POLYTECHNIC OF TORINO
FACULTY OF ARCHITECTURE 1
Degree in Architecture
Honors theses

Architecture and music: proportional ratios in the two arts from Vitruvio to Milizia

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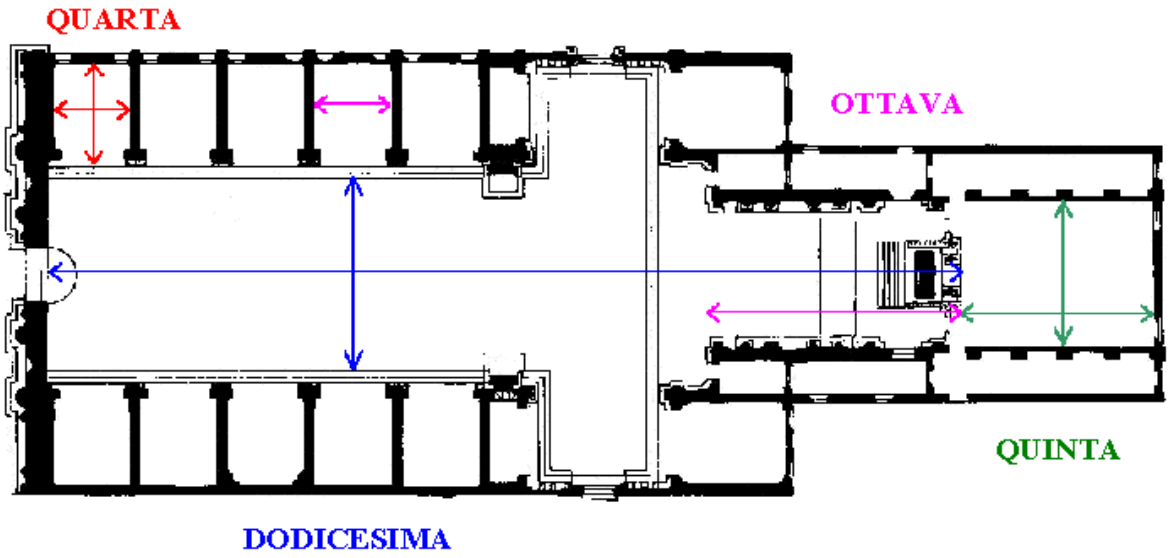
References to proportional music characterised architectural treatises until the 17th century, or to put it another way, the principal theoretical connections between music and architecture regarded the proportional kind. In music, proportional ratios rise from length of strings that determine musical intervals. Similarly, in architecture they relate to elements of architectural orders or to parts of buildings. Moreover, there are projects and buildings directly showing the application of musical theories to architecture. In Western culture the musical scale, based on arithmetic ratios between the notes, evolved in three main stages, where number and type of proportional ratios, determining musical consonances, changed with time.

For Pythagoras there were only three consonances (the fourth, the fifth, the octave); for music theorist Zarlino (late 16th century) there were also the fourth, the fifth, the octave, the thirds, and the sixths. Towards the end of the 17th century Werckmeister corrected all the musical intervals with 'equal temperament'. Theorists of architecture were therefore faced with the evolution of musical theory and until the late 17th century comparisons between architectural and musical treatises showed convergences and historical incongruities between the two arts.

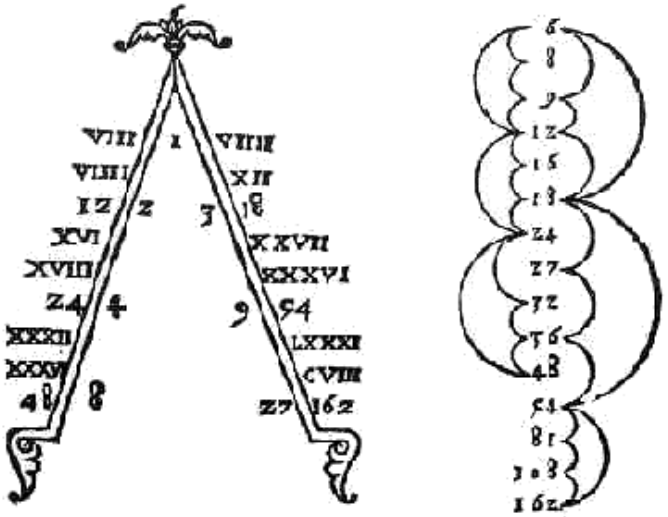
Vitruvio started a tradition that emphasised the importance of musical knowledge for architects; thanks to the publication of several editions of his treatise, this tradition was still popular during the Renaissance and was supported by architects (such as Alberti, Palladio, Vignola, Serlio), painters (like Lomazzo, Dürer) and other characters (for example, Pacioli, Giorgi). At that time, current Pythagorean and Platonic philosophy, strongly based on numeric content, was linked to the Christian doctrine; a cosmological significance was subsequently ascribed to music. In this way, harmonic theory was legitimised by such a concept and acquired an important place among proportional theories in architecture that lasted for the whole Reinassance period. In other words, music was associated with architecture thanks to those common mathematical and cosmological theories.

The application of harmonic theory to architecture is evident in many buildings of the period, such as the famous villas by Reinassance architect Andrea Palladio. Yet, the most important example is the Church of *San Francesco della Vigna* in Venice by Iacopo Sansovino.



Plan of Sansovino's Church of San Francesco della Vigna in Venice (16th century), including Pythagorean consonances.

In the *Memorandum per San Francesco della Vigna* by monk Francesco Giorgi we can observe that ratios between lengths of elements in the plan follow the musical consonances elaborated by Pythagoras, in order "to tune the church to the universal harmony."

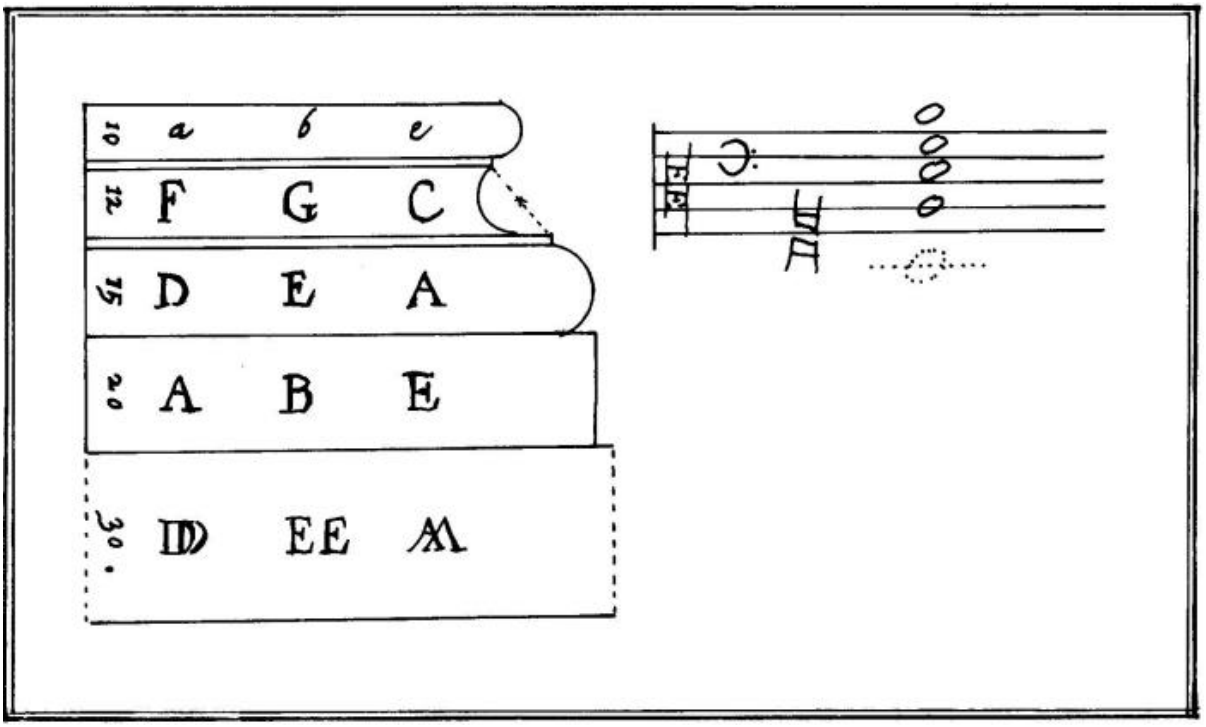


Giorgi: platonic lambda and musical consonances
(from *De Harmonia Mundi Totius*, 1525)

In the 17th century this convergence on cosmological contents lost its value owing to the achievement of new scientific knowledge; with the crisis of geocentricism, even the cosmological concepts linking music to architecture were unavoidably confuted.

In fact, the relationships between cosmology, religion, science and art were beginning to be interpreted differently.

At that point harmonic theory contributed to divide architectural culture: as the employment of musical ratios did not correspond to the universal model, it became an aesthetic device. On the one hand there were supporters, like N. F. Blondel in France - who applied the harmonic theory to St. Denis Gate in Paris - and Wotton in England. On the other hand, opponents, like Perrault, began to reject it, viewing it as a matter of taste relativism. The new scientific discoveries helped both parts support or criticize the same theory.



Blondel: musical ratios in the attic base (*Cours d'Architecture*, 1683)

During the 18th Century the debate on harmonic theory continued and architects still sided on opposite fronts. Briseux, Laugier, Morris, Hogarth, abroad, Vittone, Milizia, Lodoli and some important characters of the Venetian scenario, like Temanza and Preti (authors of an interesting dispute on the harmonic proportional mean), in Italy, were all involved in such controversy.

After harmonic theory had lost the religious meaning legitimising its universal character, and was not substantiated by musical theory – as the arithmetic computation of musical intervals had been rectified with 'equal temperament' – it could only be re-proposed acritically in the name of tradition.

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