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A Symbiosis of Beauty: Transformational geometry and the Art, Architecture and Textiles of Central and South America.

Beginning with early civilizations, mathematical principles flowed from nature to art, architecture and textiles. The beauty of mathematics was integrated with the history and culture of the ancient peoples as they attempted to enhance their lives and surroundings. Societies found inspiration in the symmetry of nature and used geometric transformations to create designs. This paper focuses on the ancient cultures of Latin America and their use of transformational geometry in the design and decoration of vessels, structures, and textiles. Transformational geometry is a highly visual form of mathematics. It involves the process of taking a figure and "copying" it in manner that creates a recognizable pattern. To better understand the extent to which geometric transformations abound in the cultures of the pre-Columbian Latin Americans, we look briefly at transformational geometry as we know it today. After examining the symmetries, we explore their use by the pre-Columbian peoples of Central and South America. We travel on a visual journey viewing the textiles, tools and temples of the early civilizations of Peru northward to the ancient peoples of Mexico. The discussion of each civilization's art, architecture and textile design is accompanied by representative photographs. (Received September 28, 2005)