

AHS London Lecture Thursday 26 November 2015

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Frogs, Frequencies and Forks: The Bulova Accutron and the Tuning Fork as a Time Standard

In 1961 Bulova launched the Accutron wristwatch – the first watch in the world to use the recently developed transistor. An equally significant step was to replace the normal power train, escapement and balance wheel with a tuning fork resonating at 360 Hertz. The Swiss inventor, engineer, Max Hetzel had previously studied acoustic tone control for machine tools. Hetzel maintained that he was an engineer, not a watchmaker, though went on to invent tuning fork successors to his original movement, principally for Omega.

The watch became an emblem of American high technology and was chosen as the Presidential ‘gift of state’. It also played a significant part in the American space programme. And though some astronauts did wear them, the key role was the Accutron movement itself, in incorporated in various specialist timers and dash displays.

The tuning fork movement was widely adopted, from Citizen in Japan, to well-known Swiss houses, until the arrival of quartz movements from 1969.

Though the Accutron system was original, the tuning fork had an important pre-history. During the 19th century it could time phenomena that were too fine for discrimination by conventional clocks. In physiology laboratories the secrets of muscle and heart action were studied against time traces provided by a tuning

fork allowing events as brief as 1/100th of a second to be analysed.

The tuning fork also replaced the pendulum in some clocks, both for ‘polite’ use, and in laboratories to investigate acoustics. Moreover, in the interwar period, the tuning fork found a new role as a frequency standard in the developing fields of radio and in electrical power generation.



Dr Andrew Nahum is Keeper Emeritus at the Science Museum and has a wide-ranging interest in the history of technology.

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