

Brunelleschi's Tempered Proportions

by Liliana Gorini

Architecture and Music

by Lando Bartoli

Florence, Italy: Edizioni dell'Erba, 1998

42 pages, paperback

Jan 6—In the most recent weeks, Lyndon LaRouche has been emphasizing the importance of Brunelleschi's Dome in Florence for starting a new Renaissance worldwide. A close friend of the LaRouches, Lando Bartoli was the world expert on the dome Brunelleschi designed for the cathedral of Santa Maria del Fiore in Florence.

In the 1980s Bartoli fought alongside the Schiller Institute to save the dome from the risk of destruction, when a proposal was implemented to fill with cement its 48 staging holes, where its edge meets the supporting structure¹ inside the Dome. They had purposely been left open by Brunelleschi. The holes were key to the Dome's construction,—which was a true revolution in architecture at the time of the Italian Renaissance.

Bartoli won this battle, and the Dome of Brunelleschi still stands, in all its beauty, as it has since 1434.

1. The story is told in an interview with Bartoli titled, [Can the Dome of Florence Cathedral Be Saved?](#) in *EIR*, March 25, 1988.

It is the first thing you see when you come to Florence by train.

In 1998, before he passed away in 2002, Bartoli published this little-known booklet, *Architettura e musica*, which echoes what Lyndon LaRouche has been saying through the years about the connection between music and science, and between science and art in general, including, of course, Renaissance architecture.

The book reports on Bartoli's measurements of the Chiesa di San Salvatore al Monte, also in Florence, in order to demonstrate that it was built based on golden mean proportions, as were also the Brunelleschi Dome,



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The church of San Salvatore al Monte, cited as an example of musical architecture by Bartoli.

the Pazzi Chapel, and many other churches and chapels of the Italian Renaissance. But Bartoli goes beyond the “criteria of proportions” (harmonic, geometric, and arithmetic) used by Antonio del Pollaiuolo in building this church, and investigates their connection to musical intervals.

This connection is something emphasized by both Brunelleschi and Leon Battista Alberti, which recalls Leonardo da Vinci’s definition of music as the “representation of the invisible.” And it is something which is proven by Brunelleschi’s Pazzi Chapel, which is able to “sing back” to a singer since it was built on the basis of the same golden mean proportions as the human, trained, *bel canto* voice.

In order to prove that for the case of the San Salvatore al Monte church in Florence, Bartoli built a lattice “using the Florentine unit of length, the braccio” (0.5836 meters) “inserted into reticular grids which represented the octave, fifth, fourth, whole step, unison, etc., in order to have the demonstration of the perfect formulation of the proportional and harmonic plan of Leon Battista Alberti.”

Measuring the nave, sanctuary, and other sides of the church, on this basis, Bartoli came to the following conclusion: “Translating these ratios and numbers into musical terms, you can define the first one (14:14) as a unison, the second one (1:3) as a fifth (analogous to the 2:3 ratio since 1:3 is the octave of 2:3), and the third one (48:54) as a fourth.”

Further on in the book he writes: “Nothing could demonstrate better than this, the fact that Renaissance artists did not mean to translate music into architecture, but, in the harmonic intervals of the musical scale, they saw the audible proof of the beauty of the ratios of small whole numbers 1:2:3:4.”

The Harmony of Bach

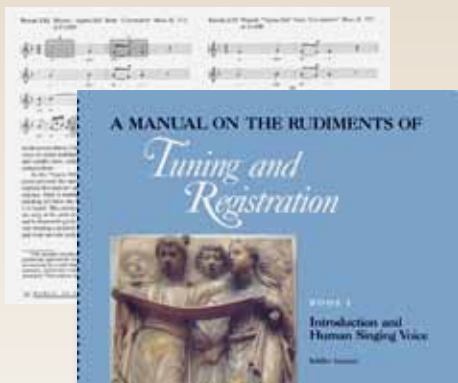
Discussing this matter with an Italian cellist and composer, Pietro Grossi, Bartoli got confirmation of this music-architecture link from the work of the most important Classical composers, including J.S. Bach, “who used to create his musical compositions using reverse motion, mirror fugues and the reverse of the mirrored.” This statement reminded me of discussions we

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—Norbert Brainin, founder and first violinist, Amadeus Quartet

“Without any doubt an excellent initiative. It is particularly important to raise the question of tuning in connection with *bel canto* technique, since today’s high tuning misplaces all register shifts, and makes it very difficult for a singer to have the sound float above the breath. . . . What is true for the voice, is also true for instruments.”

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had in the 1970s with Mr. LaRouche on Bach's *Art of the Fugue*, which includes a mirror fugue (or rather two fugues, one of which is the mirror image of the other). It is as though a mirror were placed above or below an existing fugue, producing inversions of each interval in each part, as well as inverting the position of the parts within the texture, so that, for example, the topmost part in one fugue is inverted to produce the lowest part in the other. This is well demonstrated by the two four-part fugues of Contrapunctus 12 in the *Art of the Fugue*.

According to Bartoli, Leon Battista Alberti and Brunelleschi proceeded in the same way as Bach. "Architects have the same possibility, since the same harmonies are kept if we observe an architecture as a whole in front, if we read it from left to right, from right to left, if we admire it bottom up or top down. In a few words, we use both categories, space and time, which in our spirit cancel distinctions which according to our sensitivity in reality never existed."

"As Alberti writes," Bartoli concludes, "'architects do not use such numbers in a confused or mixed way,

but in such a way that they may correspond and allow harmony from all sides.'"

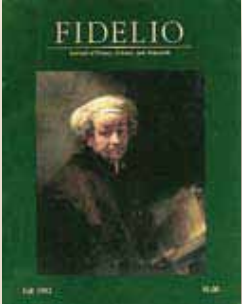
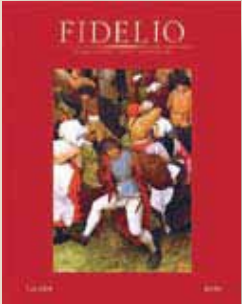
This harmony is the reason why Renaissance buildings still convey to their viewers a sense of lawfulness of the Universe, and beauty, the same lawfulness and beauty which is conveyed to listeners by a composition of Bach, Beethoven, or Giuseppe Verdi.

Bartoli's work is an important first phase in revealing the true nature of Brunelleschi's thought. Brunelleschi's creative work is reflected most strongly in the *non-mathematical* curvature of the Dome in Florence. All of the whole-number proportions that he employed in the beautiful edifices of his design, must necessarily be *tempered*, not "pure" intervals, in the same way that freedom in the musical domain as discovered by J.S. Bach requires that the intervals of the musical scale be tempered, so as to effect a dynamically harmonious whole.

The secret, still waiting to be revealed by future investigators, is exactly *how* Brunelleschi tempered his intervals, in a way which anticipated the great Bernhard Riemann's work by five centuries.

FIDELIO

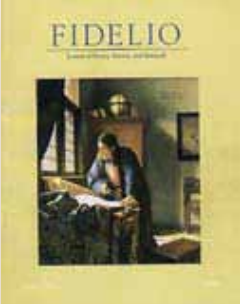

Journal of Poetry, Science, and Statecraft

From the first issue, dated Winter 1992, featuring Lyndon LaRouche on "The Science of Music: The Solution to Plato's Paradox of 'The One and the Many,'" to the final issue of Spring/Summer 2006, a "Symposium on Edgar Allan Poe and the Spirit of the American Revolution," *Fidelio* magazine gave voice to the Schiller Institute's intention to create a new Golden Renaissance.

The title of the magazine, is taken from Beethoven's great opera, which celebrates the struggle for political freedom over tyranny. *Fidelio* was founded at the time that LaRouche and several of his close associates were unjustly imprisoned, as was the opera's Florestan, whose character was based on the American Revolutionary hero, the French General, Marquis de Lafayette.

Each issue of *Fidelio*, throughout its 14-year lifespan, remained faithful to its initial commitment, and offered original writings by LaRouche and his associates, on matters of, what the poet Percy Byssche Shelley identified as, "profound and impassioned conceptions respecting man and nature."

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