

The Archaeology of Measurement
Comprehending Heaven, Earth and Time in Ancient Societies

Edited by Iain Morley and Colin Renfrew
Cambridge University Press, 2010

reviewed by
Ken Krechmer
October 16, 2013

Twenty papers by different authors are included in this work on the prehistory of measurement standards. The editors are both associated with Cambridge University and have pulled together a significant set of papers which present the current understanding of how measurements standards developed. The book is based upon papers presented at a symposium, *Measuring the World and Beyond*, in Cambridge, England 13-17 September 2006. The symposium was hosted by the McDonald Institute for Archaeological Research (MDIAR), Oxford, England and funded by the John Templeton Foundation.

From the stones of Stonehenge to the alignments and calendars of Mesoamerica, measurement stands at the dawn of cosmology (a conception of the universe). The rise of measurement standards is a vital development to support an agrarian civilization. In order for hunter-gatherer societies to transition to agrarian societies, counting and measuring are required. It is vital to know how much to plant, in what size area, to feed a counted number of people. Several of these papers also address the development of symbols during the hunter-gather era, the earliest era of human pre-civilization. Understanding how symbol and measurement standards developed and were utilized helps to understand and improve standardization for future eras of civilization.

Each era of civilization requires (among other things) a succession of standards to codify the technology appropriate for each wave of human civilization. After measurements are standardized, new eras of civilization occur: the industrial revolution which requires similarity standards to define the results of repetitive manufacturing processes, the information age which requires compatibility standards to define compatible computer and communication interfaces, and adaptability standards (the basis of the Internet) that are just emerging in the post-information age.

Neolithic societies had many of the same standardization issues as the most advanced societies of today. The standards that define a new technology do affect worldviews (consider the Internet, cell phones, or GPS), how widely used new technology changes social structures (consider cell phones ringing in theatres, or the new social networks created by Facebook or Twitter - which may one day have standardized interfaces), how measurement standards are one mark of societal development, how successful standards may become a mechanism for taxation, how all standards evolve, the difficulties in changing from one standard to another, and inaccuracy in maintaining and using standards.

Useful overviews of each section are included by the editors. The book is organized into five sections by themes:

I. Number: Counting, Mathematics and Measure.

1. Conceptualizing quantification before settlement: Activities and issues underlying the conception and use of measurement by Iain Morley.
 2. Measure in navigation: Conceiving distance and time in the Neolithic by Helen Farr, MDIAR.
 3. The token system of the ancient Near East: Its role in counting, writing, the economy and cognition by Denise Schmandt-Besserat, University of Texas, Austin, Texas.
 4. Grasping the concept of number: How did the sapient mind move beyond approximation? by Lambros Malafouris, MDIAR.
 5. Numerical cogitation and the development of 'zero' in Mesoamerica by John Justeson, State University of New York, Albany, NY.
 6. Recording measure(ment)s in the Inka khipu by Gary Urton, Harvard University.
- II. Materializing the Economy.
7. Measuring by weight in the Late Bronze Age Aegean: The people behind the measuring tools by Anna Michailidou, National Hellenic Research Foundation.
 8. The concept of weighing during the Bronze Age in the Aegean, the Near East and Europe by Lorenz Rahmstorf, University of Mainz, Germany.
 9. Measuring the Harappan World: Insights into the Indus order and cosmology by J. Mark Kenoyer, University of Wisconsin, Madison.
- III. Dimension and Belief
10. Architectural measurement in Indus cities: The case study of Mohenjo-Daro by Michael Jansen, RWTH Aachen University of Technology, Germany.
 11. Teotihuacan city layout as a cosmogram: Preliminary results of the 2007 Measurement Unit Study by Saburo Sugiyama, Aichi Prefectural University, Japan.
 12. Aztec dimensions of holiness by John E. Clark, New World Archaeological Foundation of the Brigham Young University, Chiapas, Mexico.
 13. Establishing direction in early Egyptian burials and monumental architecture: Measurement and the spatial link with the "other" by Kate Spence, University of Cambridge.
- IV. Calendar and Cosmology
14. The measurement of time and distance in the heavens above Mesopotamia, with brief reference made to other ancient astral sciences by David Brown, Free University of Berlin.
 15. Evolution of the calendar in Shang China by Mark Edward Lewis, Stanford University.
 16. The measure of time in Mesoamerica: From Teotihuacan to the Maya by Anthony F. Aveni, Colgate University.
 17. Measuring time, sacred space, and a social place in the Inca Empire by Charles Stanish, University of California, Los Angeles.
 18. Measuring time in the European Neolithic? The function and meaning of Central European circular enclosures by Peter F. Biehl, State University of New York at Buffalo.
- V. The Spirituality of Measure
19. The roots of spirituality and the limits of human mensuration by F. LeRon Shults, University of Agder, Kristiansand, Norway.

20. Worldview, measurement and the 'roots of spirituality' by Jeremy S. Begbie, University of Cambridge.

The papers in the first four sections of this book provide detailed discussion of archaeological evidence of the development of measurement standards in Neolithic societies around the world. Many of these papers represent significant work. Understanding how tokens (paper 3) evolved from counting to writing (symbols) to taxation ("gifts to the gods") recognizes how many standards over time provide a mechanism for taxation. The development of weighing is presented with extensive detailed research in paper 8 covering Europe and the Near East in the Bronze Age and in paper 9 covering the Indus civilization. A few papers are, perhaps too speculative, but an understanding of measurement in pre-history does require some speculation. The concluding section discusses the close coupling between the early development of measurement standards and the religious and spiritual beliefs of a society.

The book is a large format of 267 pages with extensive diagrams and pictures to support the papers presented. A reasonable index covering all the papers is included. For those interested in better understanding the fundamental nature of standards in all eras, this is an important work.