ABSTRACT. The basic assumption of this paper is that mathematics and history of mathematics are both forms of knowledge and, therefore, represent different ways of knowing. This was also the basic assumption of Fried (2001) who maintained that these ways of knowing imply different conceptual and methodological commitments, which, in turn, lead to a conflict between the commitments of mathematics education and history of mathematics. But that conclusion was far too peremptory. The present paper, by contrast, takes the position, relying in part on Saussurean semiotics, that the historian’s and working mathematician’s ways of knowing are complementary. Recognizing this fact, it is argued, brings us to a deeper understanding of ourselves as creatures that do mathematics. This understanding, which is a kind of mathematical self-knowledge, is then proposed as an alternative commitment for mathematics education. In light of that commitment, history of mathematics assumes an essential role in mathematics education both as a subject and as a mediator between the aforementioned ways of knowing.

KEY WORDS: conflicting and complementary epistemologies, diachrony, synchrony, mathematical self-knowledge

INTRODUCTION

This paper has a basic assumption. It is that both history of mathematics and mathematics itself embrace genuine forms of knowledge, so that the historical and mathematical enterprise represent forms of knowing. In the background is a second assumption, that education, in general, is directed towards the whole human being, and, accordingly, mathematics education, as opposed to, say, professional mathematical training, ought to contribute to students’ growing into whole human beings. The main purpose of this paper is to elaborate on the basic assumption above and, with the second assumption ever in mind, show the possibility of a mathematics education in which history of mathematics has an essential place.

The starting point for the paper was a critical argument set out in Fried (2000, 2001) pointing to a seeming incompatibility between the commitments of mathematics education and those of the history of mathematics. That argument, in the briefest possible terms, was this: to the extent that mathematics education works within a traditional curriculum, which is dedicated to the modern mathematics needed both for mathematics itself
and for its applications, its attempts to incorporate history of mathematics will lead it to subordinate history to modern ends and, therefore, lead it to adopt an anachronistic or non-historical history; on the other hand, historians of mathematics, like other historians of ideas, are dedicated to finding how mathematics of the past differs from that of the present, to find the idiosyncrasies in the thought of mathematicians and the dependence of their thought on philosophical and cultural contexts, so that to pursue the history of mathematics in a way consistent with the spirit of the historical discipline will lead mathematics education into areas the usual curriculum would judge irrelevant and a waste of time.

Suffering the fate that criticism often does, the argument above has been understood by some (e.g. Nooney, 2002) as a disavowal, as an attack on the very idea that history of mathematics might have a place in mathematics education. This was not the intention. What the argument summarized above meant to do was (1) to bring out the implications, in the context of mathematics education, of taking history of mathematics very seriously, that is, within the presuppositions of its own methodology and approach; (2) by showing that a dilemma arises when the traditional commitments of mathematics education are assumed, to imply that those commitments need to be reconsidered if history of mathematics is to play a significant part in forming mathematically educated students. These two points, of course, are the source of the assumptions stated at the outset.

Thus, in this paper, I want to emphasize how the dilemma just mentioned reflects the deeper division contained in the basic assumption, namely, that between genuinely different ways of knowing: historical vs. mathematical (Fried and Unguru, 2001; Unguru, 2004), or, borrowing from Saussurean semiotics (Saussure, 1974), diachronical vs. synchronical (Fried, 2004) epistemologies. But I want to emphasize also that these epistemologies ought not be taken as competing, as it were, but as complementary. In other words, the historian of mathematics and the working mathematician view mathematics from different perspectives, and, moreover, mathematics itself is something that allows these different viewpoints. In this connection, history, whose attention, by the very nature of the discipline, is fixed on difference and different ways of thinking has itself, therefore, a privileged position. It is for this reason, I shall argue, that history can play a more than subsidiary role within the commitments of mathematics education.

It should be noted too – although I do not plan to expatiate upon this point – that the issues to be discussed in this paper fall square within a greater discussion engaging the mathematics education research community, namely, that concerning cultural diversity (e.g., Bishop, 1988; Powell and Frankenstein, 1997; Ahmed et al., 2000). This is because, as I have said,