

## Letters to the Editor

### Math and Poetry as Exemplified in Ernst Schröder's Work

I had occasion elsewhere to note the artistic facets in the work of Ernst Schröder. I am referring not only to his logical texts, but also to his mathematical ones, such as *On the iteration of functions*, where Schröder formulated the equation now named after him. This German mathematician gave great significance to the visual layout of his formalism. For example, he defines the dual form of a theorem, its conjugate, and its dual conjugate. So every sentence admits four forms, which are arranged in a square: in the left upper corner the theorem, in the right upper corner the dual theorem, in the left lower corner the conjugate theorem, and in the right lower corner the dual conjugate theorem. Why all this structure? Once introduced and explained, the concepts of dual and conjugate are *useless*, every new theorem is stated, and we see that the result has many possible forms.

But this graphic effort is not at all useless if we regard the matter from another point of view—that is, if we are interested not in the theorem alone but in its symmetries and the possible connections among its forms. It is not pedantry. Schröder was often lazy, self-contradictory, and not as accurate as one would expect (especially from a mathematician). The *raison d'être* for this array of formulas abides in the realm of art, in the plasticity of the medium. I think of Beethoven's first movement of his piano Sonata Opus 78, where the composer inserted a double *ritornello*. Did he want to hear repeatedly the same material? Of course not. Artistic reason drove Beethoven to polish his sonata in this way.

More than other mathematicians, for Schröder, art is in the foreground, revealing a search for poetry and elegance.

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### More on Course Surveys

The August 2010 issue of the *Notices* carried an Opinion column I wrote entitled "Evaluation of Our Courses". My main point is that we math profs *do not* get fairly evaluated. Something gets done, as we know; it is only what is easy to carry out. By doing only that, we tacitly assert our acceptance of the students' point of view on education in college.

The survey outcomes are used in some places as professional evaluation, and that is a serious problem. This is independent of the sporadic statements that students make in the written commentary. (I agree with what Martin Scharlemann wrote in his Letter to the Editor in the November 2010 issue of the *Notices*, that the more sober comments can be helpful.)

I would like to draw the reader's attention to the study that can be found at the URL: <http://www.journals.uchicago.edu/doi/pdf/10.1086/653808>.

It is a carefully controlled study that demonstrates the negative correlation between good survey scores for the instructor in one semester and good learning by the students in the next.

As for myself, I get so-so survey scores, but it has been long reported that my students are better prepared. I elect to put a lot of the burden of learning on them, and I find that appropriate at JHU. Maybe I should be less demanding? Once I said to my class, probably near the midpoint of the semester, "I'll run the lectures any way you want." Many hands went up. "But it won't change the scope of the course nor the nature of the exams." All hands went down.

Michael Fried, in his Opinion column in this issue of the *Notices*, reports on his experience in the opposite direction. When he started paying attention to improving his students' learning, his survey ratings suffered greatly.

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### Correction

The November 2010 issue of the *Notices* carried a book review, by Michèle Audin, of *Mathematicians fleeing from Nazi Germany* by Reinhard Siegmund-Schultze. In the reference list in the review, the authors of reference [2] are given as J-P Kahane, K. Krickeberg, and L. Lee. The third name should be instead L. Lorch. The *Notices* thanks Lee Lorch for pointing out this error.

—Allyn Jackson

### Submitting Letters to the Editor

The *Notices* invites readers to submit letters and opinion pieces on topics related to mathematics. Electronic submissions are preferred ([notices-letters@ams.org](mailto:notices-letters@ams.org)); see the masthead for postal mail addresses. Opinion pieces are usually one printed page in length (about 800 words). Letters are normally less than one page long, and shorter letters are preferred.