Geometric and Arithmetical Methods in Early Medieval Perspective

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Abstract: This paper examines the hypothesis that early perspective paintings were drawn arithmetically, without vanishing points. The best argument for this hypothesis is that the division of two parallel lines by straight lines intersecting each other at the vanishing point (geometrical method) is equivalent to the division of those parallel lines in proportional parts (arithmetical method). If arithmetical method had been used, then the vanishing points exhibited ex post should be purely fortuitous. But the lack of multiples and submultiples of measurement units, the absence of proportionality ratios, the length of the operating series, and the correspondence of vanishing points to visible loci of the picture offer sound objections for this hypothesis. The use of optics and geometrical method is more probative—though it does not mean that painters were using concepts of linear perspective, which would be an anachronism.

Keywords: geometry, Middle Ages, perspective, painting, arithmetic, geometry.

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Fichiers produits par l'(les) auteur(s)
About 25000BC Early geometric designs used. About 5000BC A decimal number system is in use in Egypt. About 4000BC Babylonian and Egyptian calendars in use. It applies arithmetical and algebraic methods to the solution of various problems, including several geometric ones and is one of the best textbooks in the whole of medieval literature. 1434 Alberti studies the representation of 3-dimensional objects and writes the first general treatise Della Pictura on the laws of perspective. 1437 Ulugh Beg publishes his star catalogue Zij-i Sultani. The first edition appeared four years earlier under the title Linear perspective. The work gives the first general treatment of vanishing points. 1722 The work unfinished by Cotes on his death is published as Harmonia mensurarum. The earliest civilizations have left only archaeological and limited historical evidence that requires substantial interpretation. We have many mathematical treatises from the later civilizations, but these are usually in a completed form which leave out the development of the concepts and the purposes for which the mathematics was developed. Thus, we will have to analyze the arguments given by historians of mathematics for their objectivity and completeness. Catalog text from Clark’s Academic Catalog. follow the development of mathematics from early number systems to the invention of calculus. read and understand some historical mathematics. survey the development and use of methods of computation, some of which involve tools such as the abacus. Exercises 3.6 Arithmetic and Geometric Progressions 1. For each of the following progressions, determine whether it is arithmetic, geometric, or neither: (a) 5, 9, 13, 17, . . . (b) 1, −2, 4, −8, . . . (c) 1, 1, 2, 3, 5, 8, 13, 21, . . . (d) 81, −9, 3, 1, . . . (e) 512, 474, 436, 398, . . . 2. Find the sixth and twentieth terms, and the sum of the first 10 terms of each of the following sequences: (a) −15, −9, −3, . . . (b) log 7, log 14, log 28, . . . (c) 1 16 , 1 8 1 , . . . (d) 0.5, 0.45, 0.405, . . . (e) 64,−32,16 Geometrical and Arithmetical Methods in Early Medieval Perspective. Arithmetic and Geometric Sequence & Series Using STELLA. clexchange.org.