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Gerdes, Paulus
African Pythagoras. A study in culture and mathematics education. (English)
Maputo: Instituto Superior Pedagógico, 103 p. (1994).

In the author's words, the present book shows "how diverse African ornaments and artifacts may be used to create an attractive context for the discovery and the demonstration of the Pythagorean theorem and of related ideas and propositions". The objective is not to trace the kinds of mathematical knowledge possessed by the producers of these ornaments and artifacts but to provide a framework that may help "to surpass the cultural-psychological learning blockage" that cause "African countries [to be] faced with relatively low 'levels of attainment' in mathematics" by incorporating elements of "ethnomathematics – all types of mathematical activities and reasoning found in daily life – into the curriculum"; these elements are also meant to be "used as starting points for playing and doing interesting mathematics in and around the classroom". (All quotations from p. 3 – author's emphasis; a few geometric patterns from ancient Egypt occur, but the choice of ornaments and artifacts of recent date shows that sub-Saharan Africa is meant). As far as can be assessed by somebody who never taught in a sub-Saharan classroom this purpose is eminently well served by the book. The reviewer was astonished by the number of different heuristic proofs that could be derived from or impressed on the material. Most of these are evidently of the cut-and-paste type, but others involve the proportionality of similar figures and even considerations of limits. Teachers and textbook authors will thus find substance and an abundance of ideas for the introduction of many essential aspects of geometrical reasoning, not least geometrical reasoning about real-world phenomena. There is no reason that only African teachers should draw on this inspiration, and that fear of exotism should lead didacticians from other parts of the world to dismiss it. In general, the so-called geometric art of non-Modern cultures can be categorized into two types: One is "impressionistic", its aim (as far as geometry is concerned) is the global visual impression; the Greek vase painting of the Geometric Period is an exquisite example; in earlier specimens from the Greek and Aegean region one may find, e.g., a mixture of local 6- and 7-fold symmetries, or chessboard-patterns where a few cases get the "wrong" colour. The other type bears witness of deliberate explorations of symmetries and other formalizeable properties of figures; its actual drawings need not be very precise, but they contain an underlying formal structure. The "impressionistic" type, whether visually exquisite or crude, is evidently unfit as a basis for mathematical reasoning. But all the examples explored by the author (and sub-Saharan geometrical decoration in broad average as far as the reviewer is aware) belong to the second type. Together with certain local traditions (e.g., Peruvian Indians), sub-Saharan African geometrical art thus possesses a universal value of which the mathematics eduction of the global village should take advantage.

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