

The Galton Whistle

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In the mid-1800s, Sir Francis Galton was presented with a dilemma. He wanted to test hearing ability for higher frequencies but did not have a piece of equipment to adequately measure them. Using some scientific ingenuity, he went about creating an object to produce the sound frequencies he wanted to study. He ended up with a small brass tube with a slit at the end of it. Air would be forced through the tube, coming out at the slit as an audible tone. Along the tube a sliding piece could be maneuvered up or down the tube to create different frequencies. The sliding plug was marked so that precise notes could be recorded in research. It became known as the “Galton Whistle.”

Galton’s 1883 book *Inquiries into Human Faculty and Its Development* described some of the pioneering research he conducted with the whistle. Galton and subsequent researchers used these whistles to create increasingly higher frequency tones to test research subjects as well as animal abilities to hear different tones. Galton was able to determine that the normal upper limit of human hearing was about 18 kHz. He also noted that the ability to hear higher frequencies declined with age. (Reportedly, Galton derived much pleasure from demonstrating this deficit to older people.)

From his early tests on humans, Galton adapted his new whistle to test the hearing of various animals. He attached the whistle to a long tube with a rubber squeeze ball at the other end. Galton would go the enclosures of different animals, at the zoo, use the long stick to reach toward the animals and squeeze it to make a pitch. He then would watch for the animal’s ears to prick up as an indication of hearing. He was also a fan of walking through the streets and seeing which types of dogs could hear higher pitches (small dogs were better at this than large dogs). Galton noted that natural selection had produced the best hearing of shrill notes in cats.

Early comparative psychologists took the crude animal assessment techniques of Galton and refined them. Galton whistles were used in the examination of hearing in reptiles (Kuroda, 1923), insects (Wever & Bray, 1933), hedgehogs (Chang, 1936), bats (Galambos, 1941), and of course rats (Finger, 1941; Smith, 1941).

The whistle was combined in the psychological laboratories with acoumeters, tuning forks, and other hearing instruments. The Galton whistle was manufactured with tables of vibration rates to five digits. The whistle itself went through several different design changes to make its tones more precise and the Edelman Institute, one manufacturer of Galton whistles, added a diaphragm to the device to prevent the sin of “over-blowing” (Ruckmick, 1923). Early psychologists made design changes of their own for the necessity of their experiments. At Harvard, Frank Pattie invented a blower that could deliver a constant, steady stream of air pressure through the whistle for up to a half hour. Despite its simplicity, the whistle was used in highly complex and revealing psychological experiments. One such early experiment combined a Galton whistle with a Titchener Sound Cage (see the History Corner in the January 2009 *Observer* for more information about the Sound Cage) to study differences in ear sensitivity toward sound (Ferree & Collins, 1911).

From its creation in 1876, the Galton Whistle is still in use today, most commonly known as a dog whistle. The Archives of the History of American Psychology is home to the older version of the Galton whistle pictured above. An invention of simplicity and imagination, Galton's whistle has played a significant role in our understanding of auditory processing.