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Introduction to cultural mathematics. With case studies in the Otomies and Incas. (English)

Hoboken, NJ: John Wiley & Sons. xvii, 287 p. £ 60.50; EUR 72.60 (2012). ISBN 978-1-118-11552-7/hbk; ISBN 978-1-1183-0434-1/ebook

The book is primarily intended as a textbook for courses held at a level where the notion of mathematical proof is considered "advanced". The didactical exposition also shows that it is supposed to be the typical reader's first introduction to ethnomathematics.

The "cultural mathematics" of the title is supposed to be a synonym for ethnomathematics (p. xi), but it is actually presented in a way whose relation to that field (the study of the mathematical practices of particular social or cultural groups) is similar to that of traditional "historical mathematics" to the history of mathematics; in both cases, the socio-cultural respectively historical object under study serves as a way to introduce mathematics as familiar to the author. However, the book contains some quite sensible discussions of principle of the need to explain a foreign conceptual world in terms of a familiar conceptual framework.

The book falls into two parts, one arranged with cross-cultural examples around particular topics (oral numeration systems – number gestures and number symbols – kinship and social relations – art and decoration – divination – games – calendars) and one discussing some of these themes (namely those where adequate knowledge is available) in relation to the Otomies of present-day Mexico and to the Incas. All chapters are provided with questions, exercises and invitations to brief essay writing.

In the first part, the cross-cultural examples are chosen so as to allow the introduction of modern mathematics (the notion of relations, additive modular arithmetic, and symmetries of the plane). The reader who knows no better will thus get the impression that divination is based on modular arithmetic in all cultures, and decoration always on symmetry and symmetry groups.

From the reviewer's limited familiarity with pre-Columbian mathematics, what is said about this topic is reasonable but rather meagre – the reader is merely told, for instance, that beyond having a (quasi-solar) year of 365 days and a sacred cycle of 260 days, the Mayans "solved sophisticated problems related to their calendar that are beyond the level of discussion here". However, outside the author's central own domain of interest, things sometimes get catastrophic. When presenting ancient Egyptian numeration, the author invents a sign for 10,000,000; is unaware that symbols for the same order of magnitudes (for instance, the tadpole standing for 100,000) ~~are~~ were always kept together as a group even in predynastic times and never spread randomly; and that "mathematical" and other computational texts were always written in hieratic script in pharaonic times. If he had read ~~a~~ just a little bit into the two publications he refers to (by Richard Gillings and Annette Imhausen) he would have been wiser. Even worse, perhaps, he explains (p. 46) how to perform the multiplication 280 15 with Egyptian hieroglyphic numerals, showing essentially the modern algorithm by means of partial products (80 5+200 5+200 5+200 10), without betraying that the Egyptians used a

wholly different procedure; division follows, treated no better.
"Culture" is explained (p. 4) to be constituted by the way to "assign meanings and beliefs" – shared technologies and shared ways to cope with material conditions are not mentioned. Nor are these taken much into account when the mathematical practices of various populations are presented – the relations of mathematical practices to "culture" are mostly stated on a very abstract level, as for instance by the preference for "order" in Inca culture.
The book (easily read, and written with obvious enthusiasm) may still be used as inspiration for teachers organizing a course on its topic. But only on the condition that at least the teacher familiarizes also with the much better informed works – all appearing in its bibliography – of (say) Marcia Ascher, Michael Closs, Paulus Gerdes, Gary Urton and Claudia Zaslavsky – and, for the concept of culture, Ubiratan D'Ambrosio.

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