

Powell, A.B.; Frankenstein, M. (Eds):

Ethnomathematics – Challenging Eurocentrism in Mathematics Education

Albany, NY: State University of New York Press, 1997. – 440 p.

(SUNY Series, Reform in mathematics education)

ISBN 0-7914-3352-8

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1. Introduction

This is a most welcome addition to the mathematics and mathematics education literatures. It presents an impressive collection of papers on the different themes of ethnomathematics, and is compiled in a style which will allow it to be widely accessible to teachers, university students, and researchers alike. It is particularly welcome at this time of heated debate about the future role of mathematics education in modern multi-cultural societies as it helps to shed light on the nature of mathematics itself, but from cross-cultural, anthropological, and political, rather than philosophical, perspectives.

Ethnomathematics is a relatively recent field of study, in terms of being a coherent field. There have been many individual studies occurring over the last 50 years but the published findings, reports, and critiques have appeared in the literatures of disciplines as diverse as mathematics, anthropology, history of ideas, sociology of knowledge, social psychology, and mathematics education. It is important that some of these writings are brought together here.

Another reason to welcome this book is that it is constructed largely from already existing, but sometimes difficult to locate, articles and chapters which are significant in the field but which have appeared in some of these different literatures. In that sense then it is both a convenient and an essential reader for anyone entering this field.

2. Structure of the book

Powell and Frankenstein's contribution to scholarship in creating this book lies not just in the selection of papers but in the structuring they use. The book contains 18 articles and chapters, edited into new chapters, all by well-known authors in the field, and grouped into 6 sections, each with its own introduction from the editors. The introductions themselves have also been previously published in an important chapter by the editors (Powell & Frankenstein, 1994). In addition the editors invited Ubi D'Ambrosio (who is sometimes referred to as the "intellectual father" of ethnomathematics) to write the foreword, and Gloria Gilmer (who for 11 years was the President of The International Study Group on Ethnomathematics) to write the "afterword".

The different sections of the book represent the main foci of this field:

Section I: Ethnomathematical knowledge

Section II: Uncovering distorted and hidden history of

mathematical knowledge

Section III: Considering interactions between culture and mathematical knowledge

Section IV: Reconsidering what counts as mathematical knowledge

Section V: Ethnomathematical praxis in the curriculum

Section VI: Ethnomathematical research

Rather than reflecting the different traditional disciplines, the editors have skilfully structured the book in terms of the goals and foci of the writings, thus representing as well some of the motives and aspirations of the different authors. This is important because as the editors say in their acknowledgments: "What is particularly significant about the academic discipline of ethnomathematics is that it emerged from intellectual influences of emancipatory struggles worldwide and that interest and work in the discipline has not been limited to the academy" (p. xi). There is thus no doubt that this book is a socio-political documentation of some of the challenges to orthodoxy and entrenched traditions in academic mathematics and its related fields.

3. The chapters

Section I

This section is basically an introductory section to the book and it sets the scene with two of the fundamental papers in the field. The first, by d'Ambrosio, "Ethnomathematics and its place in the history and pedagogy of mathematics" grew out of his plenary address at the International Congress of Mathematics Education in Adelaide, Australia, in 1984. The title reveals that in those early days the field which helped to legitimise the new area of study was history. In contrast, and indicating some of the challenge which this new field represented, the second chapter, by the Aschers, "Ethnomathematics" was, as they say, written in the early 1980s but did not find journal acceptance for several years. This paper was firmly in the field of anthropology, a field which traditionally had not been a great contributor to disciplinary thinking about mathematics and mathematics education.

Section II

In this section are three of the key papers which directly challenge the orthodox views of the history of mathematical ideas, and which, the editors claim, get to the heart of Eurocentrism. As if to illustrate this point, the first chapter by Joseph is entitled "Foundations of Eurocentrism in mathematics". In this he documents the historical "gaps" concerning the roles of the Arabs, and the Africans, which are fundamental to understanding the history of mathematical development. The next chapter, by Bernal, "Animadversions on the origins of Western science", develops this theme further by describing the contribution of the Egyptians to science, and shows how the traditional history of Western science fails to recognise that contribution in giving much greater credit to the work of the Greeks. The third chapter in this section is by Lumpkin, "Africa in the mainstream of mathematics history", who argues that although for thousands of years Africa was in that mainstream, that fact is rarely acknowledged by orthodox

historians of mathematics.

Section III

This section, which could in this reviewer's view have been much longer, tackles the issue of the relationship between culture and mathematics. In some sense this is the focus which is at the disciplinary heart of the ethnomathematics movement. For this section the editors have selected only 3 papers of the many which could have been chosen. The first by Ginsberg, "The myth of the deprived child: new thoughts on poor children" exposes the dominant cultural underpinnings of many societal assumptions about academic failure by so-called "poor" children. The next chapter by Martin, "Mathematics and social interests" is perhaps less well known to mathematics educators but is a powerful demonstration of the way that mathematical ideas, which have usually been portrayed as culture-free and value-free, have been crucially influenced by societal interests and pressures. His chapter finishes with this remark with indicates perhaps better than any other the driving force behind the whole book, "Exposing the links between mathematics and social interests should not be seen as a threat to "mathematics" but rather as a threat to the groups that reap without scrutiny the greatest material and ideological benefits from an allegedly value-free mathematics" (p. 169). Another unfamiliar paper by Struik is the third chapter in this section. It is called "Marx and mathematics" and shows how a particular perspective affects one's views of mathematical constructs, in this case how "dialectical materialism" influenced Marx's theoretical ideas on the calculus.

Section IV

This section focuses our attention on what counts as mathematical knowledge and on who considers it thus. The first chapter by Walkerdine, "Difference, cognition, and mathematics education" discusses some of the issues related to class and gender resulting from her research on the learning of mathematics by young children. The second chapter by Harris, "An example of traditional women's work as a mathematical resource" continues the theme of gender stereotyping in the definition of mathematical knowledge. The third by Gerdes, "On culture, geometrical thinking and mathematics education" focuses on the issues from the perspective of a developing country, Mozambique. All three chapters in this section force us to confront the power of the dominant groups in determining the nature of orthodox mathematical knowledge, an orthodoxy which of course has many educational implications.

Section V

This section, with 4 chapters, represents one of the predominant foci of contest in mathematics education, namely the mathematics curriculum. Developments in ethnomathematics have added a different dimension to this contestation, with particular implications in educational situations of difference. Borba's chapter "Ethnomathematics and education" sets the scene well by discussing the relative "efficiency" and "efficacy" of ethnomathematics and orthodox mathematics in the classroom, in terms of the methods to be used in a particular context, and the avail-

ability of ideas for aiding learning. Fasheh, in his chapter "Mathematics, culture, and authority", critiques standard mathematics teaching in the context of a non-Western culture and a Third World society, and discusses the authority issues associated with trying to change the curriculum in that kind of situation. Anderson, in "Worldmath curriculum: fighting Eurocentrism in mathematics" shows how including historical information about the mathematical knowledge of African, Asian and Latin American peoples can help students from marginalised cultures in USA classrooms. Zaslavsky in "World cultures in the mathematics class" continues this theme by arguing that exposure to such multi-cultural ideas can, and should, benefit all students, not just those from minority cultures.

Section VI

This section is concerned with some of the developments taking place in ethnomathematical research and demonstrates that not only is the research continuing but the contests are still continuing. Gerdes' "Survey of current work in ethnomathematics" presents a huge coverage of the main developments, with references from p. 357–371. Pinxten, an anthropologist, uses his specific knowledge to discuss some "Applications in the teaching of mathematics and the sciences" with a traditional native American group in mind. Knijnik contributes the final chapter of the section "An ethnomathematical approach in mathematics education: a matter of political power" from the perspective of the landless peasants in Brazil.

4. Conclusion

As was stated in the introduction, this book is an important "reader" for those who are new to the field, but it is also important to recognise that this is not a mere random collection of papers and articles in the field. There are many other papers and writings which could have been chosen to constitute a reader in ethnomathematics.

This collection has been skilfully and deliberately constructed to represent a particular perspective on ethnomathematics and its development, one which catches the aims, arguments and contexts of those who see it as the main hope for the necessary challenge to Eurocentrism. This is not a neutral anodyne account of the development of a field. It is a lively, partial, and political expose of both the contest and the contestants over the definition and ultimately the control of mathematical knowledge.

One could argue with many aspects of course, such as whether Eurocentrism is the appropriate target, or whether Westernism might be more appropriate nowadays, given the major roles that the USA has played in this century concerning the proselytising of Western, contrasted with European, values. One could certainly also argue with some of the choices of papers; for example there is little which represents the struggle for appropriate articulations of mathematical knowledge in workplace education and training, and there are no chapters discussing Chinese mathematical knowledge and culture, so important in East Asia nowadays.

The fact remains that ethnomathematics presents a viable and crucial challenge to Eurocentric thinking in mathematics and mathematics education, and this book with its

reworked papers mainly from 1982-94, documents much of the dynamic of its genesis during that period. The world of mathematics and mathematics education will certainly never be the same again, and the editors are to be complimented on their contribution to our knowledge.

5. References

Powell, A. B.; Frankenstein, M. (1994): Towards liberatory mathematics: Paulo Freire's epistemology and ethnomathematics. – In: P. L. McLaren; C. Lankshear (Eds.), Politics of liberation: Paths from Freire. London: Routledge

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