Contribution ID: **1** Type: **not specified**

Between acoustics and music: Two letters of Giovanni Battista Benedetti to Cipriano de Rore

Wednesday 28 September 2022 14:00 (25 minutes)

In two letters written to the famous musician Cipriano de Rore (c 1515–1565), Giovanni Battista Benedetti (1530-1590) afforded two different kinds of problems: one mathematical, raised by just intonation (a system of tuning where the goal is pure intervals with simple acoustical ratios) and the other physical, raised by the nature of observed consonances of two different tones having particular ratio. The letters were published in the Diversarum speculationum mathematicarum et physicarum liber of 1585, after de Rore's death. In them, Benedetti with a mathematical approach 'demonstrated'in a clear way the well-known phenomenon for which some passages of counterpoint played in just intonation cause inevitably the music ascend or descend by a syntonic comma. He also formulated the physical law for which the frequency of vibration of a string is inversely proportional to its length by drawing on experience and not on a rigorous proof. Moreover, he succinctly wrote something that explained, or at least which could be interpreted as an explanation of, the consonances of two tones: consonance is due to periodic matching of vibration, what goes under the name of correspondence law. Benedetti's letters ended with a mathematical formulation of a rule to express the goodness of consonances. It is the purpose of the present paper to understand how much Benedetti was original and to search from where he drew conclusions: his empirical observations, his mixed mathematical vocation, his knowledge of the philosophy of nature of the time, his connection with Aristotelian conception of music.

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Session Classification: Physics and other sciences

Track Classification: sisfa 2022