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Gerdes, Paulus

Sona geometry from Angola. Mathematics of an African tradition. (English)
Monza: Polimetrica. 232 p. EUR 21.00 (2006). ISBN 978-88-7699-055-7/pbk

The present volume is an English version of a volume first published in Portuguese in 1993. It constitutes the first part of the same author's "Ethnomathematik - dargestellt am Beispiel der Sona Geometrie" [Ethnomathematics – described by the example of Sona geometry. Heidelberg: Spektrum Akademischer Verlag (1997; Zbl 0908.01001)], also published in French in 1995. The English version was first published in Moçambique in 1994, and is now republished with an appendix "mathematical research inspired by the sona tradition: the example of mirror curves, Lunda designs and cycle matrices" (13 pp.) and an updated bibliography.

Sona are abstract sand drawings produced by the Cokwe, a Bantu people living mainly in Lunda in eastern Angola. The sona are drawn around points marked out in the sand, preferably in a single line, and preferably with some kind of symmetry. They represent specific objects, situations, proverbial sayings, or even stories, and they were an essential part of the teaching surrounding the adolescential circumcision. All adults would therefore be familiar with some of the simpler patterns, but the more complex ones would only be known by a restricted group of specialists who kept them jealously as secrets. It is suggested (p. 13) and sounds very plausible, given the complexity of many drawings and the relations between variants, that "the sona experts who invented these [chain, elimination and other] rules probably knew why they are valid, that is, they could prove in one or another way the truth of the theorems these rules express". After the social breakdown caused by intensified slave trade, wars and colonial occupation, the tradition is almost lost today, and the present book therefore aims both at presenting and analyzing a large number of sona documented in the literature, and at reconstructing the algorithms and composition principles which allowed the masters to perform them (as required) without the least hesitation. This is done without any attempt to use advanced notions from contemporary academic mathematics, which would only bar the pedagogical usefulness and would anyhow be irrelevant (the interest in geometric symmetry makes elementary topology misleading, the distinction between sharp and round corners falls outside graph theory, etc.

Gerdes gives the semantic reference of the various sona, but makes few hints to possible connections between their mathematical type and semantic classes - probably because no obvious connections exist.

Gerdes speaks consistently about monolinearity and symmetry as "cultural" and not as "aesthetic" values. The (unexplained) point is, firstly, that mathematical aesthetical values are not universally valid but culturally bound, and secondly, (as can be seen in the amazement on p. 165 that "the cultural ideal of monolinearity" is not respected in a drawing representing a god) that they are supposed to have universal value within the culture in question (on which account the reviewer nourishes some doubt).

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01-02 Research monographs (history)