# Letters to the Editor


## Mallory, Not Hillary

In Volume 42, Number 2 of the *Notices* there is a letter from Michael de Villiers about "The Meaning of Proof for a Mathematical Researcher". I agree with everything except his paraphrase of Hillary's famous comment "Because it is there" (meaning climbing Mt. Everest because IT IS THERE). This comment is due to Mallory, who disappeared together with Irvine somewhere above 27,000 ft. on the last stretch to climb the peak in 1924. His ice ax was found in 1933 at 27,600 ft. His body has never been found.

*Gerhard Hagen*
*Hamilton, NJ*

(Received February 15, 1995)

## Popularization of Mathematics

The letters of Lee Rubel and Michael de Villiers (*Notices*, February 1995) raised interesting points concerning the nature of our enterprise.

Lee Rubel dislikes the trend toward contaminating the purity of our endeavors with irrelevant issues. While I agree with him about politics and tie clips, I would differ in questions of education which are related to the popularization of mathematics and efforts to make it more accessible to the general population. Michael de Villiers paraphrases Sir George Leigh-Mallory with: "We prove our results because they're there." The general public (and likewise our general student body) can be likened to someone sitting in a camp chair, surrounded by a vast Ozymandian plain, smoking a pipe while reading a newspaper, saying, "Because it isn't there." Working mathematicians know it is there and struggle daily to explore its hidden treasures. The general public needs also to know it is there.

*Don Chakerian*
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## Discriminatory or Compensatory?

It's not easy to decide if Larry Shepp intends his letter (*Notices*, v. 41, 1994, p. 899) seriously or as satire on those opposing specific encouragement (he calls it "discriminatory help") for women and minorities. Without them, the mathematical world would lose much of its future personnel, many of its best ideas, and be unable to make urgent contributions to social development.

He makes a mountain out of the molehill on which the 1972 AMS resolution promises to "include more women on (a) Society programs and panels, including invited speakers and section chairmen; (b) committees and governing boards." He urges its destruction and, along with that, any planned encouragement for minorities.

He tells us that, as chair of the AMS Committee to Select Hour Speakers at Eastern Section Meetings, he had, in canvassing his Committee, "used only first initials and last names in listing the candidates to remove first name gender clues." Why not also pseudonyms for Slavic or Lithuanian last names, since such surnames incorporate gender identification, and for Hispanic names so as not to identify that minority?

Is he telling us that people invited to give hour addresses at AMS meetings are so obscure that the committee charged with selecting them would not know their genders? Come now. Is he engaged in satire, or is he conning us?

The 1972 resolution recognized that there were fully qualified women colleagues for whom positive steps were needed to make it possible for them to make their fullest contribution to mathematical life. This need persists.

Minorities (to whom he would also deny specific encouragement) need it no less. The AMS cannot be absolved from responsibility in its own turf for what happens at the heart of its mandate and jurisdiction. This cannot simply be handed back to earlier stages of life.

Minorities are a rarity on the roster of invited speakers. One prominent and eminent Black colleague, a member of the National Academy of Engineering for quite a few years, gave an invited address for the first time only in 1992 (he had received no previous invitations). This was a joint AMS-MAA lecture, and his invitation came from the MAA, almost exactly fifty years after his Ph.D.

It came also in the wake of many years of demands in mathematical circles, inspired by similar demands in the country at large for exactly the kind of encouragement and support that Larry Shepp would have us withhold.

The AMS Council is now entirely white, as it has been for about a decade. While I was a member of the Council, I made several efforts (all unsuccessful) to have highly qualified Black colleagues brought into office. Leaving the Council, I published a letter (*Notices*, v. 30, 1983, p. 402) pointing out that only three Black colleagues, two of them Academy members, had ever served on the Council. Another served briefly shortly thereafter, but none now for about ten years. My letter proposed a practical remedy. This was not adopted. The result: no Blacks on the Council.

There is no level playing field, nor will there be one without preparing the ground with specific measures, visible and operative at all levels.

*Lee Lorch*
*York University*

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## Graduate Students and Colloquia

The weekly colloquium in a mathematics department is available in most universities and provides an opportunity for mathematics graduate students to learn about backgrounds and developments in other areas of mathematics. However, many graduate students only attend colloquia which are relevant to their own areas. A lot of mathematics graduate students have not realized that a mathematician should learn about as many aspects of mathematics as possible and frequently communicate with other mathematicians.

Mathematicians certainly cannot spend equal time on every branch of mathematics, but this is not an excuse for ignorance in the areas outside their own. Attending colloquia provides an easy way to learn mathematics, since it costs less time and money than reading books and taking courses. In a colloquium people may ask questions and exchange information and ideas. Sometimes an idea applied in one area may be helpful in another area.

I am so impressed by a colloquium in the Iowa State University, since it helped me to find a topic in which I am interested and a good major professor for my master's degree, and I learned about a lot of mathematics from it. So enjoy colloquia, because they help.

*Ying Li*
*Ames, IA*

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## Discriminatory Advertisement

Could you please explain the following apparent discrepancy to me? From the February 1995 *Notices*, page 288:

U.S. laws prohibit discrimination in employment on the basis of color, age, sex, race, religion, or national origin. "Positions Available" advertisements from institutions outside the U.S. cannot be published unless they are accompanied by a statement that the institution does not discriminate on these grounds whether or not it is subject to U.S. laws.

Same issue, page 293:

The International School for Advanced Studies (SSISA/ISAS) in Trieste expects to offer a number of postdoctoral positions...Candidates, who must not be over 36 years of age...

*Jan Holly*
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*Editor's Note*: This unfortunate contradiction was an inadvertent result of improper oversight on the part of the editor. We have corrected our procedure so that it will not reoccur. The editor thanks Dr. Holly for bringing this to our attention.

## Course in Linear Algebra

We are pleased that Seymour Lipschutz has taken note of our efforts in his Forum article "This is Linear Algebra?" in the September 1994 *Notices*. Yes, we are attempting to bring about change, and we would like a broad audience of mathematicians to be aware of and think about and try out our suggestions. The LACSG Recommendations appeared in the January 1993 Special Issue on the Teaching of Linear Algebra of the *College Mathematics Journal* and have been otherwise circulated. Various aspects have been presented at the January

Joint Meetings in 1991, 1992, 1993, 1994, and 1995 and in as many other forums as we could find. While feedback on our Recommendations to date has been generally (obviously not unanimously) positive, we are still looking for more ways in which to interact with colleagues. It seems to us, however, that the mathematical community shouldn't be bound forever by decisions made, in Lipschutz's own words, "about thirty years ago". We were still using slide rules then! We believe that it is time to look at what is needed in a linear algebra course today, when we and our students use computers effectively in many different ways.

Professor Lipschutz has certainly taught and written about linear algebra for a long time, and his "Schaum Outline on Linear Algebra" can be a valuable reference on the subject. However, we too have taught and written about linear algebra for a long time. All four of us (the organizers of the Linear Algebra Curriculum Study Group) began working in linear algebra in the 1960s. The sixteen panelists and four consultants at the Williamsburg Workshop which produced the Recommendations came from all over the USA: from private and public institutions, from graduate universities, four-year universities, and two-year colleges. Some teach and do not do research. Others teach and are active in research, in pure or numerical linear algebra or in mathematics education. They deal with remarkably different student populations.

The basic questions addressed by the Workshop participants were: (1) What are the most important concepts of linear algebra for an omnibus first course (which typically includes many more students from client disciplines than math majors), and how much time can be alloted to each? (2) What are the most effective ways to develop these concepts in our students?

It was our goal to provide a syllabus "lean" enough to give students sufficient time to master the material presented and "lively" enough to motivate them to do the work necessary for such mastery. It is our belief that students learn best when they build on their previous knowledge and see value and relevance in the ideas presented. For some students, "effective calculation" (e.g., eigenvectors can help us calculate matrix-by-column products Ax more effectively) helps provide value. For others, applications (in differential equations or statistics or outside mathematics) or interpretation of algebraic concepts in terms of geometry or using computer technology in linear algebra (or vice versa) can help provide relevance. For most lower-division students, an axiomatic development (especially early on) is far removed from their previous knowledge, does not provide relevance, and can be counterproductive in the learning of other concepts. Thus such a development is optional in our recommended syllabus, and we feel should only be done with great care.

We believe that students should see careful definitions and statements of theorems. We believe that proofs—by students as well as by instructors—are an important part of the first linear algebra course. However, we believe also that matrices and spaces of $n$-tuples are appropriate contexts in which careful definition and proof can be useful and challenging for all students. It is important to note that the LACSG approach need not downplay the notion of linear transformation as a focus of linear algebra. (See for example David Lay's new textbook on elementary linear algebra.) A concrete view of that notion, however, can make its communication to students easier and make available the very useful tools of row reduction and the "Three Views of Matrix Multiplication" presented in our Recommendations to explain much important theory.

We agree with Professor Lipschutz that just learning how to row-reduce a matrix is not learning much mathematics. (We would be happy for our students to do it by machine except for small examples.) Learning how to convert a problem from mathematics or elsewhere into a system of linear equations (so that row reduction is applicable) and learning how to interpret the output in terms of the original problem are more significant. We do not call for students to just learn cookbook procedures, but for them to be able to use various procedures appropriately in dealing with mathematical concepts and applications.

We like Professor Lipschutz's closing suggestions for a minimal list of objectives and a sample of questions which could be used to test our students' learning. We would be happy to work with anyone on such lists of objectives and question; or to discuss anyone else's lists of objectives and questions (together with the recommendations we have already made). We would suggest that all teachers of linear algebra (not just Professor Lipschutz or just a special committee of the AMS or MAA) join with us in beginning what will surely be a long and difficult task: the "testing" of what our students are learning, how they learn, and how we can help them to understand and appreciate mathematics.

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**Editor's Note**

The article by R. J. Gardner, entitled "Geometric Tomography", which appeared in the April 1995 issue of the *Notices*, should have been accompanied by the following acknowledgement: "Work supported in part by NSF Grant DMS-9201508". The acknowledgement was inadvertently omitted in the editing process, and the *Notices* regrets the error.