

70-лет Победы в Великой отечественной войне
100 лет героической обороне крепости Осовец в Первой мировой войне

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**BILLROTH'S EARLY OBSERVATIONS (1895) ON PACING FREQUENCIES
MAY HAVE INCLUDED CASES OF DYSRHYTHMIA¹⁶**

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Introduction and hypothesis. Although “we are living in an age of staccato, not legato”, a slogan written down in 1925 by the famous composer of Russian descent George Gershwin [1], just a few scientific analyses of pacing frequencies in humans had already been described by that time. The most notable observations of this kind were performed by the founder of modern surgery Theodor Billroth, and edited posthumously, Berlin, 1895 [2]. Now in view of present techniques of teaching and training in e.g., the performing arts - as a matter of fact consisting of providing teacher feedback on student performances, with attention to elements such as timing and rhythm accuracy [3] - it may be interesting to reevaluate Billroth's late 19th century descriptions. His first observations concerned the training of recruits, some of whom never acquired the sense of rhythm necessary to keep their steps with one another, when marching to drum taps [2]. We hypothesize that Billroth's subjects may have included some “dysrhythmic individuals” (for definition: see below) [4]. Material and methods. Starting with the close reading of Billroth's descriptions (pp. 26-28, original 1895 edition), consisting of six clusters of observations [2], we made a critical comparison with a small but representative selection of current 21st century literature about individuals diagnosed with “beat deafness” or “dysrhythmia” [5, 6]. “Dysrhythmia describes the abnormal timing and coupling of movements [...]” [4]. Results. In four out of Billroth's six clusters of recruits, comprised of mixed nationalities, high percentages of otherwise healthy individuals showed to be unable to walk in step to the tune of a band. Many of them came from mountain countries (“aus den Gebirgsländern”). In Billroth's concept of musicality as such, moreover, the rhythmic elements are first and foremost, while in today's criteria of musical performance rhythm accuracy is just one out of, say, fifteen elements [3]. Billroth's typical 19th century concern for the physical and psychological well-being of mountain people,

¹⁶ К.Й. ван Цвиетен Ранние (1895 г.) наблюдения Бильрота касательно задающего частоту шагов ритма могли содержать описания случаев дизритмии.

however, matches fairly well with 21st century biological studies [7]. Therefore, taking into account the effects of 19th century finite population size and inbreeding on genetic variation, random evolutionary changes with respect to e.g., congenital rhythm perception deficits may be understood [5]. Recruits from flat land (“Flachländer”) were found most suitable for marching, Billroth finally concludes [2]. Meanwhile, today’s studies offer reliable insights and plausible percentages of dysrhythmia and beat deafness, in neurologically compromised as well as in otherwise healthy persons - regardless of their country of origin [4 - 6]. Conclusions. Billroth’s pioneering 1895 bundle of writings entitled “Who is a musical person?” (“Wer ist musikalisch?”) starts by describing the sense of timing and rhythmic accuracy shown by someone’s ability to walk in step to the tune of a band [2]. His high percentages of healthy, late 19th century recruits who were unable to do so, and who mainly originated from mountain countries, may be elucidated taking into account today’s population genetics of then living mountain populations [7] in which some may have shown a congenital beat deafness or dysrhythmia [5, 6].

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