Letters to the Editor

Plundering the Russian Academy of Sciences

The project of reforming the Russian Academy of Sciences (RAS) was suggested in June 2013 by the Russian "Duma" without discussion with Russian scientists. It appears as a sudden attack. The project implies the expropriation of property of the RAS, elimination of the RAS, and creation of a new organization with the same name but with new staff and new regulations.

From my point of view, such a "reform" should be qualified as the liquidation of the RAS, the plundering of properties of the RAS, and the plundering of the name of the RAS.

I think the RAS deserved serious criticism but not liquidation. Such a liquidation would be a big step toward the total destruction of any science in Russia.

Corruption has created serious problems for science in Russia. The revolution in and disintegration of Russia are predicted for "this year" by many authors. Such predictions have appeared again and again over the past several years, so I cannot qualify them as scientific, but I accept that there are reasons behind these predictions. The observed destruction of science in Russia is one of these reasons.

I do not ask colleagues to save the RAS nor to save science in Russia; I doubt if they can be saved. I would only suggest that at least mathematicians use the correct terminology to describe what is happening with science in Russia at the beginning of the twenty-first century.

In support of my point of view, I suggest the following links:

http://www.mi.ras.ru/index.php?c=ref

http://mizugadro.mydns.jp/t/index.php/About_RAS_reform

http://mizugadro.mydns.jp/t/index.php/Against_the_RAS_reform

http://mizugadro.mydns.jp/t/index.php/RAS_reform

http://samlib.ru/k/kuznecow_d_j/saveras.shtml

—Dmitrii Kouznetsov
Institute for Laser Science, University of Electro Communication, Japan
dima@ils.uec.ac.jp

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Evidence-Based Teaching Practices

I applaud Professor Reys's efforts to improve the teaching of undergraduate math ["Getting Evidence-Based Teaching Practices into Mathematics Departments: Blueprint or Fantasy?", by Robert Reys, *Notices*, August 2013]. Let me pass on a couple of thoughts based on forty years of undergraduate teaching experience.

The term "evidence-based" worries me. A distinguished professor of education once said to me that there were no reliable statistics in education. Of course he was exaggerating, but it is true that one should be very careful about statistical evaluations of teaching. And, in the absence of good statistics, it is not clear what one would mean by "evidence".

Professor Reys mentions "inquiry-based learning". He also mentions the PCAST [President's Council of Advisors on Science and Technology] report calling for "1 million more college graduates in STEM fields." It seems to me the thrust of the PCAST report is that STEM [science, technology, engineering, and mathematics] should be spelled STEm; i.e., there should be less math, and what math there is should be geared to practical applications, principally computers. I worry that, if we try to combine the slower, deeper, inquiry-based approach with the more efficient "industrial" methods which will be required to produce 1 million more STEm graduates, the result will be a train wreck.

Two final thoughts. Firstly, when I started teaching more than forty years ago at Princeton, all the senior faculty except one taught undergraduate courses. Gradually over the years, institutions started hiring specialized faculty to do undergraduate teaching, so now many senior faculty don't teach undergraduates at all. (I do not know what the situation is now at Princeton. Perhaps things there are as they were in 1971 when I arrived.) Secondly, despite what I just said, I think math continues to put more thought and effort into undergraduate teaching than any other science. Unlike other sciences, the high demand for calculus and other undergraduate level teaching means that we can (and we do) live with only a fraction of the government support available to physics or biology. We should be proud of that independence.

Spencer Bloch
University of Chicago (retired)
bloch@math.uchicago.edu

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Remark on a Quartic Algorithm

Performing one step of the algorithm mentioned on page 845 of the August 2013 issue of the *Notices* as follows

$$x_0 = \text{some initial approximation of } \sqrt{q}$$
$$0 \le n \Rightarrow a_n = \frac{q - x_n^2}{2x_n} \quad \text{and} \quad x_{n+1} = x_n + a_n - \frac{a_n^2}{2(x_n + a_n)}$$

(which yields a sequence $(x_n)_{n=0}^{\infty}$ converging quartically to $\sqrt{q}$) is equivalent to—but is less computationally efficient than—performing two steps of (the quadratically convergent) Newton's method as follows.

$$x_0 = \text{some initial approximation of } \sqrt{q} \quad (\text{in fact any } x_0 \in (0, \infty))$$
$$1 \le n \Rightarrow x_n = (x_{n-1} + q/x_{n-1})/2$$

—Dan Jurca
California State University, East Bay
dan.jurca@csueastbay.edu

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