

# Sound

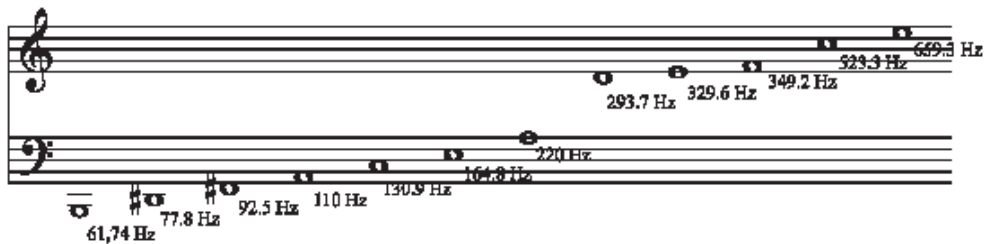
This case displays instruments from the museum's collection of 19th-century acoustics. We have highlighted here the set of 12 Helmholtz resonators and the sirens. All the objects are listed on the reverse of this sheet.

## Resonators

A resonator is an object which can create sound when it vibrates at a special frequency or, more usually, at a small range of frequencies. This vibration causes it to "sing" a note at a particular pitch.

For example, when you blow across the top of a bottle, you can sometimes produce a sound. The bottle has become a resonator.

The 12 Helmholtz resonators work at the following frequencies and pitches:



Because a resonator responds to a known frequency, early examples were used to analyse the components of sound.

What we hear as sound is properly called "complex" sound, and is made up of many "pure" sounds. So when a complex sound is produced in front of a set of resonators, every pure sound present creates a resonance with its corresponding resonator. By listening, the composition of the complex sound is known.



## Sirens

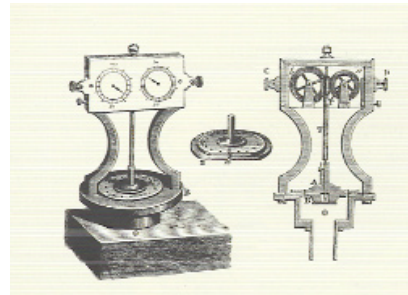


The siren is an instrument invented by Charles Cagniard-Latour in 1819. It was used to determine the number of vibrations in a sound during a determined duration.

The instrument takes the form of a cylindrical box with a pair of overlying discs, one fixed and one movable, both pierced with 16 holes, and also two dials, which are revolution counters.

When air is blown into the siren through a tube, the movable disc rotates. Whenever its rotating holes lie over those on the fixed disc, some air flow occurs. The faster the rotation, the more frequent the vibration of the air and the higher the pitch of the sound.

The frequency of the sound is the number of vibrations per second. It is found by multiplying the number of holes in the discs (16) by the number of turns made during a second (shown on the revolution counter).



A double siren uses the same principle but with two plates and two discs, making it possible to create and compare two sounds at the same time.

Cagniard-Latour gave the instrument its name because it could be used not only in air but also under water, so he identified it with the song of the legendary siren or mermaid.

### Sound: case listing

Shelf 1 :

Wave Demonstration Model, by  
Watkins & Hill?, London, 19th  
Century  
[22433]

Shelf 2 :

1) Siren, French, Late 19th Century  
[14729]

2) Siren, French, Late 19th Century  
[27652]

3) Siren, by Watkins & Hill, London,  
19th Century

[27499]

4) Professor Hughes Sonometer  
Induction Apparatus, London, 19th  
Century  
[86021]

Shelf 3:

Helmholtz Double Siren, by  
Rudolph Koenig, Paris, 1865-1880  
(with stand) [17376]

Shelf 4 :

Twelve Helmholtz Resonators, by  
Rudolph Koenig, Paris, Later 19th

Century

[84327]

Shelf 5 :

1) Edison Tinfoil Phonograph, by  
Edison?, USA, c. 1877?  
[56613]