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**“Hard Days on the Endless Frontier”
Revisited****Peter Csermely, Ph.D., D.Sc.¹**

August's LSF article, "Hard Days on the Endless Frontier," by Robert Pollack, generated a number of responses. The following letters are published, along with Dr. Pollack's replies, in order to continue the dialogue on morale in the biomedical sciences. **VTM**

Due to the intensive Ph.D. program launched by the Hungarian government 3 years ago, I recently had the chance to be one of the examiners in numerous doctoral exams. Talking to other Hungarian and foreign colleagues, I think that my alarming experience can be generalized: our recent doctors in the field of life sciences are quite outstanding experts in their particular specialized field and research techniques, but know less and less about the facts and logic of, say, biochemistry, or about the general context of their own results. The increasing demand for new and newer data—the 'publication race'—distracts them more and more from reading the literature and especially from studying articles that are not of immediate relevance to their actual experiments. Most of the time even these papers are advised (and therefore screened) by their supervisors.

Scientific efficiency carries a price not only among graduate students. Overspecialization is more and more characteristic of senior scientists as well. Principal investigators find themselves as CEOs of a small or larger 'data factory' instead of being a leader of a true lab where novel ideas and approaches are born. An increasing number of research papers have discussion sections lacking a broader perspective of the field and of the findings. Many reviews restrict themselves to a mantra of known major facts or to a mere listing of available data in the field. Conferences became an unbearably long series of monotone monologues, allowing less and less time for real discussions and vivid exchange of different views. Life sciences are slowly imprisoned by an increasing redundancy and an overflow of minuscule details.

What can help us to stop these dangerous trends? We must reorder our values to emphasize outstanding achievements even more over the continuous flow of low-value publications. Groundbreaking contributions should more generally balance a few 'nonpublishing' years. As members of grant-giving bodies, we should give more credit than before to high-level attempts to synthesize a particular field of science. We have to make the 'scientific background' part of Ph.D. theses and grant applications an even more important criterion of acceptance. When organizing conferences, we should reverse the 20 minute talk + a 5 minute discussion general setup (where the latter is usually absorbed by the talk itself) to a 5 minute talk + a 20 minute discussion scheme. Meeting organizers should 'plant' known debaters of related fields in the audience, asking them for thought-provoking interdisciplinary comments or questions. Technical advances (such as the pagers applied successfully in the recent International Congress of Stress in Budapest) enable us to devise a more flexible meeting structure that allows the formation of spontaneous workshops/discussions.

Last, but not least: fully agreeing with Dr. Pollack, I also stress the importance of teaching. Teaching of science, the mandate of 'profess'-ors, however, does not begin at the postgraduate or even the undergraduate level. On the basis of examples from the Howard Hughes Medical Institute, the New York Academy of Sciences, and other U.S. institutions, we began a few years ago a highly successful campaign to draw talented high school students to research labs in Hungarian universities and research institutes. Introducing the 'wholeness' of science at an age when potential future investigators are not yet spoiled by the general trends of overspecialization may help us to preserve (or regain) the integrity of life sciences in the 21st century.

Response to Secretary General Csermely**Robert Pollack** Author Affiliations

Secretary General Csermely's response pleases me greatly. I have nothing but the greatest admiration for someone who has come through real revolution—without medals—and who seems so clear-minded about the value of personal integrity and the observing of behavioral boundaries in science. Apparently Hungary, like Spain,

has scientists whose experience of a repressive regime has given them a more realistic perspective than their American colleagues, whose memories of strife and revolution are likely to center around pot busts and teach-ins. What is really unexpected, though, is how little it seems to have mattered that Spain's regime was Fascist and Hungary's Communist: real personal autonomy means more once you've felt its absence in your bones.

Articles citing this article

Limits of Scientific Growth

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