HIPP CHRONOSCOPE

Peyer & Favarger, Co., Neuchâtel, Switzerland, No.13919

Purchased by James Mark Baldwin, University of Toronto, in the academic year, 1890-91, from Clay and Torbenson, Co., Philadelphia, $ 87.00.

"A chronoscope driven by Clock-work, whose movement is regulated by a vibrating tongue; it is provided with two dials of 100 divisions each, one recording seconds and 10ths, the other 100ths and 1000ths (sigma); the movement of the pointers is started and stopped by means of a clutch actuated by electromagnets, and there are connections whereby the record may either be started by making the circuit and stopped by breaking it, or vice versa." Warren, (1934).

Researchers used the Hipp Chronoscope primarily as a timing device for reaction time experiments. Titchener (1915, p. 328) cautiously endorsed this instrument as a reliable and durable timing instrument. He would not claim, as did a contemporary, that the "best instrument for measuring reaction times is the Hipp Chronoscope" but was pleased that a fellow psychologist had the courage to do so.

Charles Wheatstone developed a Chronoscope in 1842 to determine the velocity of projectiles at an English gunnery. In 1848 Mathias Hipp improved upon Wheatstone's design making the movement of the clockwork more uniform.. (Edgell and Syme, 1906).

Astronomers were the first to appreciate the unparalleled accuracy of Hipp-Wheatstone invention. They used it to measure inconsistencies in time-reliant observations. In 1822, the astronomer, Bessel, coined the phrase "personal equation" to describe discrepancies between the measurements of observers for the same stellar events. Over the next 60 years, astronomers went to great lengths to mechanize their observation process in order to eliminate this so-called personal equation. (Schaffer, 1988).

Wilhelm Wundt, and other early adherents of the "New Psychology," viewed the personal equation as a psychological issue. Observational differences, they argued, were due to inherent psychological differences in individuals. In 1874 Wundt published studies of "reaction times" displaying his attempts to discover laws that may govern response behavior. In this way, the "personal equation" became something to study in its own right. The Hipp Chronoscope, with its putative accuracy, became an invaluable timing device for measuring these reaction times.

As Titchener hinted, the Hipp-Chronoscope was not free of controversy. Often the same person, under similar experimental conditions, registered differing reaction-time results. Psychologists viewed these timing discrepancies as a errors of the Hipp Chronoscope. They introduced control instruments - Hammer Apparatus, and Fall Chronometer - to control error arising from the central timing device. Draaisma and Benschop, (1996) refer to a "receding line of calibration instruments" that came to surround the Hipp-Chronoscope.

Persistent discrepancies in the reaction time experiments also led to modifications in theory. Cattell speculated that discrepancies may be a sign of two distinct types of reactions - motor and

sensory. In other words, subjects had different reaction times, depending on how they focused their attention - on the motor aspect of the response, or the sensory aspect of the stimulus. Baldwin took Cattell's idea one step further by proposing that reactions depended on distinct memory types. Many of the experiments that went into Baldwin's theory of "Types of Reaction" were conducted at U of T.

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