The presidents of FASEB and of the American Society for Clinical Investigation express their concern about a decline in the number of new physician-scientists. Origin-of-life researchers emphasize that "the environment in which life began may not have been the same as the one in which the last common ancestor thrived." A letter writer questions the value of scientists presenting cost-benefit analyses of their work. The cosmological constant is explored. And the game of solitaire is discussed.

Disappearing Physician-Scientists

I write to express my agreement with Leon E. Rosenberg about the declining number of physician-scientists pursuing avenues of biomedical research (Policy Forum, *Science*'s Compass, 15 Jan., p. 331). This issue has also been a significant concern for the Federation of American Societies for Experimental Biology (FASEB), and we explored this topic in some depth during our annual Consensus Conference on Federal Funding for Biomedical and Related Life Sciences Research held last month. In a just released report based on that conference (www.faseb.org/), FASEB outlines its view of the problem and provides recommendations for its resolution. The report highlights the critical, unique role that physician-scientists play in biomedicine by studying patients and their diseases. They take their observations from the bedside into the laboratory, make basic discoveries, and translate these discoveries into new methods for prevention, diagnosis, and treatment of disease. In addition, the need for highly trained physician-scientists will only increase in the post-genome era.

We strongly agree with Rosenberg that the same factors constraining patient-oriented research have also had a profoundly negative impact on the ranks of physician-scientists. Their proportion has declined as relatively fewer first-time physician-investigators have applied for National Institutes of Health (NIH) awards over the past several years. The next generation of patient-oriented trained researchers is at risk without support for training and career development. If this is allowed to occur, we will have a drastically reduced capacity for translational research, have lost a critical source of research insights, and have diminished ability to train future generations of medical students in the context of scientific method.

The FASEB report recommends increased support for training physician-scientists, for programs that specifically promote rigorous and intense training opportunities for medical students with an interest in research, and for clinical research training and career development programs. To remove disincentives to career development and retention of physician-scientists, we suggest debt forgiveness for medical education costs. Later this year, we are planning to hold a consensus conference on personnel needs for disease-oriented and patient-oriented research and will address the constraints on the supply of physician-scientists in detail.

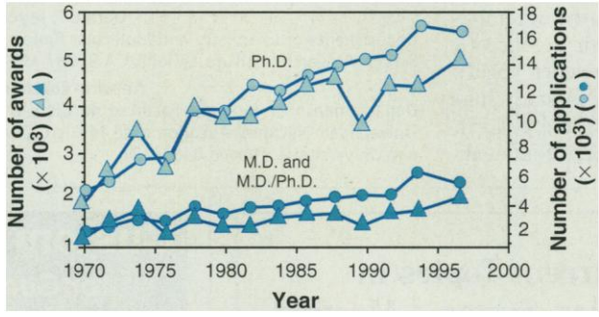

Fig. 1. NIH research project grant awards, 1970–1997.

FASEB strongly believes that the training of physicians with an interest in research is critical to the future of biomedicine. We pledge to make this issue a top priority for our federation and to work with our 17 member societies and other organizations to reverse this alarming trend.

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I write on behalf of the American Society for Clinical Investigation (ASCI) to provide information supporting Rosenberg's Policy Forum, which described a "progressive, dangerous decline in the number of physician-scientists...an inclusive designation, covering basic, disease-oriented, patient-oriented, population-oriented, and prevention-oriented investigations." ASCI is a 90-year-old honor society that elects physician-scientists who have made major contributions in biomedical research at a relatively early stage in their careers (our senior ranks include many members of the National Academy of Science and several Nobel Laureates (see www.asci-jci.org/asci/). In times past, ASCI frequently elected the maximum number of new members per year allowed by our charter. The number of nominations for election began a rapid decline a few years ago, as did the number elected. In reponse to this trend, a concerted effort was made to encourage members to identify and nominate all potentially eligible candidates. Despite a temporary increase in nominations, ASCI was still unable to identify a much larger number of nominees considered worthy of election. Admittedly, no system of selection for honorific election can be perfect. Also, the trend we have noted is recent, and its future direction cannot be definitively predicted. However, since physician-scientists are typically nominated for ASCI election in their early forties, we are concerned that this change actually reflects a constriction of the pipeline that began many years ago, when such individuals began their independent scientific careers. Indeed, informal reports from our members do suggest that the numbers of new physician-scientists seeking and succeeding in independent research careers are continuing to decline. This decline is particularly worrisome, given that we are in the midst of a revolution in molecular genetics and cell biology that promises to have a dramatic impact on the practice of medicine over the upcoming decades.

In the past, ASCI has kept a low profile in the public arena, focusing mainly on fostering the scientific spirit among physicians, honoring the achievements of younger physician-scientists, and on publishing excellent biomedical research in the *Journal of Clinical Investigation*. However, ASCI has recently accepted an invitation to join FASEB and is now working with this umbrella organization of scientific societies to address these and other matters of importance to the biomedical research enterprise. We are gratified to find that representative leaders of the 16 other organizations that make up FASEB share our concerns about the decline in physician-scientist numbers, and have voted to place this issue on the frontline agenda for the upcoming year. There are plans for more objective data-gathering and for a FASEB Consensus Conference on the subject.

Rosenberg clearly articulates many of the reasons for the decline in the numbers

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of physician-scientists and suggests several well-thought-out solutions. ASCI vigorously endorses the need to address this urgent problem.

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Origin and Ancestor: Separate Environments

Nicholas Galtier *et al.* (Reports, 8 Jan., p. 220) argue on the basis of calculated values of the guanine plus cytosine (G+C) content of ribosomal RNAs that the last common ancestor of extant life on Earth was not a hyperthermophile. They correctly point out that this neither supports nor invalidates claims that life originated at high temperatures. They clearly state that the environment in which life began may not have been the same as the one in which the last common ancestor thrived.

This thrust of the report by Galtier *et al.* is accurately reflected in the accompanying item in This Week in Science (8 Jan., p. 143). However, in Gretchen Vogel's News of the Week article "RNA study suggests cool cradle of life" (8 Jan., p. 155), the two environments have been conflated.

It is important to recognize that the arguments for and against a thermophilic last common ancestor are almost irrelevant to discussions of the temperature at which life originated. The last common ancestor seems to have been an organism with a biochemistry about as complicated as that of a contemporary bacterium, and it must, therefore, have had a complex evolutionary history. During the course of their evolution, the predecessors of the last common ancestor may have adapted one or more times to changes in the temperature of their enviroment. Therefore, it is broadly accepted that the nature of the last common ancestor, whether or not it was a thermophile, may not provide evidence about "the cradle of life."

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Health Care Costs

There is something fundamentally wrong when scientists produce cost-benefit analyses defending the value of what they do, as in "Effects of medical research on health care and the economy" by Herbert Pardes *et al.* (Policy Forum, *Science*'s Compass, 1 Jan., p. 36).

The need to support scientific research to comprehend ourselves and the world around us ought to be self-evident. But when it comes to judging whether research will illuminate our understanding of human disease and reduce health care costs, projections are dangerous because they are likely to be blurred by factors that have not been adequately analyzed. The result is false public expectations and damage to the credibility of science.

In the early 1970s, I became involved in reporting the recombinant DNA developments and other findings about the gene and the cell that had emanated from scien-