

**Meeting:** 1003, Atlanta, Georgia, MAA CP P1, MAA Session on Philosophy of Mathematics

1003-P1-652      **David W Henderson\*** (dwh2@cornell.edu), Department of Mathematics, Malott Hall, Cornell University, Ithaca, NY 14850-4201, and **Daina Taimina**. *Strands in the history of geometry and how they affect our views as to what geometry is.*

We argue that the main aspects of geometry emerged from four strands of human activity, which seemed to have occurred in most cultures: art/patterns, navigation/stargazing, motion/machines, and building/structures. These strands developed more or less independently into varying studies and practices that from the 18th and 19th century on were woven into what we call geometry. Axiomatic mathematics developed (through Euclid) within the Building/Structures Strand and this strand has been emphasized (sometimes to the complete exclusions of the other three) in most discussions of the history and meaning of mathematics—this has distorted our understandings of mathematics and placed obstacles in paths of people trying to understand what mathematics is. This has led to confusing and oftentimes-incorrect statements in many expository descriptions and textbooks of geometry. This is true even in works written by well-known research mathematicians. These include answers to questions such as: What is geometry? What was the first non-Euclidean geometry—how and why was it investigation? Can you construct the trisector of any angle? What does "straight" mean in geometry? Why was spherical geometry in curricula and then mostly disappeared 100 years ago? What is the shape of our physical universe? (Received September 26, 2004)