



# John Chowning: Turenas (1972)

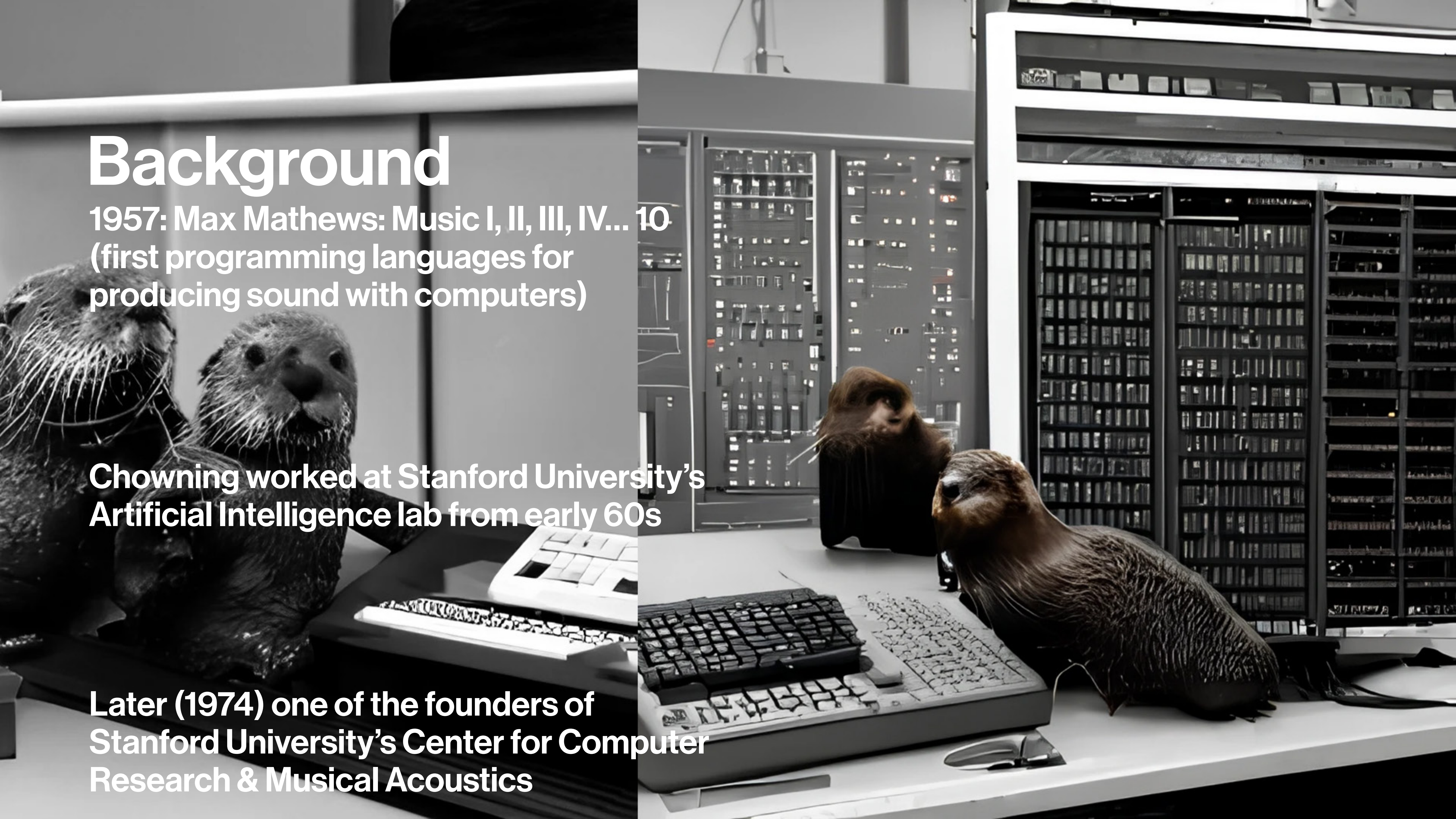


# Background

1957: Max Mathews: Music I, II, III, IV... 10  
(first programming languages for  
producing sound with computers)

Chowning worked at Stanford University's  
Artificial Intelligence lab from early 60s

Later (1974) one of the founders of  
Stanford University's Center for Computer  
Research & Musical Acoustics





# Localisation of sound, trajectories

Turenas was composed for four-channel playback > "Liberating sound from its loudspeaker source"

Reverberation = an important component of distance perception

EMT 250 (first digital reverb) was ready 1976





# FM Synthesis



au naturel



vibrato



FM

...commercialised  
by Yamaha (DX7)



# Context & impact

Created in research facilities / academia

Engineering / technology

musical training, “ear discovery”

1960s California

Parallel developments in (slightly more accessible) synthesizer technology

Later compositions: *Stria* (1977)  
explored FM synthesis and  
spatialisation further, *Phoné* (1980–81)  
studied also voice synthesis





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Collections

- Delay & Loop
- Drive & Color
- Dynamics
- EQ & Filters
- Modulators
- Pitch & Modulation
- Reverb & Resonance
- Utilities

Categories

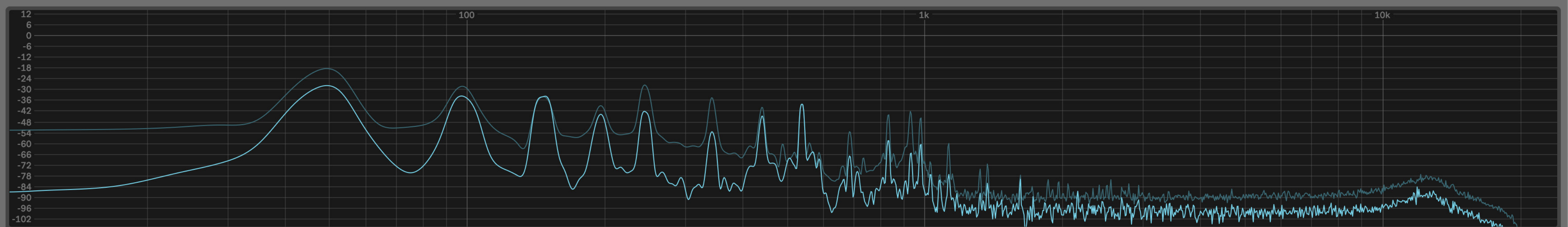
- Sounds
- Drums
- Instrument
- Audio Effr
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- Plug-Ins
- Clips
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Places

- Packs
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A. Fr. Ext. 1 Mon. Auto	A. Fr. Ext. 1 Mon. Auto	A. Fr. Ext. 1 Mon. Auto	A. Fr. Ext. 1 Mon. Auto	A. Fr. Ext. 1 Mon. Auto	Audio From No Input Monitor In Auto Off	A. Fr. Ext. 1 Mon. Auto	A. Fr. Ext. 1 Mon. Auto	A. Fr. Ext. 1 Mon. Auto	A. Fr. Ext. 1 Mon. Auto	A. Fr. Ext. 1 Mon. Auto	Audio From No Input Monitor In Auto Off	A. Fr. Ext. 1 Mon. Auto	A. Fr. Ext. 1 Mon. Auto	A. Fr. Ext. 1 Mon. Auto	A. Fr. Ext. 1 Mon. Auto	A. Fr. Ext. 1 Mon. Auto	Audio From No Input Monitor In Auto Off	A. Fr. Ext. 1 Mon. Auto	A. Fr. Ext. 1 Mon. Auto	A. Fr. Ext. 1 Mon. Auto	A. Fr. Ext. 1 Mon. Auto	A. Fr. Ext. 1 Mon. Auto	Audio From No Input Monitor In Auto Off	Audio From No Input Monitor In Auto Off
A. To Master	A. To 6-Au Track	A. To 6-Au Track	A. To 6-Au Track	A. To 6-Au Track	A. To 25-1 22-Audio Track In	A. To Master	A. To 12-A Track	A. To 12-A Track	A. To 12-A Track	A. To 12-A Track	A. To 25-1 22-Audio Track In	A. To Master	A. To 18-A Track	A. To 18-A Track	A. To 18-A Track	A. To 18-A Track	A. To 25-1 22-Audio Track In	A. To Master	A. To 24-A Track	A. To 24-A Track	A. To 24-A Track	A. To 24-A Track	A. To 25-1 22-Audio Track In	A. To Master
A -inf	-inf	-inf	-inf	-inf	Sends A B C	A -inf	-inf	-inf	-inf	-inf	Sends A B C	A -inf	-inf	-inf	-inf	-inf	Sends A B C	A -inf	-inf	-inf	-inf	-inf	Sends A B C	Sends A B C
-Inf 0	0	0	0	0	-15.0 -6.0	-Inf 0	0	0	0	0	-17.8 -5.0	-Inf 0	0	0	0	0	-31.0 -4.0	-Inf 0	0	0	0	0	-47.2 -4.0	-12.6 0
C 1	C 2	C 3	C 4	C 5	C 6	C 7	C 8	C 9	C 10	C 11	C 12	C 13	C 14	C 15	C 16	C 17	C 18	C 19	C 20	C 21	C 22	C 23	C 24	C 25

A Convolu	B Valhalla	C Magnet	Master
A. To Master	A. To Master	A. To Master	Cue Out 1/2 Master Out 1/2
A -inf	-inf	-inf	Post
B -inf	-inf	-inf	Post
C -inf	-inf	-inf	Post
-Inf 0	-38 0	-58 0	-7.40 0
C A	C B	C C	Solo



**Spectrum**

Block: 8192

Channel: L R L+R

Refresh: 60.0 ms

Avg: 1

Graph: Line Max

Scale X: Lin Log ST

Range: 14 -106

**Mastering - make it loud** cytomic

Attack: 0.3 1 3

Release: 0.1 0.2 0.4 0.6 0.8 1.2

Ratio: 4 10

Threshold: -12.0 dB

Makeup: 5.00 dB

Range: 70.0 dB

Dry/Wet: 100%

Clip: Soft

Drop Audio Effects Here