.se/10.1017/S1355771807001793>

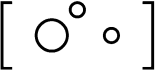
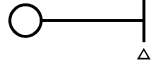
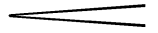

Modulation

	Gradual change; Morphing from one sound object to the next
	Pitch mod.; vibrato
	Amplitude mod; tremolo
	Spectrum mod.; timbre fluctuation
	Spectral change; filter sweep, frequency modulation etc.

Textures

	Accumulation/grains
	Cloud/stream
	Soundweb; evolving texture
	Coarse texture

Gestures

	Sequence/arp/loop; cell
 	Sweep/swell
	Impact; attack; plosive

SYNTAX

The electronics part uses a *spectral staff* (reduction), visualising the sonic spectrum from the lowest to the highest frequencies possible. This is relative to the full range of the instruments at hand, rather than an exact representation of the audible frequency spectrum (i.e., ~20Hz-20KHz). Thus, the clefs are merely illustrative rather than iconic.



Lines (— or ---) are used in conjunction with the staff's horizontal and vertical axis to represent 1) duration and 2) pitch respectively.

Text explanations of sound objects are written with *boxed text* (e.g. sine) on the top line. An *ossia staff* above indicates auxiliary instructions for the performer modulation or effects (e.g., min/max values of a parameter) and are connected via *circuit lines* (•—•). Previous sound objects occurring in the background are written (cue-sized) below the bottom staff to clarify polyphony.

Other forms of notation are used together with the spectromorphological symbols. This includes both rhythm stems and pitches from common practice notation (CPN) as well as free graphic notation.

SETUP/INSTRUMENTS

Any electroacoustic or electronic instruments/setup can be used to perform this work. The notation only specifies or suggests certain sound archetypes which can be interpreted using the appropriate equipment of the performer.

To contextualise this approach, a number of example setups are given below:

- a) Computer with algorithmic/generative patch(es) based on timecodes
- b) Modular synthesizer(s)
- c) Tabletop setup w/ different electronic instruments
- d) Hybrid setup with amplified acoustic instruments/objects and analog/digital effects processors
- e) Fixed media (tape) according to timecode

As shown, the instrumentation and interpretation are up to the performer and can take many forms. The soundscape will vary heavily between performances, equipment and performers, which I as composer strongly encourage.

Regarding sound design the performer is given creative freedom within the framework of sound objects and textures instructed in the score.

	<i>Vacillating</i>		<i>Stratified</i>		<i>Sustained</i>	<i>Impulse</i>	<i>Iterated</i>	<i>Composite</i>		<i>Accumulated</i>			
STABLE													
<i>Pitched</i>													
<i>Dystonic</i>													
<i>Complex (unpitched)</i>													
VARIABLE													
<i>Pitched</i>													
<i>Dystonic</i>													
<i>Complex (unpitched)</i>													

Figure 2. Typology - expanded diagram.

(Thoresen & Hedman, 2007, p. 34)

