Letters to the Editor

Be a Reader for the National AP Exams

The AMS has been seeking ways for its members to contribute to mathematics education. Here is a suggestion.

Every year, a large number of the best high school mathematics students take an Advanced Placement Calculus course as the culmination of their high school career in mathematics. This year nearly 125,000 students took one of the AP Calculus examinations. They form a substantial portion of all calculus enrollments nationally and a much larger portion of the students who will eventually follow scientific careers. They preferentially attend the better universities. The AP program is the basis on which kids place out of the first semester or year of calculus in college. The huge size and the elite nature of the program ensures that expectations kids form in it will have an impact on university instruction. For example, the AP exam this year had questions which were very difficult to do without using a graphing calculator. Also, even as I write, a committee is hard at work revising the AP curriculum. They are pondering such issues as whether to eliminate proofs, even of the central chain of results which leads from Rolle's Theorem to the Fundamental Theorem of Calculus. Thus it behooves university mathematicians, especially research mathematicians, to get some perspective on the AP program in calculus.

Fortunately this is very easy. Each June, to grade the "free-response" portion of the AP exam (the part which is not multiple choice), the Educational Testing Service assembles a corps of "Readers" in one spot for a week-long orgy of grading. The increasing participation in the program has meant a corresponding increase in the number of Readers. This year, there were nearly 500 AP Calculus Readers. These numbers make the AP Calculus reading one of the major professional events of the mathematical year. A particularly nice feature for those interested in education is that the Readers are a mix of high school and college teachers. The Readers from high schools are a sampling of the cream of the nation's high school teaching corps. There couldn't be a better way for a university mathematician to meet them.

Unfortunately, very few do. This year, I was the only Reader from Yale. There were none from Berkeley, Courant Institute, Harvard, Cornell, or many other universities you might name. Readers from state universities were rarely from the main campus. An opportunity is knocking here. Outside the possibilities for high school–university interchange, if you and a colleague or two from somewhere else both go, it can be a mini-conference which *pays you* to attend. (Because of their relative rarity, the ETS usually responds favorably to applications of university mathematicians to be Readers, so this is really feasible.) Of course, the ETS extracts its pound of flesh during the day, but the long, warm evenings leave plenty of time for serious and less serious conversation. You might fear the tedium of a week of grading exams, but I found it curiously relaxing: how often do you have the comfort of knowing that, no matter how slow you are grading, there are 500 faster people helping you? Also, seeing the amazing range of response to seemingly straightforward questions and the methods for ensuring consistent grading are enlightening experiences. The Reader leadership (headed by Ray Cannon of Baylor University in recent years) sets a healthy work hard,

play hard tone for the week. Readers are allowed to serve at most six consecutive years; most keep coming back until their limit is reached.

To extend the benefits of casual exchange, the organizers of the reading have instituted a Professional Night Lecture. This could be an excellent occasion for research mathematicians to share with a wider audience their accumulated insights into standard curricular fare. I was pleased to give the lecture this year. It gave me a chance to tell about one of my favorite examples of the power and beauty of calculus—the rainbow—and I was quite pleased by the reaction. Beyond your interactions with the people there, at the reading you can sharpen your understanding of how the AP system works; and if you think it should work differently, the reading might prove an avenue to influence it. Give it a try.

Roger Howe
Yale University

(Received August 1, 1995)

Taste in Typesetting

I very much appreciate most of the ideas expressed in "Writing in the Age of LaTeX" by Andrew D. Hwang, which appeared in the August 1995 issue of the *Notices*. In particular, I can report my own struggles, as both writer and reader, with the use of "any" as a quantifier, and I find very useful the discussion of "cf". But I would like to say a favorable word for two conventions of mathematical papers with which Hwang disagrees.

First, I find the citing of references in the text by authors' initials very helpful. Hwang's suggestion that authors' names be given in full when a reference is first cited is wise, of course; but for later references, I believe the reader is likely to realize that [J-S] was written by Jones and Smirnov, but only that [18] was preceded by seventeen other references. Even lists of hundreds of references are helped by having the authors' initials as part of the citation.

Second, I acknowledge that nonstandard fonts are an inconvenience; for several years I could not print $\mathcal{A}\mathcal{M}\mathcal{S}$-TeX files because our system did not contain the latest fonts. But it is a great convenience for the reader when different fonts mean different types of structures (e.g., elements in lower case, sets in caps, sheaves in calligraphic script, and so on), and one of the basic fonts is boldface roman. To dedicate that font to the standard sets (naturals, integers, rationals, reals, complexes) is to "freeze" (in Halmos's sense) twenty-six symbols for the sake of five. To ease the problem of nonstandard fonts, the blackboard bold symbols (which I find attractive) for the standard five sets might be added to the general set of symbols, like the binary operators, rather than placing them in a font of their own. But since the $\mathcal{A}\mathcal{M}\mathcal{S}$-TeX fonts are now widely available, perhaps the problem has solved itself.

Thanks to Hwang for his useful suggestions and to the Society for its ongoing concern about the presentation of mathematics.

David Lantz
Colgate University

(Received August 8, 1995)

Response to Ekeland

Ivar Ekeland objects to holding a joint meeting of AMS and the Israel Mathematical Union in Jerusalem, Israel, because (i) no major power recognizes East Jerusalem as part of Israel, (ii) [there are] limitations on Palestinians' right to travel to Jerusalem, and (iii) isolation of the occupied territories during Pesach prevents Christians from observing Easter.

(i) West Jerusalem has been part of Israel (in fact the capital) from the inception of the nation. Given the location of the potential facilities for such a meeting, I doubt if any sessions will take place in the east. Dr. Ekeland's suggested site, Tel Aviv, counter to his claim, is not the capital of Israel.

(ii) He would be right to object if Palestinian scholars are denied access to the meeting. Does he have information that this will be the case? Or will travel restrictions be eased for these scholars? Yes, there are restrictions on Palestinian travel in Israel. The recent bus explosion and similar attacks give adequate reason.

(iii) I agree that denial to Christians of the right to observe Easter in Jerusalem is wrong. I would like to know if Dr. Ekeland voiced similar objections to the denial to Jews of access to the Western (commonly misnamed Wailing) Wall by the Jordanian occupiers of the West Bank (including East Jerusalem) during the years 1948–1967.

I agree that Israel's policies in the occupied territories have not always been up to the standard I'd like to see. There has been a quantum improvement since the present government, dedicated to a peace agreement, replaced the former Likud-led government.

Martin Fox
Michigan State University

(Received August 22, 1995)

Editor's Note: The *Notices* has received several letters objecting to the publication of Dr. Ekeland's letter. Several correspondents have corrected the assertion about the capital of Israel, which is not Tel Aviv, but Jerusalem.

Are the Right People Getting the Jobs?

The difficulties currently facing individuals seeking employment in mathematics have been well documented. Our personal observations have led us to a less widely understood phenomenon: many superior young candidates from departments with outstanding reputations do not find employment, while less mathematically qualified applicants from less prestigious universities receive multiple offers! Talented graduates often fail in the current job market because they are not prepared to compete in it and because they are not receiving the kind of support they need to compete.

What are the responsibilities of the student's Ph.D. thesis advisor? In Belgium, the word "advisor" is replaced by "promoter". We are writing this letter because we think the word "promoter" properly describes the role the thesis advisor needs to play in the job

seeking process. How can a student's advisor "promote" student success in the current job market?

1) Most academic jobs have a substantial teaching component. To prepare for this responsibility, every student should be advised to teach, to participate in innovative instructional projects, and to document these efforts with written accounts of the nature of the work and evaluations of it.

2) A doctoral thesis can be anything from an independent project to which the advisor appends an imprimatur to a joint research project on which the student is a junior partner. For the great majority of students, the baroque and remote topics typical of many current theses do not stand a student in good stead on a job search at a four-year college or private firm. Advisors should use their influence and talent to direct their advisees toward problems which can be understood by as broad an audience and with as many connections in the mathematical sciences as possible.

3) In these days of word processors and multiple applications, job seekers at every level are encouraged to tailor their applications to fit the needs of the employer. The single most important supporting document in the application folder of a new Ph.D. is the letter of recommendation written by the student's thesis advisor. A "one size fits all" letter sent to large, comprehensive Ph.D.-granting institutions, small four-year liberal arts colleges, and private firms is bound to be mostly off the mark. Letters of recommendation should be tailored to describe how well the applicant can satisfy the employer's needs.

4) In an article in the July 1995 issue of the *Notices of the American Mathematical Society*, Donald McClure estimated that only about 360 of the approximately 1,100 students who received a Ph.D. in 1991 had obtained an academic tenure-track appointment by the fall of 1993. We conclude that many 1991 graduates will wind up taking jobs outside of academia. Most of these jobs will be related remotely, if at all, with the student's research specialty.

Advisors should encourage breadth of mathematical training, computing experience, and the study of statistics, physics or engineering, even if these diversions interfere with concentration on a thesis problem.

While these observations may seem obvious, our experience with young job seekers indicates they are often ignored.

Frank DeMeyer, Chairman
Joint Committee of the
AMS-MAA-SIAM on
Employment Opportunities
Ken Ross, President
Mathematical Association of America

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Editor's Notes

The 1995 Annual AMS-IMS-MAA Survey (First Report) will appear in the December 1995 issue of the *Notices*. Paper copies of the report will be available the second week of October and can be obtained by sending a request to Elizabeth Foulkes, AMS, Survey Department, P.O. Box 6248, Providence, RI 02940-6248; telephone 401-455-4113; e-mail edf@ams.org.

The first sentence of the editorial in the October *Notices* states as an "interesting fact" that the NSF budget for Mathematics Education is ten times that of the budget for Mathematical Research. Although it has been difficult to determine, this estimate seems to be off by an order of magnitude. The editor, who should confirm such "facts" and did not, deeply regrets this failure. At the same time, we feel that this overstatement does not affect the basic logic of the editorial.

Here are the available data from which one can derive the estimate in the editorial as well as more accurate estimates. These data have been kindly provided to us from the office of the Joint Policy Board for Mathematics.

Total Budget for the Directorate of Education and Human Resources (EHR): $606 million.

K–12 Curriculum Development—$49 M

K–12 Teacher Enhancement—$101 M

Undergrad Curriculum Devel.—$59 M

Undergrad Faculty Enhancement—$25 M

Total, EHR "teaching projects"—$234 M

These are FY1995 estimates, referring to both Science and Mathematics Education. EHR does not break down data according to discipline, but the following estimates for mathematics have been made for this Editor's note:

Division of Elementary, Secondary & Informal Education:

Materials & Curriculum Development—$17M

Teacher Enhancement & Development—$20M

Division of Undergraduate Education:

Curriculum & Laboratory Development—$9M

Teacher & Faculty Development—$4M

Total, mathematics projects—$50M

Now, for mathematical research:

Total budget for the Division for Mathematical Sciences (DMS): $84 million.

Disciplinary Research—$47M

Computational & Cross-Disciplinary Research—$18M

Infrastructure Support—$18M

These are also FY1995 estimates. A reasonable estimate for the ratio of mathematical education funding vs. disciplinary mathematical research funding is then 50/47. Of course, if one includes, on the one hand, some portion of EHR funds for undergraduate curriculum development or teacher enhancement, and, on the other, cross-disciplinary research, etc., then one can get other estimates.

The editorial "ten times" compares the total EHR budget to that of DMS going to research: 606/65. Finally, we must observe that many of the programs excluded or included in any of these computations bear or do not bear on mathematics education and/or mathematics research. Thus, in reality, a continuum of ratio estimates, ranging from .5 to about 2, is possible, depending upon the intended use of the statistic. So, as usual: may the reader beware.