

SYMMETRY COMES OF AGE: THE ROLE OF PATTERN IN CULTURE

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Fields of Interest: (DWC) Geometry, combinatorics, plane pattern symmetry analysis as an archaeological and anthropological tool; (DKW) Archaeology, anthropology, interaction between pattern and culture.

Publications: (DWC) *Excursions Into Mathematics (Millenium Edition)*, Natick, MA: A.K. Peters, 2000 (co-author); The geometry of African art II: A catalog of Benin patterns, *Historia Mathematica*, 2(1975), 253-271; Cakaudrove-style masi kesa of Fiji, *Ars Textrina*, 18(1992), 119-155 (with D. Nagy); *Symmetries of Culture*.

A Handbook of Plane Pattern Analysis, Seattle: University of Washington Press, 1988 (with D. K. Washburn).

(DKW) *A Symmetry Analysis of Upper Gila Area Ceramic Design*, Papers of the Peabody Museum of Archaeology and Ethnology 68, Cambridge: Harvard University, 1977; *Style, Classification, and Ethnicity: Design Categories on Bakuba Raffia Cloth*, Transactions 80(3), Philadelphia: American Philosophical Society, 1990; Perceptual anthropology: The cultural salience of symmetry, *American Anthropologist*, 101 (1999), 547-562; *Symmetries of Culture. A Handbook of Plane Pattern Analysis*, Seattle: University of Washington Press, 1988 (with D.W. Crowe)

Abstract: *Our 1988 book, Symmetries of Culture. Theory and Practice of Plane Pattern Analysis, was designed to make the known symmetry classifications of one and two color patterns on a strip and in the plane readily available as a working tool for archaeologists and anthropologists. When some members of that audience began to use this tool we offered to edit their work as a collection of chapters in a companion volume, Symmetry Comes of Age. The Role of Pattern in Culture, which has just been published (2004) by the same publisher. Some description of the contents of these chapters of the new book is given.*

1 INTRODUCTORY

In the introductory chapters of the present book, *Symmetry Comes of Age: The Role of Pattern in Culture*, the editors give an updated bibliography (following the extensive bibliography of 1988 in their earlier volume, *Symmetries of Culture*), and a concise summary of the pattern classifications described in complete detail in that volume insofar as they are relevant to the contributions in the present volume. A chapter by Carrie Brezine, "Creating Symmetry on the Loom", shows exactly how to set up the draft for a four-shaft floor loom to generate each of the twelve plane symmetries (of the total seventeen when 120 degree rotations are permitted) which can be woven on such a loom. This appears to be the first time this has been explicitly presented. Branko Grünbaum's important article, "Periodic Ornamentation of the Fabric Plane: Lessons from Peruvian Fabrics" (which originally appeared in the single issue of the now rare journal, *Symmetry*) is reprinted in its entirety. It is in this article that Grünbaum introduced the important idea of the fabric plane as a more relevant way of studying patterns in woven materials than the crystallographic groups; the new availability of this paper will be welcomed by students of weaving patterns.

2 AFRICA AND TURKEY

Paulus Gerdes, whose ethnomathematics investigations have contributed many new insights and pedagogical stimulus, discusses Yombe (central Africa) mats from 19th Century museum collections, supplemented by later samples made at a mission school. Since the individual designs, as well as their placement on the mats, have cultural significance, attempts are made by the weavers to incorporate as much information as possible. This leads to juxtapositions which tend to destroy desired symmetries; consequently visual tricks are employed to make symmetries appear which on close analysis are not actually present. Even the particular twill weave, 1/4, has cultural meaning; it represents the traditional four-day week.

Frank Jolles gives a detailed study of the specialized *isishunka* color sequence of period seventeen from Zulu beadwork. The sequence has a number of peculiarities, including the presence of subsequences of length five, the fact that there seems to be no preferred starting point for the sequence, and the interaction between the varying widths of the color bands and their position and relation to each other in the beadwork examples. The exposition is enhanced by the colored photographs the publisher has permitted for this chapter.

In her study of cognitive structures and body metaphors in Turkish-Yörük weaving, Patricia Daugherty shows the prevalence and cultural significance of "inside-outside",

“containment”, and other body metaphors, in the *kilims* and other items woven by the Yörük nomadic people of the Taurus Mountains in southern Turkey.

3 SOUTH AMERICA

The remaining chapters deal with pre-Columbian and contemporary aspects of South American life, i.e. archaeology and anthropology respectively. In her symmetry analysis of Ica Valley ceramics, Dorothy Washburn re-analyzes Menzel’s data on pre-Columbian Ica Valley ceramics. While Menzel’s interpretation of the ceramic data (based on analysis of features and themes), indicated a gradual replacement of local Ica styles after their conquest by the Incas, Washburn’s analyses by pattern symmetries indicates that local styles tended to be preserved even after the conquest.

Mary Frame’s study of Nasca embroideries of coastal Peru shows a fascinating relationship between the animate objects portrayed in the borders of the embroideries and the particular one of the seven strip symmetry types used to represent them. Thus upright walkers (humans, cats) are repeated along the strip by glide reflection, just as their footprints repeat by glide reflection as they walk, while fish and some birds are repeated by rotations more in correspondence with their own movements. Although these correspondences are not perfect, once they have been pointed out it is hard to forget them.

Peter Roe shows in elaborate detail how subtle differences reduce or negate the shamanic power of designs used by the Shipibo of the upper Amazon . When presented with designs made by Roe’s students, Shipibo responses, sometimes conditioned by experiences with hallucinogenic drugs, varied from ridicule to puzzlement.

Finally, E.M. and C. R. Franquemont report their experiences as novice weavers among the Chinchero in the Andes. In particular they were slow to realize that apparently very complicated patterns whose mastery was beyond their comprehension were in fact generated from a few easily learned fundamental regions by ordinary symmetry operations of the plane. Thus for the Chinchero weaver the progression from a simple woven scarf to larger productions was a metaphor for the weaver’s personal development.

Note by the Editors:

We organize an evening discussion with Don W. Crowe about their new book. In connection with Crowe's contribution to the topic of Császár polyhedron, see the notes at the paper by Császár.