

# fpa 147

## WEEK 3

Up until the post war (WWII) period, electronic music tends to emerge as the technology to enable it does.

# assignment 4

Listening journal...



Responding to developments within the world of Art: Surrealism, Dada, collage, abstract impressionism, impressionism, composers found that new sound generating technologies allowed for a liberating exploration of some of these movements in a musical context.



Responding to developments within the world of Art: Surrealism, Dada, collage, abstract impressionism, impressionism, composers found that new sound generating technologies allowed for a liberating exploration of some of these movements in a musical context.



Responding to developments within the world of Art: Surrealism, Dada, collage, abstract impressionism, impressionism, composers found that new sound generating technologies allowed for a liberating exploration of some of these movements in a musical context.



Responding to developments within the world of Art: Surrealism, Dada, collage, abstract impressionism, impressionism, composers found that new sound generating technologies allowed for a liberating exploration of some of these movements in a musical context.



Responding to developments within the world of Art: Surrealism, Dada, collage, abstract impressionism, impressionism, composers found that new sound generating technologies allowed for a liberating exploration of some of these movements in a musical context.



## Wagner, Mahler, Berlioz, Stauss

By the time of the late Romantics: **Wagner, Mahler, Berlioz, Richard Strauss**, etc., the tonal system was expanded beyond the ability of traditional Western Musical Theory to make sense of it. Seven to fourteen note chords such as found in **Wagner's** late operas confound traditional analysis and also this expansion of tonality as a structural element of the music pushed composers into focusing more on timbre, rhythm, density, effectively weakening the hold which "notes" had on the art form for several hundred years. The effect was the emergence of music which could not be reduced to a piano arrangement.

(Wagner 1813–1883, Gustav Mahler 1860 – 1911)

# timbre rhythm density



serialism, post serialism (polyphony), new composition techniques and paradigms: clusters, alternative performance techniques, extended use of percussion (non-pitched instruments), new expanding role for the “orchestrator”...



We see new compositional techniques foreshadowing the texture of electroacoustic music: the "tone clusters of **Henry Cowell** and **Claude Debussy**, the alternative techniques of piano performance: Scraping the strings, striking them with different objects, bowing them with horsehair, etc. This 19th century orchestral music stretched not only tonal limits but timbral ones. Composers such as **Mahler** had an interest in immense orchestras and the concept of tone colour - adding new instruments to the orchestra such as the cor anglais, the saxophone, the wooden trumpets of **Wagner's** opera Tristan und Isolde, trombones, various newly discovered percussion instruments, sound effect machines (thunder sheets, wind machines, etc). A good example is **Eric Satie's** "Parade" where a typewriter, a revolver and a ship's siren all have written parts in the score. Other examples: 1926 **George Antheil's** Ballet Mécanique with its car horns, anvils, saws, airplane propellers.



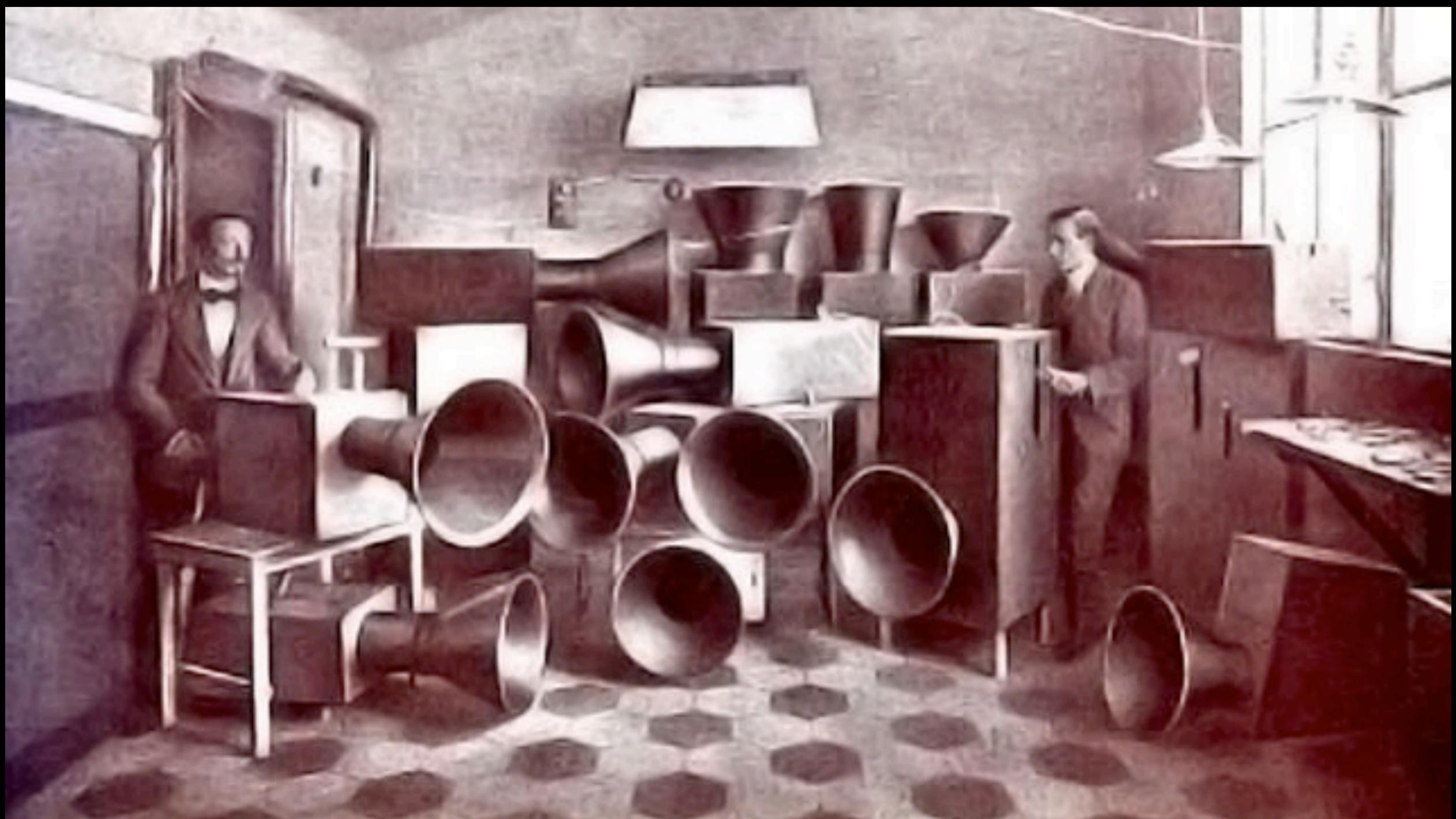
By the early 20th century orchestration is a separate art. New performance techniques develop on conventional instruments to generate new timbres. This work reaches its zenith in the work of **György Ligeti**, a Romanian composer born in 1923 whose orchestral works (Atmospheres) 1961 and choral work (Lux Aeterna) 1966 best represents this notion of an "electroacoustic aesthetic". Atmospheres is music which stands still, music without conventional motion and as such is much like an "atmosphere" shimmering, vibrating and existing in many complex layers. the score is written with some 100 staves; each instrument has its own unique part. like **Iannis Xenakis**, a another Romanina born but Greek national composer whose orchestral and instrumental work is derived from mathematical formulae, the complex movement of clouds of gas, etc. An architect, he worked with **LeCorbusier**, Xenakis coined the term "stochastic" - meaning derived from chance operations and then constrained by rules.



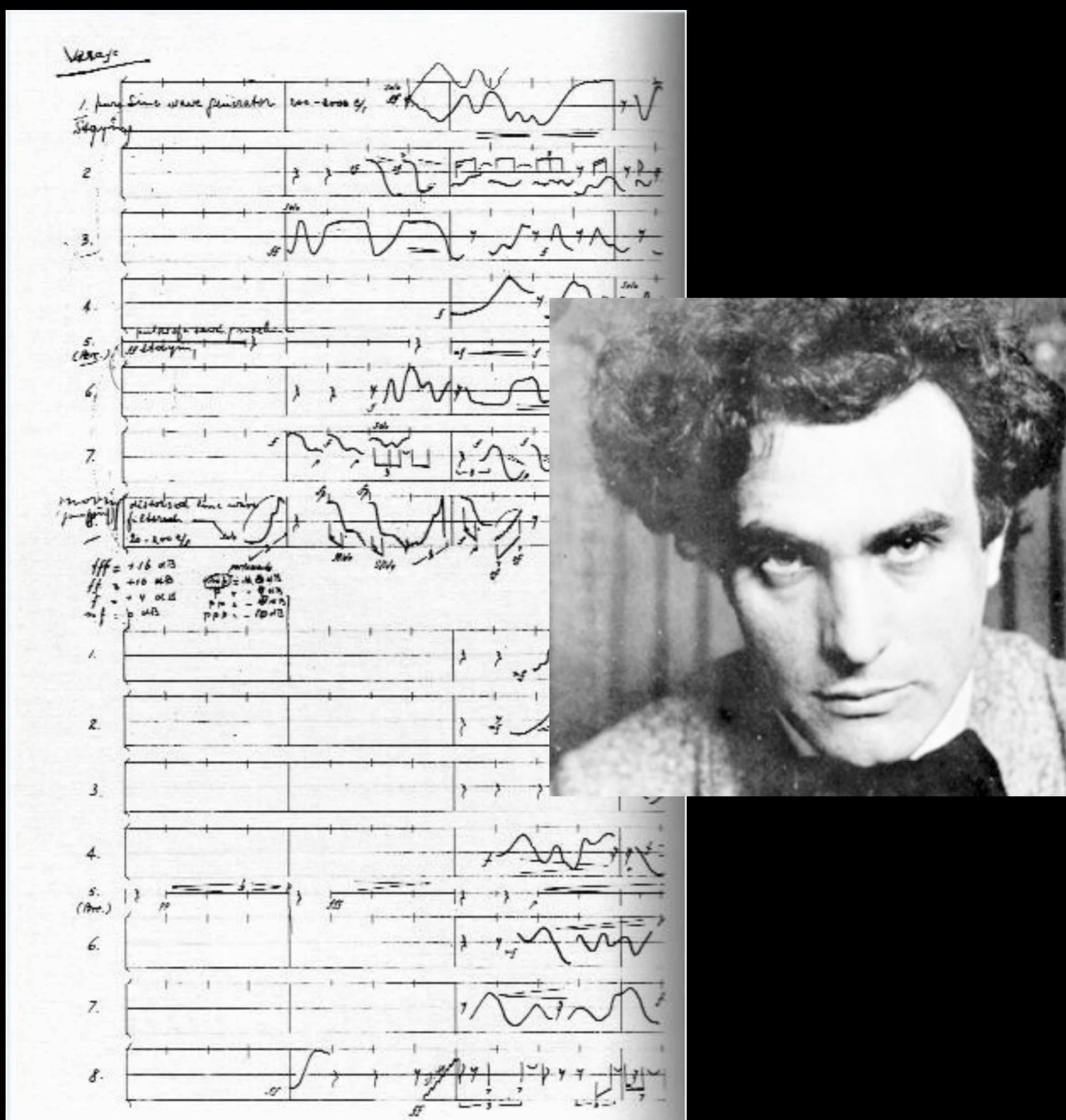
Various World Fairs, in particular the Paris exhibit in 1889 brought music from the "Orient" to the European composers for the first time. In particular the sound of the Indonesian Gamelan; its complex interlocking rhythms, its sophisticated 5 and seven tone tunings, its melodic structure, were to have a profound and lasting effect on **Debussy** and continue to be a source of inspiration to this day.



Associations with artists from other disciplines: Film: (Experimental film influences such as **Dziga Vertov's** Enthusiasm) visual art, theatre: (**Orson Welles'** Mercury Theatre Production for radio broadcast) and dance.



One of the earliest and most single-minded moves toward a new aesthetics of sound were made by a group called the Italian Futurists. Furthered by a painter named **Luigi Russolo** in 1913 with his manifesto called "The Art of Noise" wherein he described a music of noise created by various mechanically based noise boxes. The boxes were various sizes with megaphone horns attached and handcranked noisemakers inside. "Gurgler", "Rustler", "Exploder". The music was based on a rather fascistic and mysoginistic view of the world where the future looked bright because of biplanes (the ultimate ideal of speed) or guns (the ultimate weapon). To give you an idea of the nature of the movement in Futurist theatrical presentations the actors would often enter the auditorium and engage in fist fights with the audience.



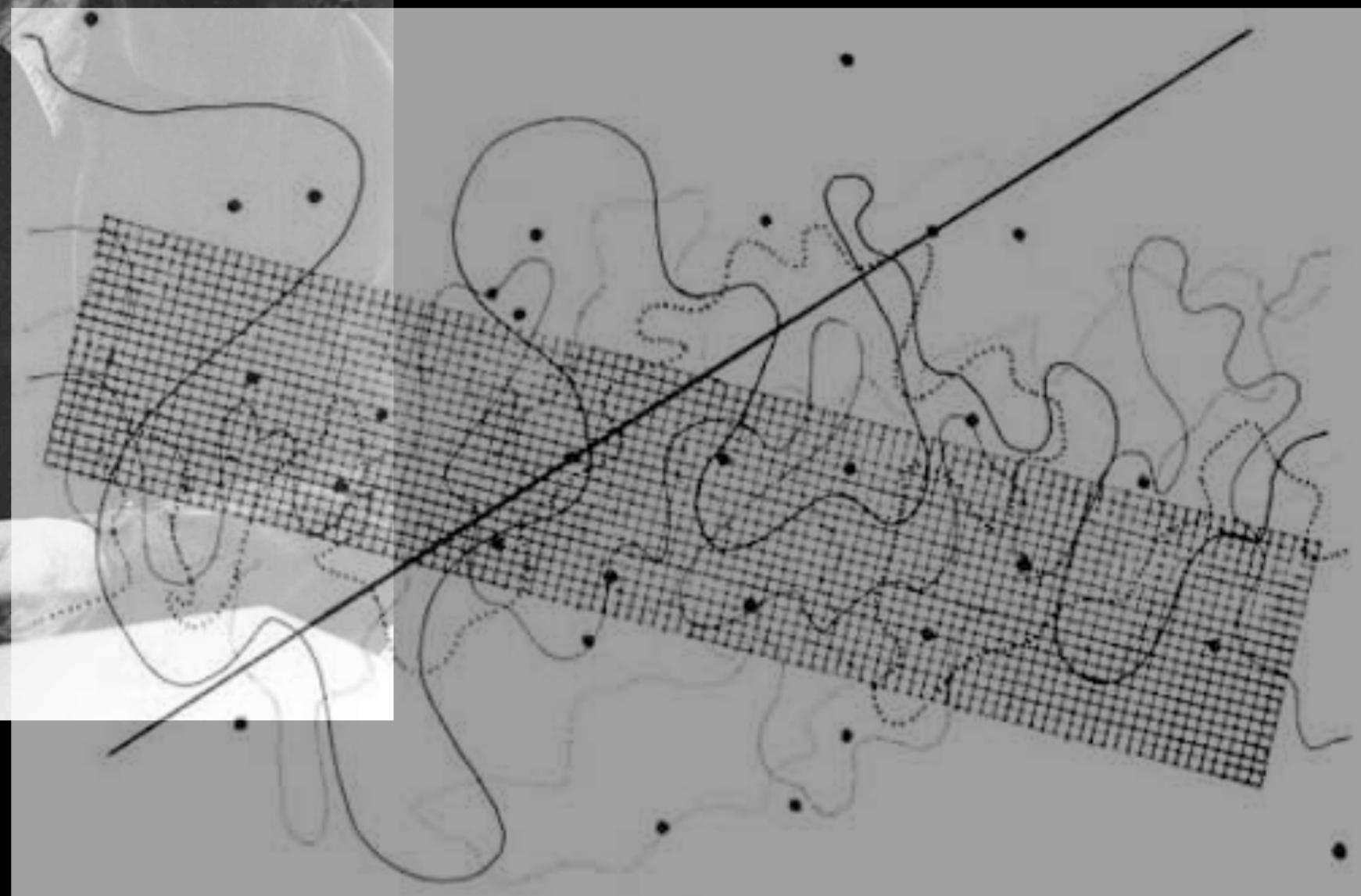
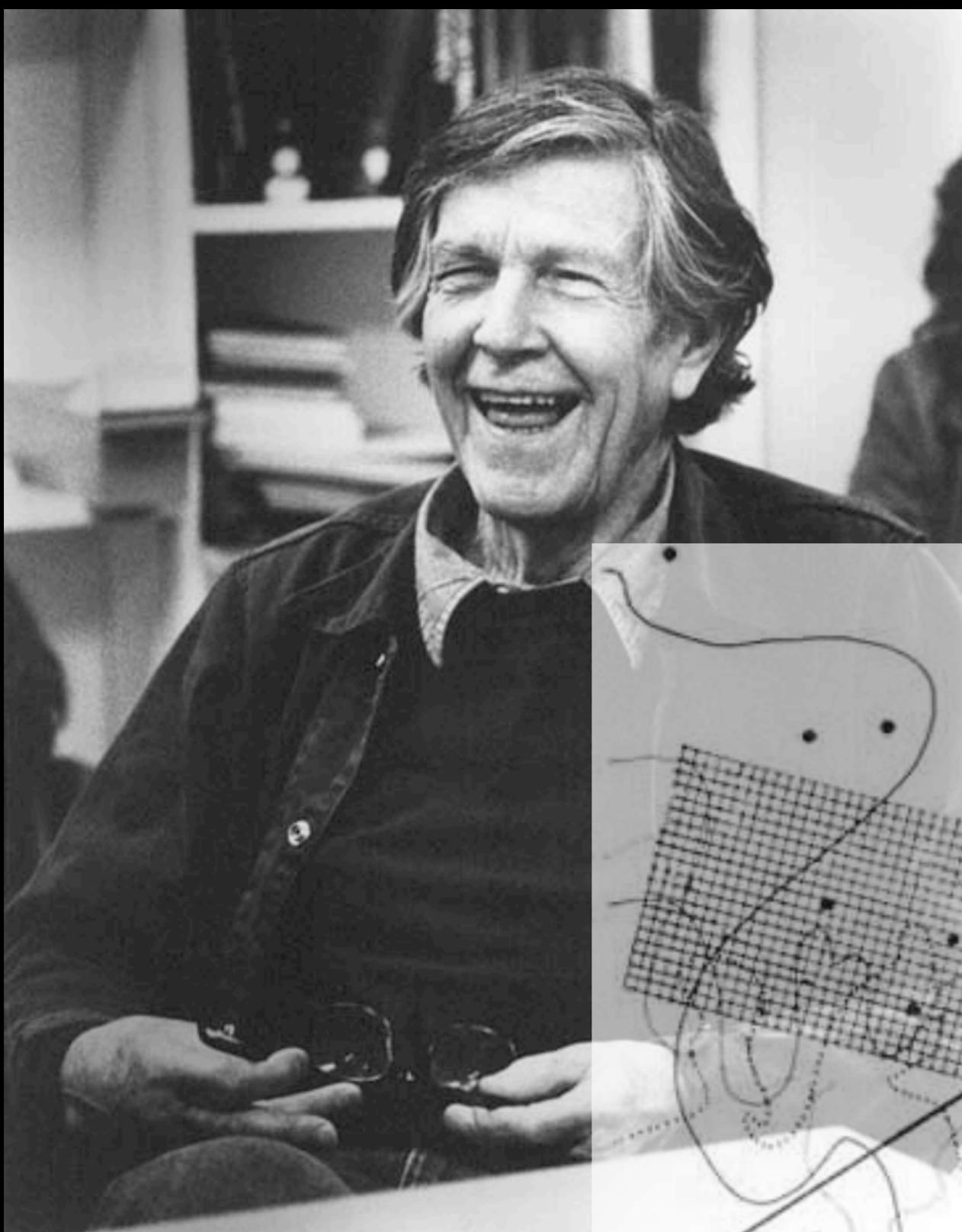
**Edgar Varèse** (1883-1965). A pioneer of new musical thought and one of the founders of electroacoustic music. He approached his work with no *a priori* restrictions as to the choice and use of the component sound sources. Taking a radical stance by stating that music was organized noise his early acoustic works such as Ionization 1930-31 were examples of how he endeavoured to circumvent the limitations of equi-temperament, and conventional notions of timbre and rhythm. His work references environmental sounds, the sound of a rapidly industrialized society with its machines and noises. Ionizations is written entirely for percussion instruments and by using handcranked sirens the composer can get true glissandi and notes between the twelve notes of the equi-tempered octave.



**Henry Cowell**  
**The Banshee**  
(1925)



Another important composer is the American **John Cage**, whose prepared piano pieces and Imaginary Landscape series of the 40's are important works in the development of live electronic performance. In the Imaginary Landscape series (recorded in Seattle) Cage used variable speed turntables with test records containing sine tone of various pitches and radios and amplified percussion instruments to create new timbres.



Another important composer is the American **John Cage**, whose prepared piano pieces and Imaginary Landscape series of the 40's are important works in the development of live electronic performance. In the Imaginary Landscape series (recorded in Seattle) Cage used variable speed turntables with test records containing sine tone of various pitches and radios and amplified percussion instruments to create new timbres.

9 Dec 1939 #1 muted piano, cymbal, 2 varispeed tt w/ RCA test records of fixed and var. freq.

1942 #2 perc quintet and amplified coil of wire

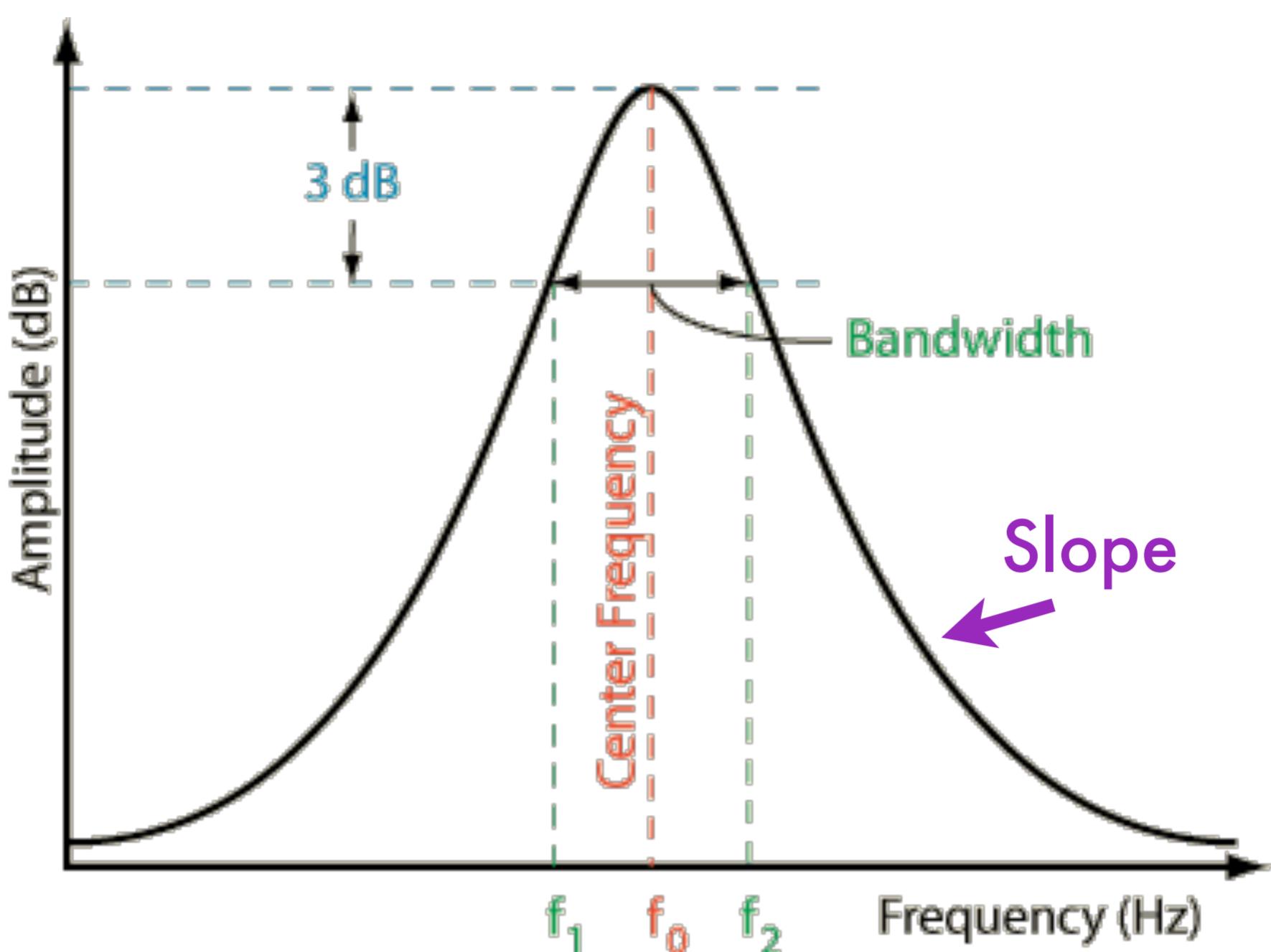
#3 perc. sextet, tin cans, muted gong, audio freq. oscillator, vs tt

1951 #4 uses 12 radios w/24 operators controlling tuning and amplitude.

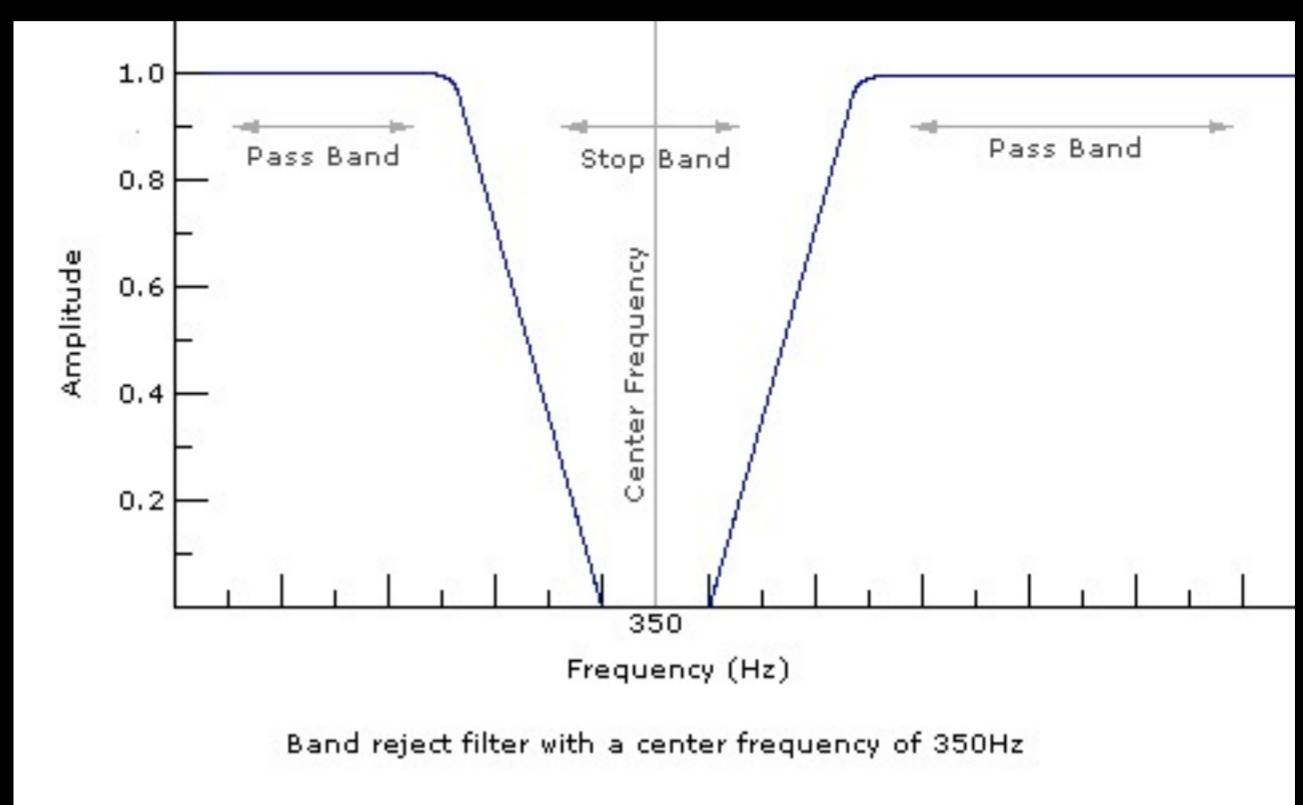
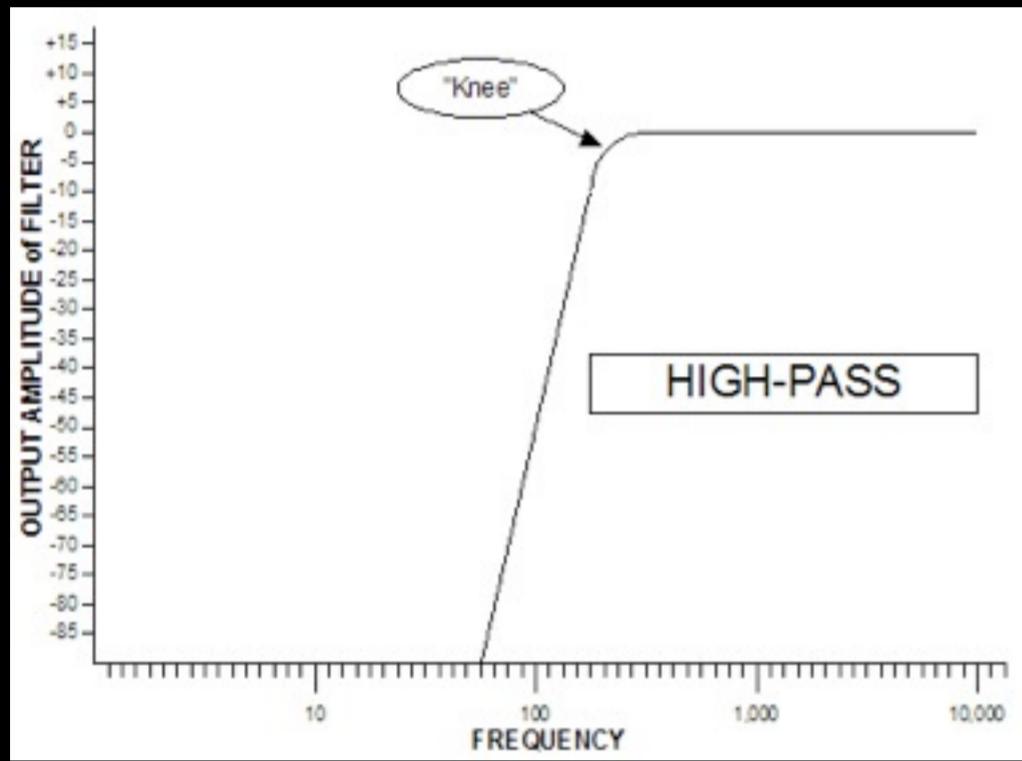
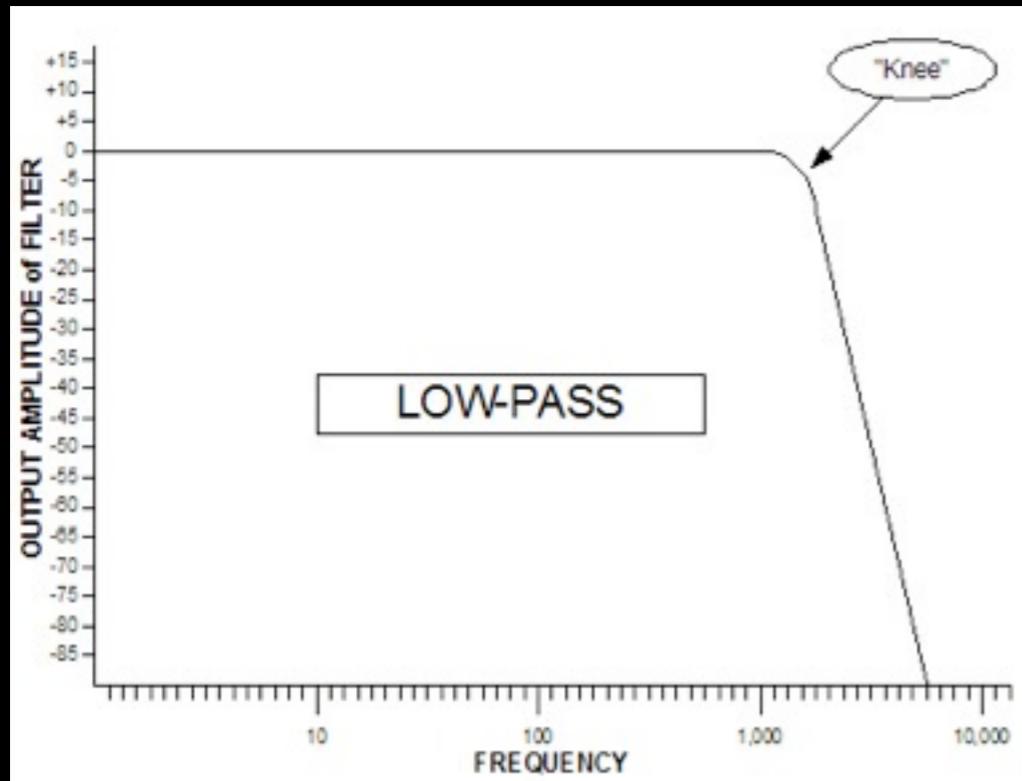
# **Classic Studio Compositional Tools**

- ▶ *Editing*
- ▶ *Direction Change*
- ▶ *Transposition*
- ▶ *Timbre (Equalization)*
- ▶ *Time:*
  - ▶ *Echo (reverb), Delay*
  - ▶ *Delay Processes*
- ▶ *Dynamic Processes:*
  - ▶ *Compression, Expansion,*
  - ▶ *Limiting, Gating*
- ▶ *Envelope Change*
- ▶ *Looping*
- ▶ *Mixing*
- ▶ *Scrambling*

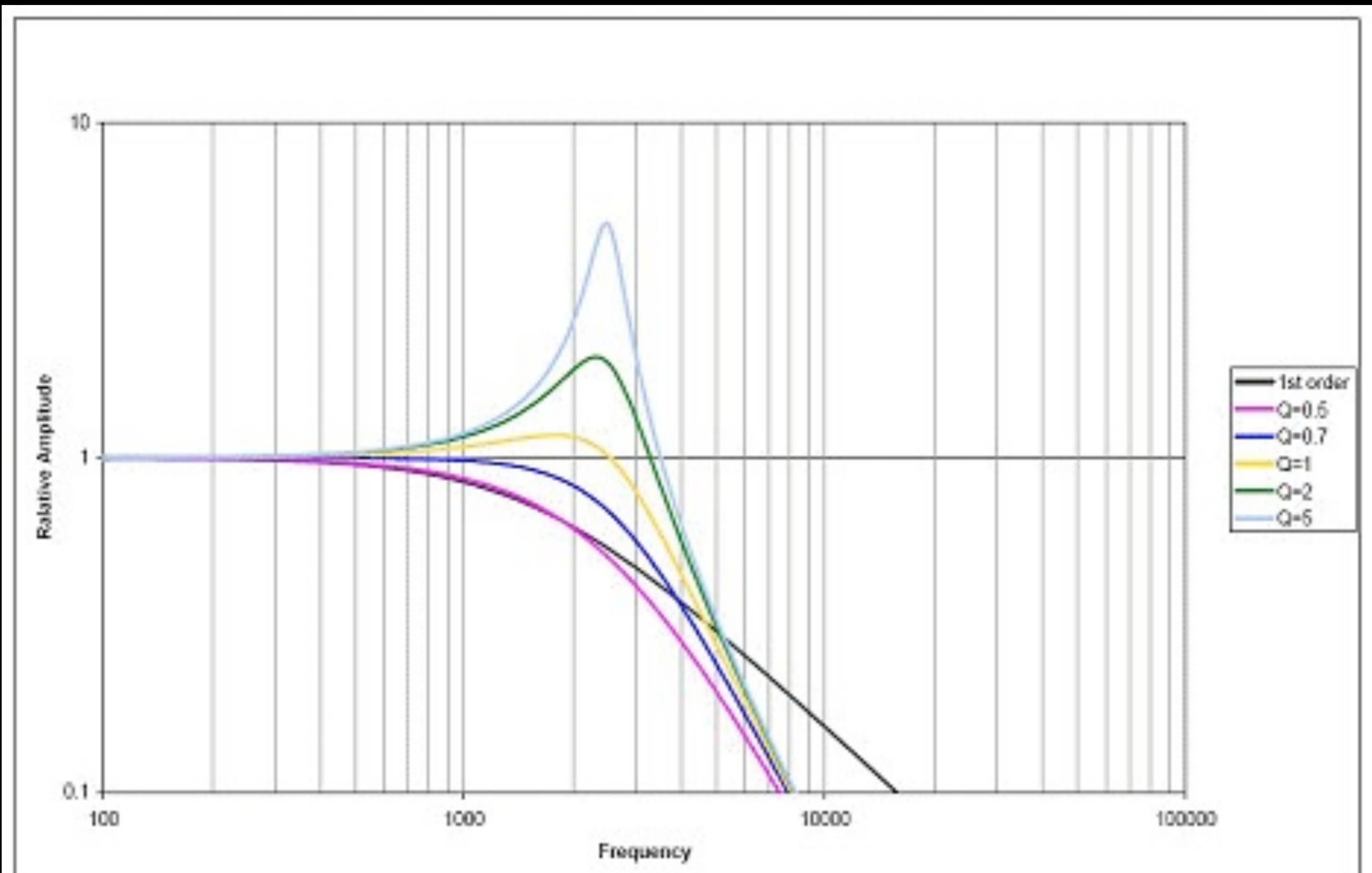
equalizers



Terms for an equalizer: Bandwidth (frequency range), Slope (roll-off) in dB per octave, cut-off frequency (in Hz.), Centre frequency (in Hz.), resonance or “Q”



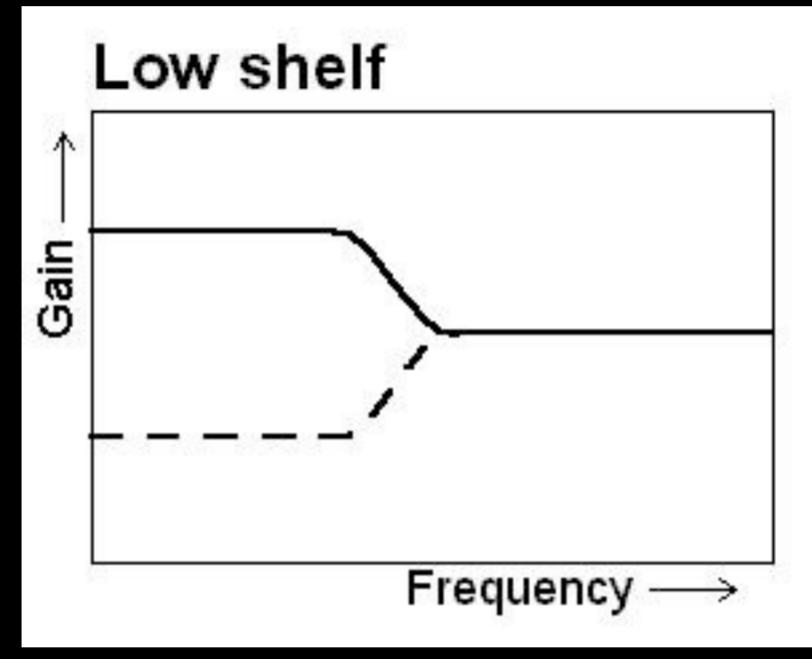
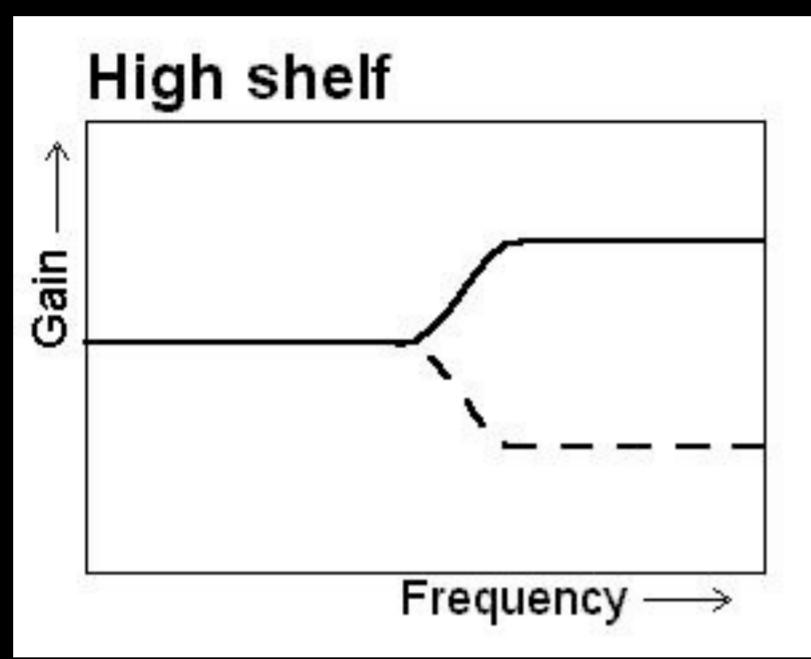
low pass, high pass and band-reject filter graphs...



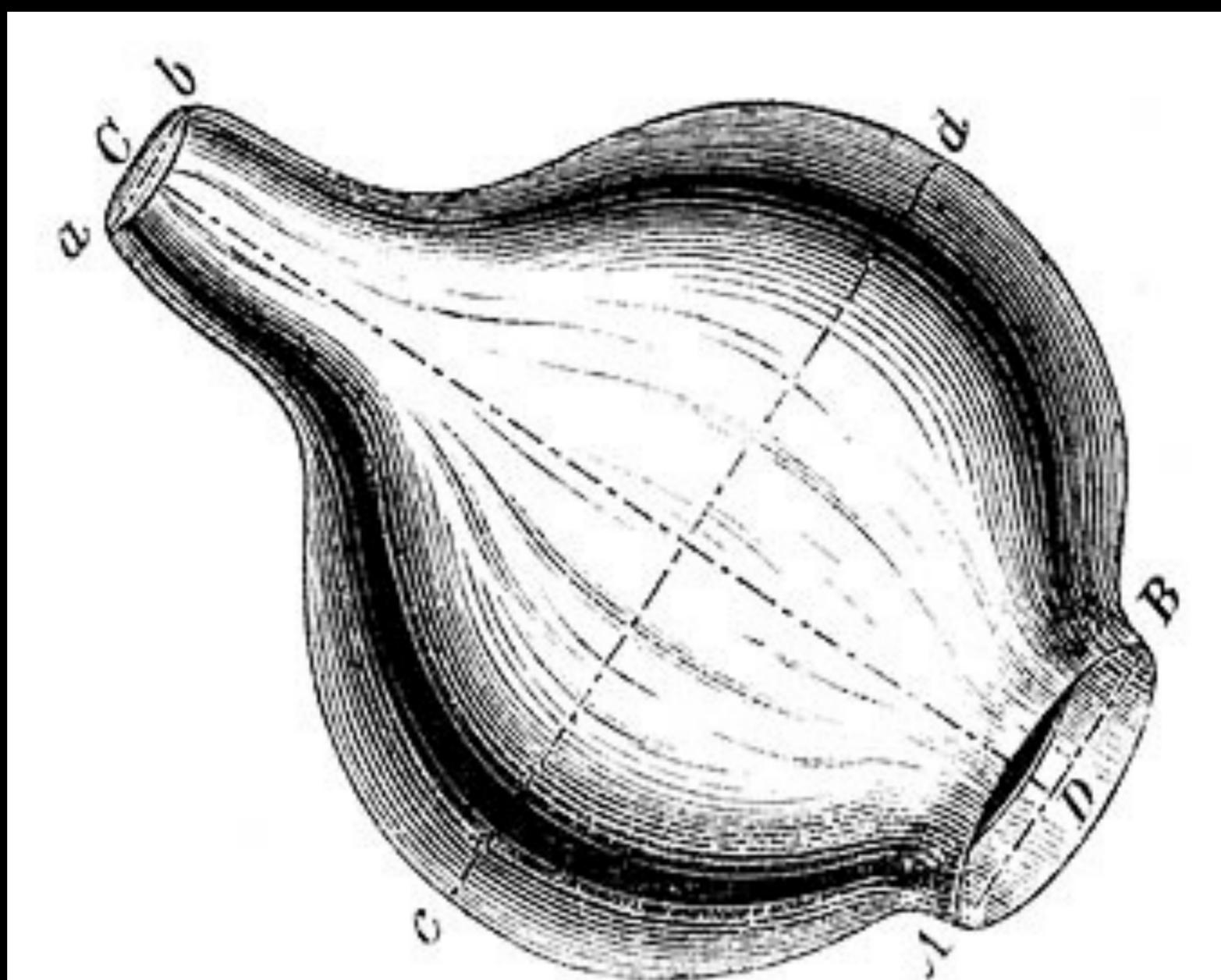
Q effect with a low pass filter



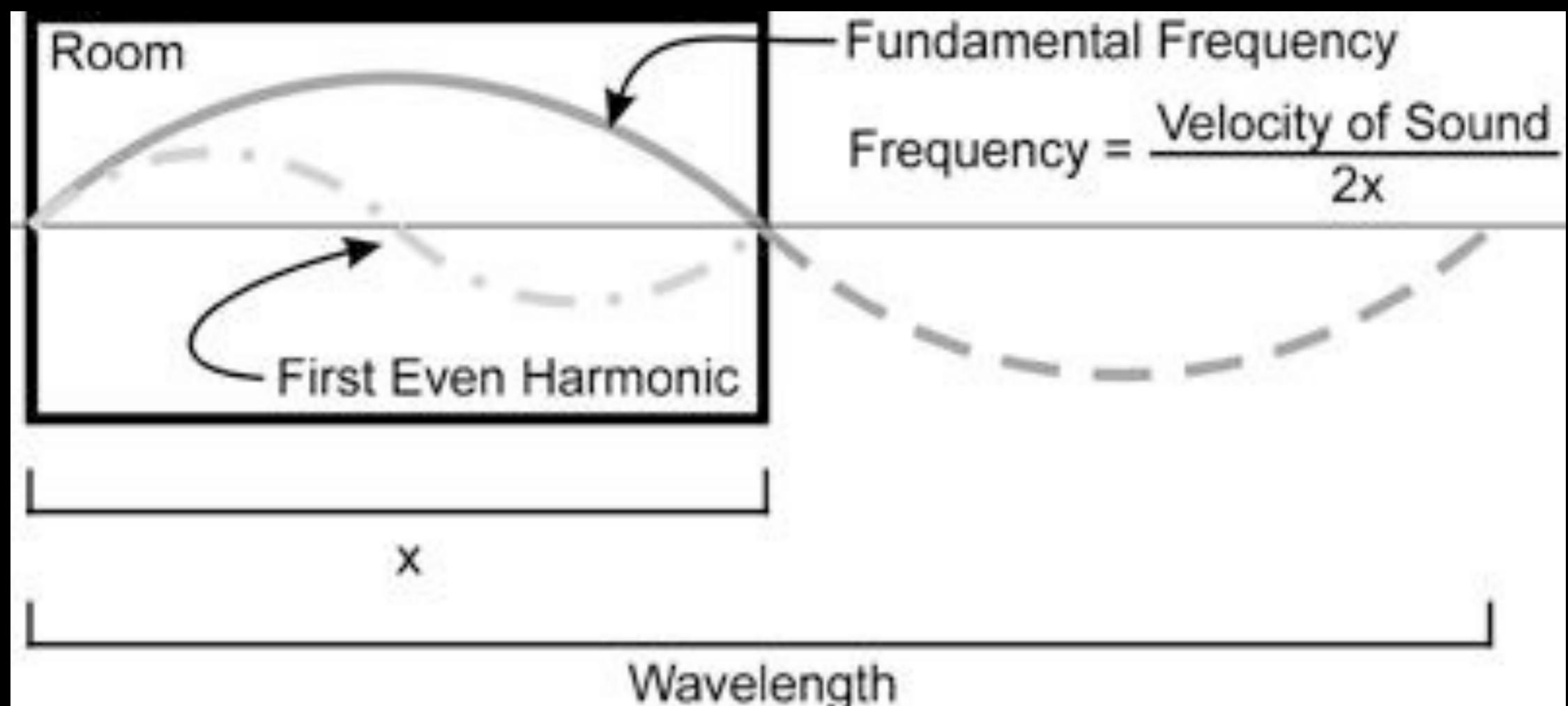
graphic equalizer, parametric equalizer



high and low “shelf” filters

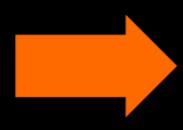


German physicist Hermann Ludwig Ferdinand von Helmholtz (1821-1894) used physical objects ("Helmholtz resonators") to demonstrate that air cavities have sonic resonance. This further helped scientists (and later on, electronic musicians) to describe sound as a physical and visual phenomenon. The guitar is an excellent example of a resonator.



Eigentones: A 110 is 3.122 meters. So in a room with parallel, reflective walls, playing the A string on a bass would create a perfect resonance if the room was 3.122 or 1.561 meters, etc. (I am Sitting in a Room by Alvin Lucier exploits this effect)

# eq. issues...



*phase distortion*



*amplitude shift*

## & techniques

Always attenuate when possible rather than amplify.

- (1) Amplify with high “Q” to locate issue then reduce “Q” and attenuate
- (2) Always check that you’ve not done more harm than good
- (3) Remember that we hear motion, so move frequency centre, especially when using a band reject function

*end*