Lionel March

Architectonics of Humanism.
Essays on Number in Architecture
 New York: John Wiley, 1998

Reviewed by Mark Peterson

Rudolf Wittkower's *Architectural Principles in the Age of Humanism*, published in 1949, marks the beginning of the modern attempt to understand Renaissance architecture in its own terms. As Wittkower so effectively points out, those terms are not our terms. To understand them now requires a conscious act of the imagination. Among his most striking observations is this: spatial proportions occurring ubiquitously in architectural designs, such as 3:2, or 4:3, would have been understood then as "musical intervals", and could even be called diapente or diatessaron (the names for the musical fifth and fourth, respectively) without any misunderstanding or incongruity. Familiar as this idea may be now, having stood the test of the intervening fifty years, it is still not entirely clear what it means. Wittkower was careful to say that it does NOT mean that such designs were simply translations of music into architecture. Rather, both musical and architectural theory in this period seem to rest on a Pythagorean faith in the importance of number: music demonstrates the importance of number in the most immediate way, but informed architecture can do so as well. As Palladio said, "The proportions of the voices are harmonies for the ears; those of the measurements are harmonies for the eyes. Such harmonies usually please very much, without anyone knowing why, excepting the student of the causality of things". [Wittkower 1949: 100]

Lionel March, author of *Architectonics of Humanism*, the remarkable book under review, read Wittkower as an architecture student at Cambridge in the 1950s. Now, nearly 50 years later, he returns to its problems, having never really forgotten them. A nagging question, first encountered as a Cambridge examination problem, described in the prologue, frames the book: what is the significance of the dimensions of the cruciform hall in Villa Malcontenta, 46-1/2 x 32? This does not look like a musical interval! Anyone who rashly skips to the epilogue out of curiosity will find that a great deal has happened in the intervening pages.

What did number and proportion MEAN in the Renaissance? This question is examined, investigated, and turned every way in *Architectonics of Humanism*. The range of investigation

is encyclopedic, and the references are impressively complete. March had ready access to the excellent Renaissance collection at UCLA, and the hundreds of figures reproduced here are a valuable resource in themselves. The wide margins, suggested perhaps by Renaissance printing conventions, contain delightful asides as well as bibliographic information. Most important, March shows an unbiased willingness to consider Renaissance number in all its variety. All this, I think, makes the book an invaluable resource and reference for everyone with an interest in Renaissance mathematics. It goes beyond architectonics, which only raised the questions, to the nature of number itself. What follows is some indication of how diverse the investigation is.

We may take “musical proportion” as a well-established Renaissance concept, but what are we to make of “gendered number”, “ethical number”, “shapeful number”, “theological number”, “occult number”, “playful number”, and “right triangular number”, to mention only a few chapter titles, and to say nothing of the many varieties of proportion? The reader will correctly guess what some of these categories are, but some will surely be new.

Consider, for example, “occult number”. The tradition of associating letters with numbers, and thereby numbers with words and names, is foreign to us, but may have been quite natural to at least some humanists and their classical predecessors. Is it significant that MARCUS VITRUVIUS POLLIO is equivalent to the number 1701? That every name gives rise to numbers? The odd possibility that designs may encode words and names is kept fully in view.

The Hebrew names of God give rise to numbers which can be arranged in intriguing patterns: who knew about this; who used it? March suggests that such numbers may have been used secretly in designs, their significance concealed from all but the most discerning. Similarly, the Old Testament is explicitly a source of numbers, like the dimensions of Noah’s ark in Genesis, and the detailed description of the Tabernacle in Exodus.

An amazingly complex number game, rithmomachia, somewhat like chess, but with polygonal pieces, bearing numbers like 120, 190, 36, 30, 56, 64, 28, 66 (and different numbers on the opponent’s pieces) was popular throughout the late Middle Ages and Renaissance. Here is a source of number meanings which is totally unknown to us, but which must have been quite immediate then, at least to skilled players.

According to Vitruvius, a temple “must have an exact proportion worked out after the fashion of a finely-shaped human figure.”[March 1998: 103] The attempts, beginning with Alberti in *De statua*, to determine these proportions were yet another source of significant numbers and ratios, with Vitruvius’ own authority, vague though it is, for their application in architecture. Here you will find Renaissance measurements of the (male) body in great detail.

A fascination with square roots and higher roots is characteristic of Renaissance arithmetic. Heron of Alexandria had given successive approximation methods for representing irrational roots by rationals. Thus 7:5 and 17:12 are rational “convergents” – March uses this admittedly anachronistic word – to the square root of 2. These methods were, in principle, known in the Renaissance. Thus we are alerted to the possibility that when we see 17, or an integer multiple of it, we are really looking at the square root of 2, and that there should be a 12 nearby. This association of certain peculiar integers with rational approximations to interesting square roots is just one of many innovations in *Architectonics of Humanism*.

Indeed, there are so many innovations that when we return, in the latter part of the text, to

make sense of plans and designs, knowing far more about number and proportion than we knew before, there is a superfluity of interpretations. Problems that had no solution, if we sought simple “musical” proportions, now seem to have many esoteric solutions, more than could simultaneously be right. This is success. March has enlarged our conception of Renaissance number until it is large enough and flexible enough to accommodate real data, in all their stubborn complexity. Perhaps none of these interpretations is right, we realize, but it is very unlikely, with these methods, that a correct interpretation would be missed. In this sense *Architectonics of Humanism* is definitive.

It is also, as I stressed above, a stimulus and reference for the study of Renaissance mathematics in general. The great mathematical problem of the Renaissance, as it seems in retrospect, but also, to some extent, as it was seen at the time, was to make sense of the irrationals. This is not a problem of architectonics, but I found *Architectonics of Humanism* nonetheless full of ideas and information on this question. The practical use of “rational convergents”, for example, clearly has a bearing on the question of the irrationals. This is just one example of how *Architectonics of Humanism* more than fulfills what its title promises.

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The Reviewer

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