

| LETTERS |

Women, science, and academia

Re: "Women, Science, and Academia: A Three-Point Plan" You write that the cost of daycare "is dwarfed by the costs to innovation of not having half the world's population adequately represented among scientific faculty members, which is the clear result of a lack of daycare." This is an argument that must be made convincing not as a matter of belief, but as a matter of data and funds accrued.

The counterargument—stated quite clearly to me by a male colleague as I struggled through the last month of a difficult pregnancy and made plans to take a three-month leave of absence from my postdoc position to be with my newborn—is persuasive in a production-oriented profession such as the life sciences. Men can do the job better

because they can be there, working, while women are busy with the biological necessities of bearing, and the societal necessities of raising children. Why bother paying for daycare (or for time off for prenatal care) to allow women to contribute to the life sciences, when there are capable men to do the job? What does science, in fact, gain by the participation of women, specifically? I would bet my career that when men can (and do, in forums such as yours) comfortably articulate exactly why it is that life science needs the participation of women, the daycare issue will begin to be solved.

So, will you take my challenge? If you make your argument, they will fund daycare.

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1. R. Gallagher, I. Oransky, "Women,

science, and academia: a three-point plan," *The Scientist*, 19[7]:6, April 11, 2005.

In Sweden the percentage of female professors is currently at 14%, not an inspiring number and increasing only at a rate of less than 1% per year. At the Karolinska Institutet, the number is 17%. Not satisfied with this performance, the Swedish government has decided that from 2005 to 2008, the target for new recruitment [of women] should be about 30%.

One year ago, a very interesting study¹ by two well-established Swedish medical researchers found that men had been almost four times more likely than women to progress to full professors in all traditional university subjects investigated.

Certainly, as your article suggested, good and affordable childcare is necessary for reducing the inequality.

We should consider other tools for reducing inequality as well:

- Withdrawal of governmental funding to universities that are not actively pursuing equality plans. Money talks.
- Education of existing professors and board members at all universities about the need for equality considerations.
- Research funding specifically directed to female principal investigators to stimulate them in their early career advancement.

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1. www.dn.se/DNet/jsp/polopoly.jsp?d=572 &a=245064&previousRenderType=2

Next stop, Mars

Jay Buckley describes well the three chief biomedical problems facing manned missions to Mars.¹ Although I find his discussion of the radiation problem too pessimistic, we do need to think carefully about mission design and engineering in overcoming it.

Above all, one needs to shorten the transit time to Mars and therefore study the trade-offs between the cost of extra propulsion versus the obvious gains

(from reducing exposure to radiation and zero-G, as well as reducing the complexity and weight of life support). For example, with additional propulsion between Earth and Mars instead of just coasting, the "Speedboat" mission² would shorten the transit time to 100 days in each direction and permit a stay at or near Mars of 30 days. The total mission duration of less than eight months is well within the time frame of experience with the MIR and ISS space stations.

In-transit shielding against radiation is best accomplished with low-atomic-weight material.³ The obvious choice is propellants arranged around the habitat. Low-atomic-weight hydrogen-rich material provides maximum absorption for least mass and also minimizes the production of secondary cosmic rays by the incident primaries.

Magnetic shielding would not be particularly effective. One can compare it to the shielding effect of the geomagnetic field, which keeps out galactic cosmic rays (GCR) below about 10 Bev, but only at low geomagnetic latitudes. The matter has been studied in detail for about a century, based on the pioneering work of the Norwegian scientist Stormer.

Magnetic shielding might hold some promise, however, against solar-produced high-energy particles (SHEP) events, which tend to be unidirectional (while GCR is omnidirectional)—coupled with the proper orientation of the habitat. Alternately, one might consider putting the crew into a deep shelter within the habitat for several days until the SHEP event is over.

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2. F. Chang-Diaz et al., "Rapid Mars transits with exhaust-modulated plasma propulsion," NASA Technical Paper 3529, 1995.
3. S.F. Singer, In *Physics and Medicine of the Atmosphere and Space*, O. Benson and H. Strughold, eds., New York: John Wiley & Sons, 1960.

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