



Beyond Musak

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Musak

US Army Major General George Owen Squier

1910: invented multiplexing—multiple signals over single wire

1922: sold patent for music over power lines and founded Wired Radio

1934: Introduced “background music” called Musak (Music + Kodak)

My background

Physician-musician

Parents, wife, kids all
musicians



Daughter: Music Therapist

Anencephalic adults
Autistic children
Behaviorally challenged
United Cerebral Palsy

Music, Brain, and Behavior

Mechanisms of Arousal by Music

Juslin PN. From everyday emotions to aesthetic emotions: Towards a unified theory of musical emotions. Physics of Life 2013; 10:235-66

Mechanisms of Arousal by Music

Hypothesis

Music elicits biologic reactions related to human survival

It affects brain at multiple adaptive levels from primitive to complex

Suggesting ways to use it therapeutically

Mechanisms of Arousal by Music

Brain stem reflex

- **Startle response**
- **Focuses attention – think Haydn's Surprise Symphony**
- **Rapid**
- **Pre-birth**

Mechanisms of Arousal by Music

Rhythmic entrainment

- **Facilitates motor coordination – think music tied to dance**
- **Periodic pulses around 2 Hz (120 beats per minute)**
- **Pre-birth**

Mechanisms of Arousal by Music

Evaluative conditioning

- Pairs objects or events with positive (e.g., happy) or negative outcomes
- Used often in opera – measurable sympathetic nervous system changes
- Unintentional, subconscious, effortless
- Pre-birth

Mechanisms of Arousal by Music

Contagion

- **Group cohesion (e.g., between mother and infant)—emotional expression mimics internal expression**
- **Choral music, vocal music**
- **First year**

Mechanisms of Arousal by Music

Visual imagery

- Internal simulations of events that substitute for overt & risky actions
- “Program music”
- Pre-school years

Mechanisms of Arousal by Music

Episodic memory

- Conscious recollections of previous events, binding self to reality
- Nostalgia – “they’re playing our song”—robust musical memory
- Age 3 to 4

Mechanisms of Arousal by Music

Musical expectancy

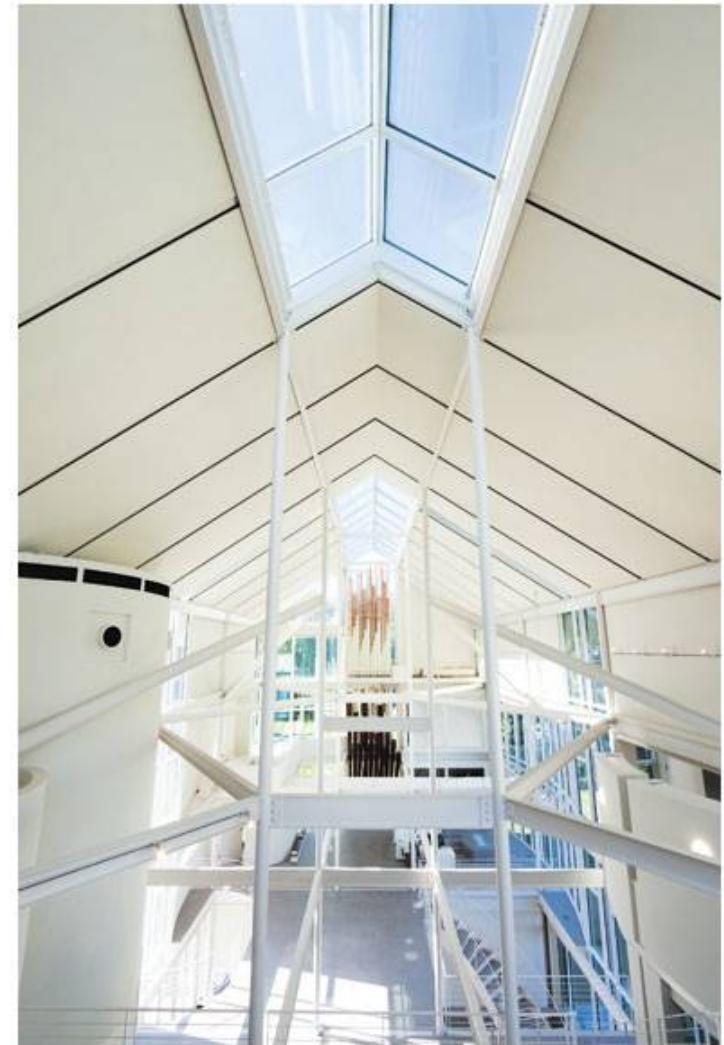
- **Musical structure – evokes interest, anxiety, surprise, chills, hope, disappointment**
- **Facilitates symbolic language with complex semantics (R v. L cortex)**
- **Age 5 to 11**



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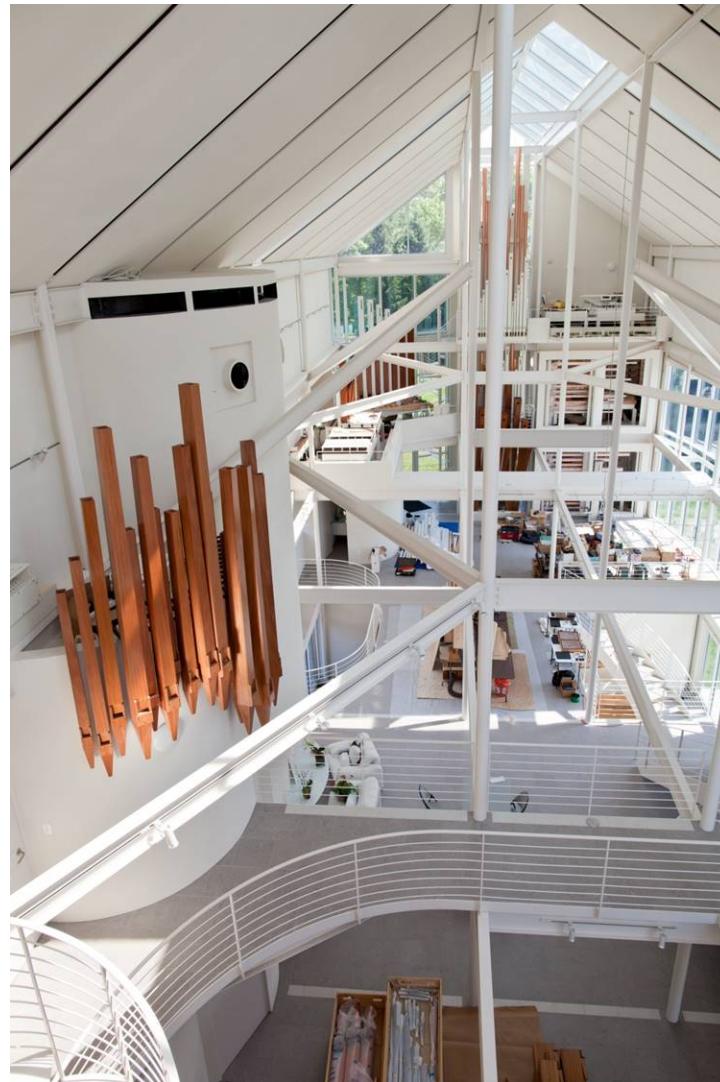
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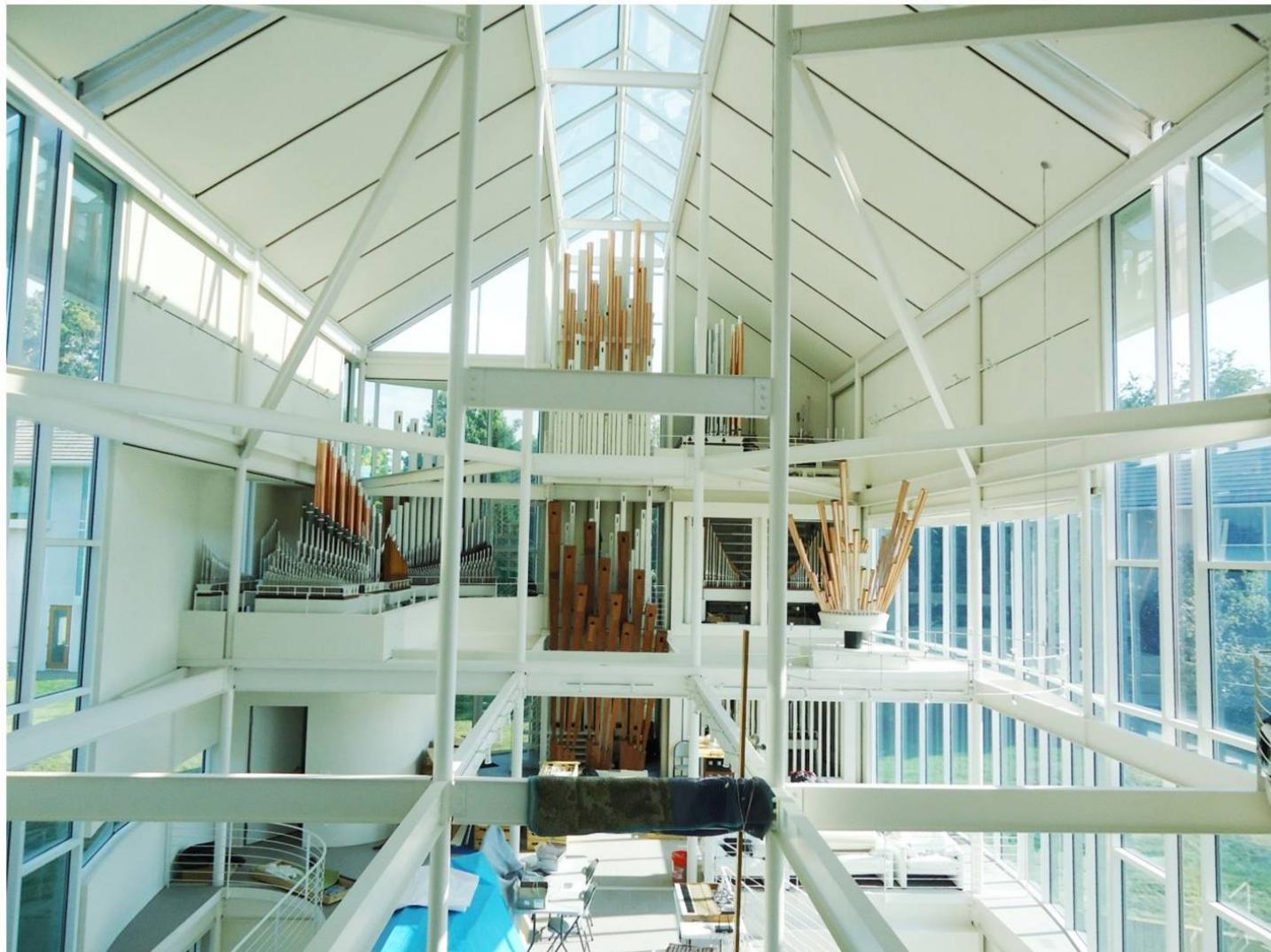
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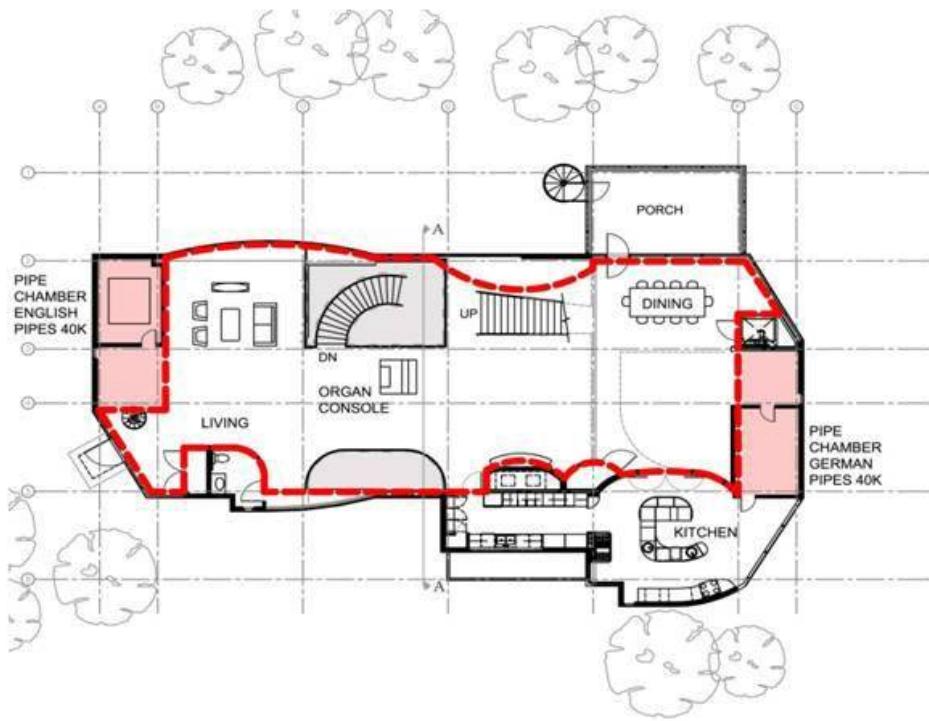






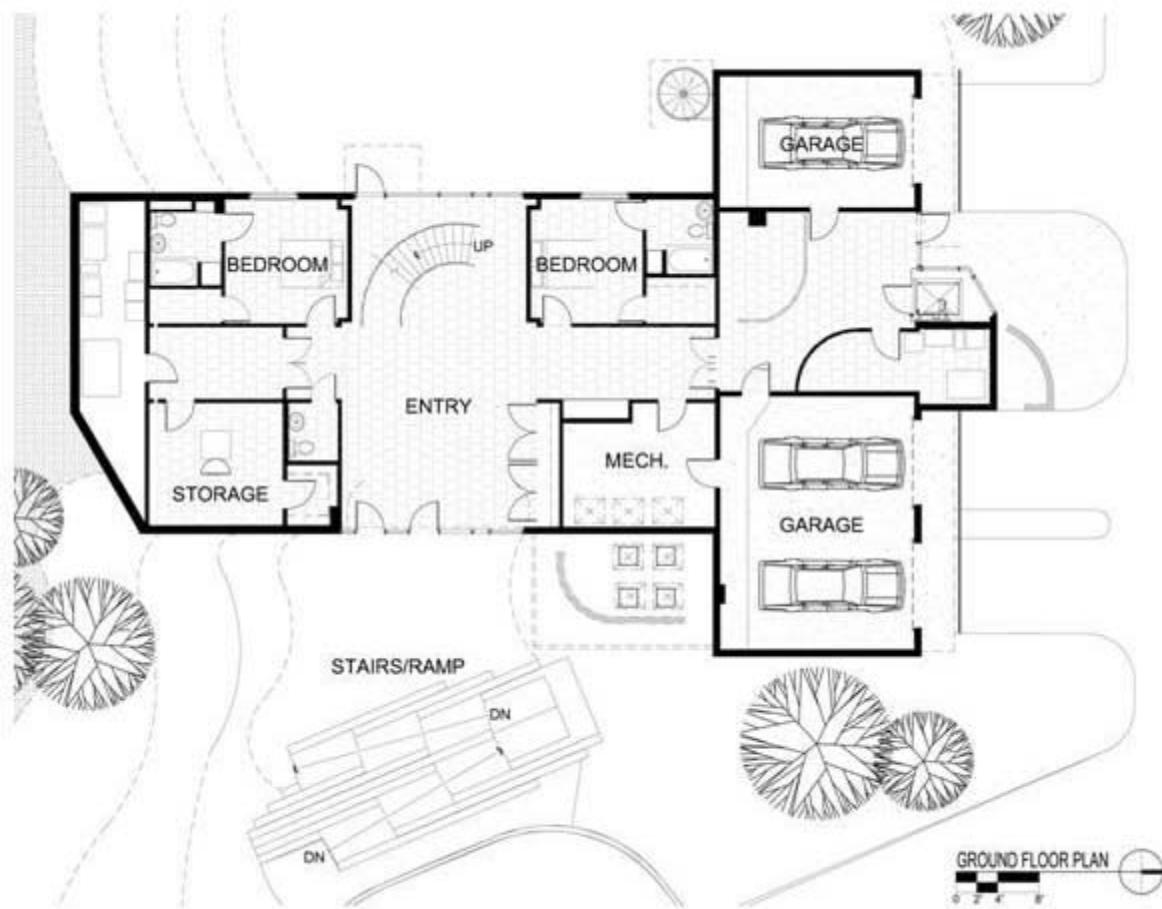


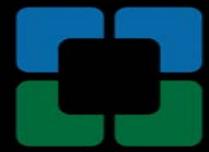
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Sound was a major design determinant in this project because of the two grand pipe organs housed within it. All vertical walls undulate providing curved surfaces to reflect sound. The goal was to have a reverberation time of 2.8 seconds and no echo.







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