

# CODEX PÆRNUENSIS

LIBER EXERCITIORUM AD MVSICAM MICROTOLALEM

VOL. I

COMPOSIT HANS-GUNTER LOCK

A.D. MMXXI

SOCIETAS ARNOLD SCHOENBERG ESTONICA

## 22-EDO Scales for Sevish's Scale Workshop Synthesizer

### 22-EDO chromatic

<https://sevish.com/scaleworkshop/?name=22%20equal%20divisions%20of%20%2F1&data=54.54545454545455%0A109.0909090909091%0A163.63636363636363%0A218.1818181818182%0A272.72727272727275%0A327.27272727272725%0A381.8181818181818%0A436.3636363636364%0A490.90909090909093%0A545.4545454545455%0A600.%0A654.5454545454545%0A709.0909090909091%0A763.6363636363636%0A818.1818181818182%0A872.7272727272727%0A927.2727272727273%0A981.8181818181819%0A1036.3636363636365%0A1090.909090909091%0A1145.4545454545455%0A1200.&freq=261.625565&midi=60&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=triangle&ampenv=organ>

### D-Superpyth[7] 4414441 (major)

<https://sevish.com/scaleworkshop/?name=Superpyth%5B7%5D%20major%20mode&data=218.1818181818182%0A436.3636363636364%0A490.90909090909093%0A709.0909090909091%0A927.2727272727273%0A1145.4545454545455%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=triangle&ampenv=organ>

### D-Superpyth[7] 4144414 (dorian)

<https://sevish.com/scaleworkshop/?name=Superpyth%5B7%5D%20dorian%20mode&data=218.1818181818182%0A272.72727272727275%0A490.90909090909093%0A709.0909090909091%0A927.2727272727273%0A981.8181818181819%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=square&ampenv=organ>

### D-Superpyth[7] 4144414 (phrygian)

<https://sevish.com/scaleworkshop/?name=Superpyth%5B7%5D%20phrygian%20mode&data=54.54545454545455%0A272.72727272727275%0A490.90909090909093%0A709.0909090909091%0A763.6363636363636%0A981.8181818181819%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=square&ampenv=organ>

**D-Pajara[10] 22322 22322**

<https://sevish.com/scaleworkshop/?name=D-Pajara%5B10%5D%2022322%2022322&data=109.0909090909091%0A218.1818181818182%0A381.8181818181818%0A490.90909090909093%0A600.%0A709.0909090909091%0A818.1818181818182%0A981.8181818181819%0A1090.909090909091%0A1200.%0A&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=triangle&ampenv=organ>

**D-Porcupine[7] 3433333**

<https://sevish.com/scaleworkshop/?name=Porcupine%5B7%5D%203433333&data=163.63636363636363%0A381.8181818181818%0A545.4545454545455%0A709.0909090909091%0A872.7272727272727%0A1036.3636363636365%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=triangle&ampenv=organ>

**D-Porcupine[7] 3343333**

<https://sevish.com/scaleworkshop/?name=Porcupine%5B7%5D%203343333&data=163.63636363636363%0A327.27272727272725%0A545.4545454545455%0A709.0909090909091%0A872.7272727272727%0A1036.3636363636365%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=sawtooth&ampenv=organ>

**D-Porcupine[7] 3334333**

<https://sevish.com/scaleworkshop/?name=Porcupine%5B7%5D%203334333&data=163.63636363636363%0A327.27272727272725%0A490.90909090909093%0A709.0909090909091%0A872.7272727272727%0A1036.3636363636365%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=sawtooth&ampenv=organ>

**Porcupine[8] 33133333**

<https://sevish.com/scaleworkshop/?name=Porcupine%5B8%5D%203433333&data=163.63636363636363%0A327.27272727272725%0A381.8181818181818%0A545.4545454545455%0A709.0909090909091%0A872.7272727272727%0A1036.3636363636365%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=square&ampenv=organ>

**Machine[6] 424444**

<https://sevish.com/scaleworkshop/?name=Machine%5B6%5D%20424444&data=218.1818181818182%0A327.27272727272725%0A545.4545454545455%0A763.6363636363636%0A981.8181818181819%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=square&ampenv=organ>

**Machine[6] 244444**

<https://sevish.com/scaleworkshop/?name=Machine%5B6%5D%20244444&data=109.0909090909091%0A327.27272727272725%0A545.4545454545455%0A763.6363636363636%0A981.8181818181819%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=square&ampenv=organ>

**Machine[6] 444442**

<https://sevish.com/scaleworkshop/?name=Machine%5B6%5D%204444442&data=218.1818181818182%0A436.3636363636364%0A654.5454545454545%0A872.7272727272727%0A1090.909090909091%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=square&ampenv=organ>

**Machine[6] 444424**

<https://sevish.com/scaleworkshop/?name=Machine%5B6%5D%204444424&data=218.1818181818182%0A436.3636363636364%0A654.5454545454545%0A872.7272727272727%0A981.8181818181819%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=square&ampenv=organ>

**Machine[6] 444244**

<https://sevish.com/scaleworkshop/?name=Machine%5B6%5D%204444244&data=218.1818181818182%0A436.3636363636364%0A654.5454545454545%0A763.6363636363636%0A981.8181818181819%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=square&ampenv=organ>

**Machine[6] 442444**

<https://sevish.com/scaleworkshop/?name=Machine%5B6%5D%20442444&data=218.1818181818182%0A436.3636363636364%0A545.4545454545455%0A763.6363636363636%0A981.8181818181819%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=square&ampenv=organ>

**D-Orwell[9] 23223 2323**

<https://sevish.com/scaleworkshop/?name=D-Orwell%5B9%5D%2023223%202323&data=109.0909090909091%0A272.72727272727275%0A381.8181818181818%0A490.90909090909093%0A654.5454545454545%0A763.6363636363636%0A927.2727272727273%0A1036.3636363636365%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=triangle&ampenv=organ>

## HOW TO USE LEIMMA FOR SCALES IN 22EDO

You need to have a Scala file for 22EDO on your computer. You can download one from the Gradus Google drive (22EDO.scl). You only need to use this once.

1. Open Leimma in Chrome. <https://isartum.net/leimma>
2. Sign in (or log in), using your email address and password. Google account won't work properly. Leimma does work without signing in but you can only save your tunings and scales if you have signed in.
3. Click 'Create a new tuning system'.
4. Choose the Reference Pitch. We've been using D4 (293.665 Hz) for our solfège. 5. Click 'Next'.
6. Click 'Import Scala File' in the upper right corner. Choose the scala file for 22edo from your computer. (You only need to do this once, it will be saved with your tuning.)
7. Click 'Next'.
8. The circle has all the notes of 22edo, with cent values. If you click the empty, outer parts of each sector, you will hear the tones. D is 0 cents (if you chose that as the reference pitch). The sound is either a beep or a plucked string sound. You can select these from the MIDI Output menu on the right: 'Internal Synth (poly)' or 'Internal Strings (poly). External synths can also be used but this guide is for the internal sounds.
9. Here's how to create a subset (scale), and to map its notes on the computer keyboard or MIDI keyboard.

First choose your preferred playing method. If you have a MIDI keyboard hooked up, select it as the MIDI Input from the menu on the right. The computer keyboard, 'QWERTY' is the default input.

With the mouse, choose the note marked '0' by clicking on the lower part of the sector, where the cent value is. It turns red.

Click the 'Keyboards' box in the bottom. That shows how the piano layout is mapped on the computer keys.

Choose a note from the 'Map to Keyboard' menu in the middle of the circle. It's up to you if you want to put the first note on the C key, or on the D key (because D is our tonic). The maximum number of notes in a subset is 12, and you can map them any way you want on the twelve keys. Obviously, this is the mapping for the MIDI keyboard, too, if you have one.

When you have chosen your mapping, the note turns grey. Choose the next note you want in your scale. In Porcupine[7] in the symmetrical ('Dingoian') mode 3334333, it would be the one three steps higher, ie. 164 cents. Map that to your preferred key. You can deselect notes and remap them.

10. When you have completed your scale, save it. Click 'Save to My Tunings' on the right. Save Tuning System to My Tunings:

Type '22edo' in the Name box. Save as New.

Save Scale/Mode to My Tunings

This saves the subset you created from 22edo. Type, for example, "Porcupine[7] Dingoian" in

the Name box, and "3334333" in the description.

A menu for 'Existing subsets' is created.

The next time you use Leimma, log in and click 'Select a tuning system'. Choose 22EDO from 'My Tunings' and the scale from the 'Existing subset' menu.

## LEIMMA synthesizer links

Porcupine[7]+2 333312313 (3333334)

[https://isartum.net/leimma/220/refpitch/D4-62/tuningsystem/1r1\\_1r1s1r1\\_54.54545s1r1\\_109.09091s1r1\\_163.63636s1r1\\_218.18182s1r1\\_272.72727s1r1\\_327.27273s1r1\\_381.81818s1r1\\_436.36364s1r1\\_490.90909s1r1\\_545.45455s1r1\\_600s1r1\\_654.54545s1r1\\_709.09091s1r1\\_763.63636s1r1\\_818.18182s1r1\\_872.72727s1r1\\_927.27273s1r1\\_981.81818s1r1\\_1036.36364s1r1\\_1090.90909s1r1\\_1145.45455/scale/403/english/0~0~3~ts3~0~6~1s6~0~7~1s9~0~10~1s12~0~12~1s13~0~13~1s15~0~15~1s18~0~0~1s19~0~1~1](https://isartum.net/leimma/220/refpitch/D4-62/tuningsystem/1r1_1r1s1r1_54.54545s1r1_109.09091s1r1_163.63636s1r1_218.18182s1r1_272.72727s1r1_327.27273s1r1_381.81818s1r1_436.36364s1r1_490.90909s1r1_545.45455s1r1_600s1r1_654.54545s1r1_709.09091s1r1_763.63636s1r1_818.18182s1r1_872.72727s1r1_927.27273s1r1_981.81818s1r1_1036.36364s1r1_1090.90909s1r1_1145.45455/scale/403/english/0~0~3~ts3~0~6~1s6~0~7~1s9~0~10~1s12~0~12~1s13~0~13~1s15~0~15~1s18~0~0~1s19~0~1~1)

Orwell[9] 323232322

[https://isartum.net/leimma/220/refpitch/D3-50/tuningsystem/1r1\\_1r1s1r1\\_54.54545s1r1\\_109.09091s1r1\\_163.63636s1r1\\_218.18182s1r1\\_272.72727s1r1\\_327.27273s1r1\\_381.81818s1r1\\_436.36364s1r1\\_490.90909s1r1\\_545.45455s1r1\\_600s1r1\\_654.54545s1r1\\_709.09091s1r1\\_763.63636s1r1\\_818.18182s1r1\\_872.72727s1r1\\_927.27273s1r1\\_981.81818s1r1\\_1036.36364s1r1\\_1090.90909s1r1\\_1145.45455/scale/572/english/0~0~3~ts3~0~6~1s5~0~7~1s8~0~10~1s10~0~11~1s13~0~13~1s15~0~15~1s18~0~0~1s20~0~2~1](https://isartum.net/leimma/220/refpitch/D3-50/tuningsystem/1r1_1r1s1r1_54.54545s1r1_109.09091s1r1_163.63636s1r1_218.18182s1r1_272.72727s1r1_327.27273s1r1_381.81818s1r1_436.36364s1r1_490.90909s1r1_545.45455s1r1_600s1r1_654.54545s1r1_709.09091s1r1_763.63636s1r1_818.18182s1r1_872.72727s1r1_927.27273s1r1_981.81818s1r1_1036.36364s1r1_1090.90909s1r1_1145.45455/scale/572/english/0~0~3~ts3~0~6~1s5~0~7~1s8~0~10~1s10~0~11~1s13~0~13~1s15~0~15~1s18~0~0~1s20~0~2~1)

Orwell[9] 223232323

[https://isartum.net/leimma/220/refpitch/D3-50/tuningsystem/1r1\\_1r1s1r1\\_54.54545s1r1\\_109.09091s1r1\\_163.63636s1r1\\_218.18182s1r1\\_272.72727s1r1\\_327.27273s1r1\\_381.81818s1r1\\_436.36364s1r1\\_490.90909s1r1\\_545.45455s1r1\\_600s1r1\\_654.54545s1r1\\_709.09091s1r1\\_763.63636s1r1\\_818.18182s1r1\\_872.72727s1r1\\_927.27273s1r1\\_981.81818s1r1\\_1036.36364s1r1\\_1090.90909s1r1\\_1145.45455/scale/572/english/0~0~3~ts3~0~6~1s5~0~7~1s8~0~10~1s10~0~11~1s13~0~13~1s15~0~15~1s18~0~0~1s20~0~2~1](https://isartum.net/leimma/220/refpitch/D3-50/tuningsystem/1r1_1r1s1r1_54.54545s1r1_109.09091s1r1_163.63636s1r1_218.18182s1r1_272.72727s1r1_327.27273s1r1_381.81818s1r1_436.36364s1r1_490.90909s1r1_545.45455s1r1_600s1r1_654.54545s1r1_709.09091s1r1_763.63636s1r1_818.18182s1r1_872.72727s1r1_927.27273s1r1_981.81818s1r1_1036.36364s1r1_1090.90909s1r1_1145.45455/scale/572/english/0~0~3~ts3~0~6~1s5~0~7~1s8~0~10~1s10~0~11~1s13~0~13~1s15~0~15~1s18~0~0~1s20~0~2~1)



9.09091s1r1\_763.63636s1r1\_818.18182s1r1\_872.72727s1r1\_927.27273s1r1\_981.81818s1r1\_1036.36364s1r1\_1090.90909s1r1\_1145.45455/scale/584/english/  
0~0~3~ts2~0~5~1s4~0~6~1s7~0~8~1s9~0~10~1s12~0~13~1s14~0~15~1s17~0~16~1s19~0~0~1

Machine[6] 444244

https://isartum.net/leimma/220/refpitch/D4-62/tuningsystem/1r1\_1r1s1r1\_54.54545s1r1\_109.09091s1r1\_163.63636s1r1\_218.18182s1r1\_272.72727s1r1\_327.27273s1r1\_381.81818s1r1\_436.36364s1r1\_490.90909s1r1\_545.45455s1r1\_600s1r1\_654.54545s1r1\_709.09091s1r1\_763.63636s1r1\_818.18182s1r1\_872.72727s1r1\_927.27273s1r1\_981.81818s1r1\_1036.36364s1r1\_1090.90909s1r1\_1145.45455/scale/626/english/  
0~0~3~ts4~0~6~1s8~0~8~1s12~0~11~1s14~0~15~1s18~0~0~1

Orgone[7]+4 31231213213 (4242424)

https://isartum.net/leimma/new/refpitch/D4-62/tuningsystem/1r1\_1r1s1r1\_54.54545454545455s1r1\_109.0909090909091s1r1\_163.63636363636363s1r1\_218.1818181818182s1r1\_272.727272727275s1r1\_327.27272727272725s1r1\_381.8181818181818s1r1\_436.3636363636364s1r1\_490.90909090909093s1r1\_545.4545454545455s1r1\_600s1r1\_654.5454545454545s1r1\_709.0909090909091s1r1\_763.6363636363636s1r1\_818.1818181818182s1r1\_872.7272727272727s1r1\_927.2727272727273s1r1\_981.8181818181819s1r1\_1036.3636363636365s1r1\_1090.909090909091s1r1\_1145.45454545455/scale/new/english/  
0~0~3~ts3~0~5~1s4~0~6~1s6~0~7~1s9~0~9~1s10~0~10~1s12~0~13~1s13~0~15~1s16~0~16~1s18~0~0~1s19~0~1~1

Porcupine[7] 3343333

https://isartum.net/leimma/220/refpitch/D4-62/tuningsystem/1r1\_1r1s1r1\_54.54545s1r1\_109.09091s1r1\_163.63636s1r1\_218.18

182s1r1 272.72727s1r1 327.27273s1r1 381.81818s1r1 436.3636  
4s1r1 490.90909s1r1 545.45455s1r1 600s1r1 654.54545s1r1 70  
9.09091s1r1 763.63636s1r1 818.18182s1r1 872.72727s1r1 927.  
27273s1r1 981.81818s1r1 1036.36364s1r1 1090.90909s1r1 114  
5.45455/scale/369/english/  
0~0~3~ts3~0~6~1s6~0~7~1s9~0~10~1s13~0~13~1s16~0~16~1s  
19~0~0~1

## 22-EDO Interval Name Table

nr.	interval name	abbreviation	note name from d	intervalli nime
0	unison	unis.	d	unison
1	quarter tone	1/4T	d+	veerandtoon
2	semitone	ST	d#	pooltoon
3	lesser wholetone	WT-	e-	väiksem täistoon
4	greater wholetone	WT+	e	suurem täistoon
5	septimal minor third	7Min3	e+	seitsmene väike terts
6	greater minor third	Min3+	f	suurem väike terts
7	major third	Maj3	f#	suur terts
8	septimal major third	7Maj3	f#+	seitsmene suur terts
9	pure fourth	P4	g	kvart
10	lesser undecimal tritone	11L_Trit	g+	väiksem üheteistkümnene tritoon
11	(12-EDO) tritone	Trit	g#	(12-EDO) tritoon
12	greater undecimal tritone	11G_Trit	a-	suurem üheteistkümnene tritoon
13	slightly wider pure fifth	P5	a	veidike laiem kvint
14	septimal minor sixth	7Min6	a+	seitsmene väike sekst
15	minor sixth	Min6	a#	väike sekst
16	lesser major sixth	Maj6-	b-	väiksem suur sekst
17	septimal major sixth	7Maj6	b	seitsmene väike septim
18	lesser minor seventh	Min7-	b+	väiksem väike septim
19	greater minor seventh	Min7+	c	suurem väike septim
20	major seventh	Maj7	c#	suur septim
21	major seventh plus quarter tone	Maj7+1/4T	c#+	suur septim pluss veerandtoon
22	pure octave	P8	d	oktav

# 22-EDO Solfège

Hans-Gunter Lock

0	1	2	3	4	5	6	7	8	9	10	
	1/4T	ST		WT-	WT+	7Min3	Min3+	Maj3	7Maj3	P4	11L Trit

11	12	13	14	15	16	17	18	19	20	21		
Trit	11G Trit	P5	7Min6	Min6	Maj6-	7Maj6		Min7-	Min7+	Maj7	Maj7 +1/4T	P8

4	5	6	7	8	9	10	11	12	13	14
	1/4T	ST	WT-	WT+	7Min3	Min3+	Maj3	7Maj3	P4	11L Trit

15	16	17	18	19	20	21	0	1	2	3	
Trit	11G Trit	P5	7Min6	Min6	Maj6-	7Maj6	Min7-	Min7+	Maj7	Maj7 +1/4T	P8

## 0. Chromatic Zigzag 1-12-23-3...

1/4T	ST	WT-	WT+	7Min3	Min3+
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Maj3	7Maj3	P4	11L Trit	Trit	11G Trit	P5
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1/4T	ST	WT-	WT+	7Min3	Min3+
------	----	-----	-----	-------	-------

Maj3	7Maj3	P4	11L Trit	Trit	11G Trit	P5
------	-------	----	-------------	------	-------------	----

WT- up, ST down, WT- up, ST down...

1.1 Superpyth[7] 4414441 (major)  $1 = 1/4T, 4 = WT+$

WT+ 7Maj3 P4 P5 7Maj6 Maj7 +1/4T P8

1.2 Superpyth[7] 4144414 (dorian)  $1 = 1/4T, 4 = WT+$

WT+ 7Min3 P4 P5 7Maj6 Min7- P8

1.3 Superpyth[7] 1444144 (phrygian)<sub>1 = 1/4T, 4 = WT+</sub>

1/4T 7Min3 P4 P5 7Maj6 Min7- P8

1.4 Superpyth[7] 4441441 (lydian)<sub>1 = 1/4T, 4 = WT+</sub>

WT+ 7Maj3 11G Trit P5 7Maj6 Maj7 +1/4T P8

1.5 Superpyth[7] 4414414 (mixolydian)<sub>1 = 1/4T, 4 = WT+</sub>

WT+ 7Maj3 P4 P5 7Maj6 Min7- P8

1.6 Superpyth[7] 4144144 (aeolian)<sub>1 = 1/4T, 4 = WT+</sub>

WT+ 7Min3 P4 P5 7Min6 Min7- P8

1.7 Superpyth[7] 1441444 (locrian)<sub>1 = 1/4T, 4 = WT+</sub>

1/4T 7Maj3 P4 11L Trit 7Min6 Min7- P8

2.1 Pajara[10] 22322 22322  $2 = \text{ST}, 3 = \text{WT-}$

ST    WT+    Maj3    P4    Trit                    P5    Min6    Min7-    Maj7    P8

2.2 Pajara[10] 23222 23222

ST    7Min3    Maj3    P4    Trit                    P5    Maj6-    Min7-    Maj7    P8

2.3 Pajara[10] 32222 32222

WT-    7Min3    Maj3    P4                                    7Min6    Maj6-    Min7-    Maj7    P8

2.4 Pajara[10] 22223 22223 2 = ST, 3 = WT-

ST WT+ Min3+ 7Maj3 Trit P5 Min6 7Maj6 Min7+ P8

2.5 Pajara[10] 22232 22232 2 = ST, 3 = WT-

ST WT+ Min3+ P4 Trit P5 Min6 7Maj6 Maj7 P8

3a.1 Porcupine[7] 3433333 3 = WT-, 4 = WT+

WT- Maj3 11L Trit P5 Maj6- Min7+ P8

3a.2 Porcupine[7] 3343333 3 = WT-, 4 = WT+

WT- Min3+ 11L Trit P5 Maj6- Min7+ P8



3a.3 Porcupine[7] 3334333  $3 = \text{WT-}, 4 = \text{WT+}$ 

WT- Min3+ P4 P5 Maj6- Min7+ P8

WT+

3a.4 Porcupine[7] 3333433  $3 = \text{WT-}, 4 = \text{WT+}$ 

WT- Min3+ P4  $\begin{matrix} 11\text{G} \\ \text{Trit} \end{matrix}$  Maj6- Min7+ P8

WT+

3a.5 Porcupine[7] 3333343  $3 = \text{WT-}, 4 = \text{WT+}$ 

WT- Min3+ P4  $\begin{matrix} 11\text{G} \\ \text{Trit} \end{matrix}$  Min6 Min7+ P8

WT+

3a.6 Porcupine[7] 3333334  $3 = \text{WT-}, 4 = \text{WT+}$ 

WT- Min3+ P4  $\begin{matrix} 11\text{G} \\ \text{Trit} \end{matrix}$  Min6 Min7- P8

WT+

3a.7 Porcupine[7] 4333333  $3 = \text{WT-}, 4 = \text{WT+}$ 

WT+ Maj3  $\begin{matrix} 11\text{L} \\ \text{Trit} \end{matrix}$  P5 Maj6- Min7+ P8

WT+

3b.1 Porcupine[8] 33133333 = 1/4T, 3 = WT-

WT-    Min3+Maj3   11L  
Trit

P5    Maj6-   Min7+    P8

1/4T

3b.2 Porcupine[8] 33313333 = 1 = 1/4T, 3 = WT-

WT-    Min3+    P4    11L  
Trit

P5    Maj6-   Min7+    P8

1/4T

3b.3 Porcupine[8] 33331333 = 1 = 1/4T, 3 = WT-

WT-    Min3+    P4    11G  
Trit

P5    Maj6-   Min7+    P8

1/4T

3b.4 Porcupine[8] 33333133 = 1 = 1/4T, 3 = WT-

WT-    Min3+    P4    11G  
Trit

Min6    Maj6-   Min7+    P8

1/4T

3b.5 Porcupine[8] 33333313 = 1 = 1/4T, 3 = WT-

WT-    Min3+    P4    11G  
Trit

Min6    Min7-   Min7+    P8

1/4T

3b.5 Porcupine[8] 33333313 = 1 = 1/4T, 3 = WT-

WT-    Min3+    P4    11G  
Trit

Min6    Min7-    Maj7  
+1/4T    P8

1/4T

3b.7 Porcupine[8] 13333333 1 = 1/4T, 3 = WT-

1/4T WT+ Maj3 11L Trit P5 Maj6- Min7+ P8

1/4T

3b.8 Porcupine[8] 31333333 1 = 1/4T, 3 = WT-

WT- WT+ Maj3 11L Trit P5 Maj6- Min7+ P8

1/4T

4.1 Machine[6] 424444 2 = ST, 4 = WT+

WT+ Min3+ 11L Trit 7Min6 Min7- P8

ST

4.2 Machine[6] 244444 2 = ST, 4 = WT+

ST Min3+ 11L Trit 7Min6 Min7- P8

ST

4.3 Machine[6] 444442 2 = ST, 4 = WT+

WT+ 7Maj3 11G Trit Maj6- Min7+ P8

ST

4.4 Machine[6] 444424 2 = ST, 4 = WT+

WT+ 7Maj3 11G Trit Maj6- Min7- P8

ST

4.5 Machine[6] 444244 2 = ST, 4 = WT+

WT+ 7Maj3 11G Trit 7Min6 Min7- P8

4.6 Machine[6] 442444 2 = ST, 4 = WT+

WT+ 7Maj3 11L Trit 7Min6 Min7- P8

5.1 Orwell[9] 232232323 2 = ST, 3 = WT-

ST 7Min3 Maj3 P4 11G Trit 7Min6 7Maj6 Min7+ P8

5.2 Orwell[9] 322323232 2 = ST, 3 = WT-

WT- 7Min3 Maj3 11L Trit 11G Trit Min6 7Maj6 Maj7 P8

5.3 Orwell[9] 223232323 2 = ST, 3 = WT-

ST WT+ Maj3 P4 11G Trit 7Min6 7Maj6 Min7+ P8

5.4 Orwell[9] 232323232 2 = ST, 3 = WT-

ST 7Min3 Maj3 11L Trit 11G Trit Min6 7Maj6 Maj7 P8

5.5 Orwell[9] 323232322 2 = ST, 3 = WT-

WT- 7Min3 7Maj3 11L Trit P5 Min6 Min7- Maj7 P8

5.6 Orwell[9] 232323223 2 = ST, 3 = WT-

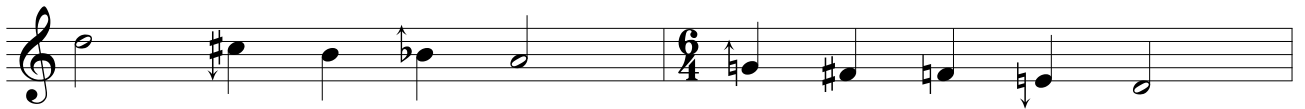
ST 7Min3 Maj3 11L Trit 11G Trit Min6 7Maj6 Min7+ P8



5.7 Orwell[9] 323232232

2 = ST, 3 = WT-

WT-    7Min3    7Maj3    11L Trit    P5    Min6    7Maj6    Maj7    P8



5.8 Orwell[9] 232322323

2 = ST, 3 = WT-

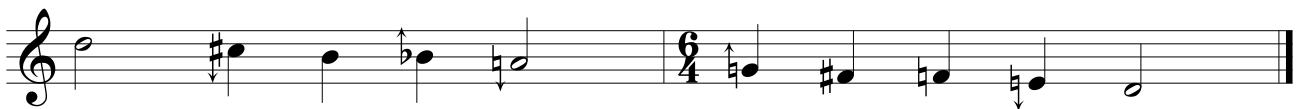
ST    7Min3    Maj3    11L Trit    11G Trit    7Min6    7Maj6    Min7+    P8



5.9 Orwell[9] 323223232

2 = ST, 3 = WT-

WT-    7Min3    7Maj3    11L Trit    11G Trit    Min6    7Maj6    Maj7    P8



# Porcupine Drill 1

Juhani Nuorvala

narrow whole-tones

wide  
whole-tone

1

minor thirds

fourths

3 3 3 3 3 3 4

3

9

16

22

27

Musical score for measures 27-30. The score is written for piano in 3/8 time. It consists of two staves. The right-hand staff begins with a repeat sign and contains a sequence of eighth notes and quarter notes, with some notes highlighted in red. The left-hand staff contains a bass line with eighth notes and quarter notes, also featuring some red highlights. The piece concludes with a double bar line and repeat dots.

31

Musical score for measures 31-34. The score is written for piano in 3/8 time. It consists of two staves. The right-hand staff features a melodic line with eighth notes and quarter notes, including a trill in measure 32. The left-hand staff provides a harmonic accompaniment with eighth notes and quarter notes. Red highlights are used to mark specific notes in both hands. The section ends with a double bar line and repeat dots.

35

Musical score for measures 35-37. The score is written for piano in 4/4 time. It consists of two staves. The right-hand staff has a melodic line with a dotted quarter note in measure 35, followed by two measures with notes marked with accents (>) and blue highlights. The left-hand staff has a bass line with a dotted quarter note in measure 35, followed by two measures with notes marked with accents (>). Red dashed lines are drawn around the first two measures of both staves. The piece ends with a double bar line.



# Porcupine Drill 2

Juhani Nuorvala

narrow whole-tones

wide whole-tone 1

minor thirds

fourths

3 3 3 3 3 3 4

5

sim.

12

22

31

40

# Porcupine Drill 2

Juhani Nuorvala

narrow whole-tones

wide whole-tone 1

minor thirds

fourths

3 3 3 3 3 3 4

5

sim.

12

22

31

40

# Porcupine Example 1

Juhani Nuorvala

narrow whole-tones

quarter-tone

1

minor thirds

fourths

3 3 3 3 3 3 1 3

4

**A** **B**

12

**C** **D**

semitone A $\sharp$

major 3rd  
A $\sharp$  is not in the scale!

# Orwell[9]

## little training session

Hans-Gunter Lock

5.2 Orwell[9] 322323232 2 = ST, 3 = WT-

WT- 7Min3 Maj3 11L Trit 11G Trit Min6 7Maj6 Maj7 P8

WT- WT- WT- WT-

3

### Exercise A

7Maj3 11L Trit 11G Trit Maj3 P4 7Maj3 Trit 7Maj3

### Exercise B

Maj3 7Min3 7Maj3 11L Trit P4 Maj3 P4

7Maj3 11L Trit 7Maj3

### Exercise C

20

WT+ 7Min3 7Maj3 Maj3 WT+ 7Min3 Maj3

P5 Maj3 7Maj3 7Min3 11L Trit ST

24

7Maj3 Maj3 WT- 7Maj3 11L Trit 11L Trit 11L Trit Min6

Maj3 7Maj3 P4 Maj3 WT+ 7Maj3 Maj3

# Orwell Exercise

Juhani N.

narrow whole-tones

**A**

septimal minor thirds

minor second

3 2 3 2 3 2 3 2 2

**B**

wide whole-tone

1. 2.

**C**

22

**D**

27

36

45 **E**

Musical score for measures 45-51. The score is written for three staves (treble, middle, and bass clefs). Measure 45 is marked with a box containing the letter 'E'. The music features various note values, including quarter and eighth notes, with some notes highlighted in blue. Red and purple arcs are drawn over the notes to indicate intervals or phrasing. The key signature has one flat (B-flat).

52

Musical score for measures 52-60. The score is written for three staves. Measure 52 is marked. The music continues with various note values and intervals. A red arc is drawn over a note in measure 53. A purple dashed arc is drawn over a note in measure 58. The text "major third" is written in the middle of the score between measures 57 and 58. The key signature has one flat.

61

Musical score for measures 61-67. The score is written for three staves. Measure 61 is marked. The music continues with various note values and intervals. A red arc is drawn over a note in measure 62. A purple dashed arc is drawn over a note in measure 65. The text "major 3rd" is written in the middle of the score between measures 63 and 64. The key signature has one flat.

68

Musical score for measures 68-74. The score is written for three staves. Measure 68 is marked. The music continues with various note values and intervals. A red arc is drawn over a note in measure 69. A purple dashed arc is drawn over a note in measure 72. The text "major 3rd" is written in the middle of the score between measures 68 and 69. The key signature has one flat.

# Exercise in a mode of Orwell[9]

Sebastian Dumitrescu  
modified from original file by Hans-Gunter Lock

## 5.3 Orwell[9] 223232323

2 = ST, 3 = WT-

ST WT+ Maj3 P4 11G Trit 7Min6 7Maj6 Min7+ P8

2

"major tetrachord"

3

ST WT+ ST ST

5 orwell tetrads 7Min3

7 subminor triads

10 "subminor triad plus 11/8"

12 interlocking Orwell triads



# Gradus

Juhani

## Machine[6]

wide whole-tones and semitone

Three staves of musical notation. Each staff contains a sequence of notes with blue and red dots. Blue dots are connected by blue arcs, and red dots are connected by red arcs. Fingerings are indicated by numbers 2, 4, and 4 below the notes.

A

Three staves of musical notation. The top staff is empty. The middle staff contains a sequence of notes with flats and naturals. The bottom staff is empty.

(same pitch)

Three staves of musical notation. The top staff contains notes with flats and naturals. The middle and bottom staves contain notes with flats and naturals, with dashed arcs connecting notes of the same pitch across staves.

B

Musical score for section B, measures 1-4. The score consists of three staves. The top staff is a grand staff with a treble clef and a 3/8 time signature. The middle and bottom staves are also in treble clef with a 3/8 time signature. The music features a complex rhythmic pattern with eighth and sixteenth notes. Some notes are highlighted in red and blue. A double bar line is present at the end of the section.

C

Musical score for section C, measures 1-4. The score consists of three staves. The top staff is a grand staff with a treble clef and a 3/8 time signature. The middle and bottom staves are also in treble clef with a 3/8 time signature. The music features a complex rhythmic pattern with eighth and sixteenth notes. Some notes are highlighted in red and blue. A dashed line connects the end of the first staff to the beginning of the second staff. A double bar line is present at the end of the section.

Musical score for section C, measures 5-8. The score consists of three staves. The top staff is a grand staff with a treble clef and a 3/8 time signature. The middle and bottom staves are also in treble clef with a 3/8 time signature. The music features a complex rhythmic pattern with eighth and sixteenth notes. Some notes are highlighted in red and blue. A double bar line is present at the end of the section.

# Orgone Exercise

Juhani Nuorvala

minor seconds

A

minor thirds

4 2 4 2 4 2 4

non-scale tones!

B

C

D

The red notes don't belong to the scale!

minor thirds

E

P5, P4

P5, P4

P5, P4

P5, P4

minor thirds

26 **F**

quarter-tone

narrow whole-tone

Minor triad      Minor      Minor

34 **G**

quarter-tone

Maj      Min      Min      Min

Maj      Min      Min      Min

for Kazoo

# Octothorpe, Section A

Jacob Barton

The musical score is written for a Kazoo. It consists of two staves of music in treble clef. The first staff contains a sequence of eighth notes, a triplet of eighth notes, and a final note with an accent. The second staff begins with a measure rest, followed by eighth notes, a triplet of eighth notes, and continues with eighth notes and accents throughout the piece.

# Porcupine Organum

Juhani Nuorvala

major second

The first system of musical notation consists of two staves. The upper staff is in treble clef and contains a sequence of notes: G4, A4, B4, C5, D5, E5, F5, G5. The lower staff is in bass clef and contains a sequence of notes: G3, A3, B3, C4, D4, E4, F4, G4. Above the notes in the upper staff are fingerings: 3, 3, 3, 4, 3, 3, 3. A blue dashed line connects the notes C5 and D5 in the upper staff, with the text 'major second' positioned above it.

The second system of musical notation consists of two staves. The upper staff is in treble clef and contains a sequence of notes: G4, A4, B4, C5, D5, E5, F5, G5. The lower staff is in bass clef and contains a sequence of notes: G3, A3, B3, C4, D4, E4, F4, G4. The lower staff begins with a Roman numeral II.

The third system of musical notation consists of two staves. The upper staff is in treble clef and contains a sequence of notes: G4, A4, B4, C5, D5, E5, F5, G5. The lower staff is in bass clef and contains a sequence of notes: G3, A3, B3, C4, D4, E4, F4, G4.

The fourth system of musical notation consists of two staves. The upper staff is in treble clef and contains a sequence of notes: G4, A4, B4, C5, D5, E5, F5, G5. The lower staff is in bass clef and contains a sequence of notes: G3, A3, B3, C4, D4, E4, F4, G4.

The fifth system of musical notation consists of two staves. The upper staff is in treble clef and contains a sequence of notes: G4, A4, B4, C5, D5, E5, F5, G5. The lower staff is in bass clef and contains a sequence of notes: G3, A3, B3, C4, D4, E4, F4, G4.

väiksed

# Harjutus: Orwelltertsid

Hans-Gunter Lock

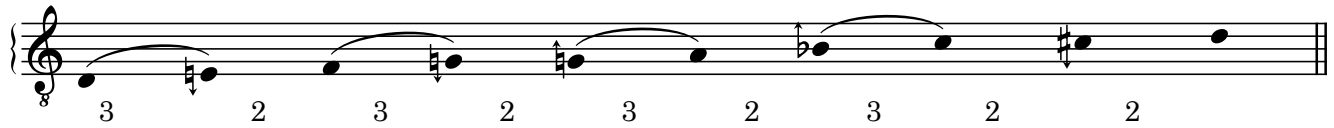
The first system of music consists of two staves in 4/4 time. The key signature has one sharp (F#). The melody in the upper staff begins with a quarter note G4, followed by a quarter note F#4 with a downward arrow, a quarter note E4, and a quarter note D4 with a downward arrow. The bass line in the lower staff begins with a quarter note G3, followed by a quarter note F#3 with a downward arrow, a quarter note E3, and a quarter note D3 with a downward arrow. The system concludes with a whole note chord of G4 and F#4 in the upper staff, and a whole note chord of G3 and F#3 in the lower staff.

The second system of music consists of two staves in 4/4 time. The melody in the upper staff begins with a quarter note E4, followed by a quarter note D4 with a downward arrow, a quarter note C4 with a sharp sign, and a quarter note B3 with a downward arrow. The bass line in the lower staff begins with a quarter note G3, followed by a quarter note F#3 with a downward arrow, a quarter note E3, and a quarter note D3 with a downward arrow. The system concludes with a whole note chord of E4 and D4 in the upper staff, and a whole note chord of G3 and F#3 in the lower staff.

# Dies irae

Juhani Nuorvala

Orwell temperament



narrow whole-tones

Di - es i - rae, di - es il - la Sol - vet sae - clum in fa - vil - la:  
Dies il - la Sol - vet sae - clum (la)

Te - ste Da - vid cum Sy - bil - la. Quan - tus fu - tu - rus,  
Te - ste Da - vid cum Sy - bil - la. Quan - tus tre - mor est fu - tu - rus,

Quan - do Ju - dex est ven - tu - rus,  
Quan - do Ju - dex est ven - tu - rus,

cunc - ta stric - te dis - cus - su - rus!  
cunc - ta stric - te