

Quantitative Analysis of the Symmetry of Artifacts: Lower Paleolithic Handaxes

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ABSTRACT

The ability to perceive and produce symmetric shapes is usually taken to be a major step in the development of human cognition. In spite of the importance of the concept of symmetry to studies of early human development, current use of it is usually based on loose qualitative assessment. A more informative approach would be to use a continuous scale of this shape property rather than the strict current language of “more” or “less”. A *symmetry measurement tool* has been developed towards this goal, which is based on the evaluation of the minimal distances that the vertices of a structure have to move in order to attain the required symmetry. Using this Continuous Symmetry Measure (CSM) method, it is possible to evaluate quantitatively how much symmetry exists in a non-symmetric configuration and how the nearest symmetric shape looks. We test and demonstrate the feasibility and versatility of this approach on handaxes samples from three Lower Paleolithic sites in Israel, Ubeidiya, Gesher Benot Ya’aqov and Ma’ayan Barukh, representing various stages in the Acheulian Techno-complex of the Levant. We provide - to the best of our knowledge for the first time - quantitative demonstration that the overall symmetry of handaxes generally increases over time, and that the variability decreases.

Discipline: Archaeology, Prehistory

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