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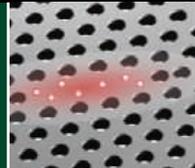
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## LETTERS

edited by Etta Kavanagh

### Cooperating over Water Issues in the Middle East

IT IS THE NATURE OF NATURE IN THE MIDDLE EAST THAT, LIKE EVERYTHING else, all things are political. Even water is laden with politics as raindrops fall either on Jewish or Arab soil. Long before the Israelis described in “Seeking sustainability: Israel’s evolving water management strategy” (A. Tal, Special Section: Freshwater Resources, Perspectives, 25 Aug., p. 1081) have a chance to manage water supplies, they must first control the quantity of water that is taken by Palestinians living on the West Bank (1–4). Within the scientific community, however, there are some contrasts to the military and political conflicts that are so often the fodder for front-page news.



The Alexander River

Three examples of teamwork stand out. The first is the award-winning cleanup of the Alexander River (5), which carries raw sewage from the Palestinian towns of Nablus and Tulkarm across the Green Line demarcating the de facto border between Israel and the Palestinian territories on the West Bank. Israeli and Palestinian planners began working together in 1997 and continued through the worst of the Al Aqsa Intifada (2000–05). Implementation of a master plan to restore the river began in 1998 with removal of pollutants, construction of an “emergency project” to treat raw sewage arriving from the Nablus Stream, and creation of seven river parks with bike and pedestrian paths and streamside picnic areas designed in cooperation with Israeli schoolchildren.

The second is a U.S. Agency for International Development–

funded Israeli/Palestinian research project to assess damage and prepare for eventual restoration of water in the Besor/Khalil watershed. The Besor/Khalil’s headwaters rise in the West Bank, where it collects the raw sewage of Hebron and the Jewish settlement of Kiryat Arba before running into Israeli territory. It flows through the northern Negev Desert, gathering yet more sewage, storm water, and agricultural and industrial waste, before becoming the only flowing surface water stream in the Gaza Strip (see also “Running out of water—and time,” J. Bohannon, 25 Aug., p. 1085). Israeli Jewish, Israeli Arab, and Palestinian scientists are preparing a joint quantitative analysis of water quality and watershed impairment from the river’s source in the West Bank highlands to its outlet in the Mediterranean (6).

Finally, in a project called Good Water Neighbors spearheaded by Friends of the Earth Middle East, Israelis, Palestinians, and Jordanians are cooperating to share best practices for water conservation. The cooperation of 17 cross-border communities has illustrated how the interdependent nature of water can create the initial trust that provides the basis for cooperative work (7). For example, Palestinian, Jordanian, and Israeli mayors have jointly called for policies to rehabilitate the lower Jordan River.

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#### References and Notes

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2. N. Kliot, in *Environmental Crisis: Regional Conflicts and Ways of Cooperation*, K. R. Spillman, G. Bachler, Eds. (Center for Security Studies, ETH, Zurich, 1995), pp. 43–56.
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6. See [www.watsoninstitute.org/meef/english/docs/ResearchBesor\\_project\\_proposal.pdf](http://www.watsoninstitute.org/meef/english/docs/ResearchBesor_project_proposal.pdf) for details.
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### What Happens to the Whistleblowers?

I AM TROUBLED BY THE COMMENT OF IRWIN Goldman in the article “Truth and consequences” (J. Couzin, News Focus, 1 Sept., p. 1222). The article states that Goldman “came to believe strongly that science needs individuals like [the student whistleblowers at the University of Wisconsin (UW)].” Yet

most of the students involved scattered, leaving UW, leaving graduate school, leaving academia, even leaving science. I feel that Goldman and others showed commendable support for these students during the ordeal they suffered, but once it was over, the students were left high and dry. No wonder they left. The article mentions Goldman’s plan for a policy to protect students in similar situations, but again, the policy he envisions

seems designed to protect students during the investigation and makes no provisions for the aftermath. I agree that we cannot change our standards of what a Ph.D. means, even for a student who has studied for years in a lab that is suddenly discredited. She obviously cannot receive a degree until she has completed and defended a dissertation. And yet, surely some accommodation can be arranged for people in this situation. Did UW

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do everything in its power to find labs for these students? Or were they all too happy to see the last of them? I wonder if government funding agencies (e.g., NIH) are considering provisions for NIH-funded students and postdocs caught in such a situation.

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## A Problem with Mentoring

I READ THE ARTICLE "TRUTH AND CONSEQUENCES" (J. Couzin, *News Focus*, 1 Sept., p. 1222) with dismay, not all of it directed at the obvious scientific misconduct. The University of Wisconsin (UW) let these six students down well before the misconduct was discovered. As a student at UW, I earned an M.S. and Ph.D. and published two papers in 4 years. Some of these students had been in the lab 6 to 7 years and had published nothing. Didn't anyone notice they weren't making progress? Didn't they have committees reviewing their work? Now I have the opportunity to mentor students and postdocs. Students not making progress because they lack the skills or commitment, or have extenuating circumstances in their lives are usually easy to identify. If a student doesn't fit that category, then the mentor deserves scrutiny. Universities have an obligation to do this. (They might also consider some mentor training.) As a parent observing my children and their colleagues in graduate schools, lack of regard for the student's time investment is not unique to UW. Universities should design their Ph.D. programs to be accomplished in 4 to 5 years, and while scrutinizing their programs, they might ask if the training they provide is suitable for the available opportunities. Subtract the number of faculty a department hires from the number of Ph.D.s they produce, and it's apparent that students need to be trained for more than university careers. If we misuse our young people, we are bankrupting the future of science, not only by losing potential talent but by alienating the public we expect to support science in the future. UW (and others)

### Letters to the Editor

Letters (~300 words) discuss material published in *Science* in the previous 6 months or issues of general interest. They can be submitted through the Web ([www.submit2science.org](http://www.submit2science.org)) or by regular mail (1200 New York Ave., NW, Washington, DC 20005, USA). Letters are not acknowledged upon receipt, nor are authors generally consulted before publication. Whether published in full or in part, letters are subject to editing for clarity and space.

needs to take steps to ensure that the mentoring of graduate students is adequate and also should have the grace to say “I’m sorry” to the students who wasted years because of bad mentoring.

MARYJANE SELGRADE

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## Mice, Pain, and Empathy

IN THEIR REPORT “SOCIAL MODULATION OF pain as evidence for empathy in mice” (30 June, p. 1967), D. J. Langford *et al.* seek to test the hypothesis that mice can empathize. I found myself filled with empathy for the subjects of the experiments. Research that describes intentionally induced “writhing and pain” needs to have better ends than knowing if mice might feel empathy for each other. I have always defended the use of animals in scientific research, but only on the condition that they do not suffer pain, at least no more than we would be prepared to inflict on ourselves in the pursuit of science. There are so many experiments that might satisfy our curiosity, but we cannot seriously study empathy with such a clear disregard for it ourselves. We have to find other ways to discover what is going on in the minds of animals that can feel pain. Perhaps the experimenters could consider using signs of pleasure and relaxation following some reward to see if this behavior transfers some signal. I acknowledge that this cannot be an alternative to empathizing with those in pain, but it is at least a painless parallel. But there must always be research that we will not do. Your report by Greg Miller on this research in the News of the Week section (“Signs of empathy seen in mice,” 30 June, p. 1860) starts, “Empathy is one of the noblest human attributes.” Must I conclude that it is absent or suppressed in some scientists?

ERNEST GWYN JORDAN

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## Response

I AGREE THAT WE AND OTHER SCIENTISTS HAVE serious ethical obligations in relation to research that involves inflicting pain on animals: the goal of the research must be important, it cannot be realized without inflicting pain, and the least pain possible is inflicted.

As to our goal, I would remind Jordan of the disturbingly high prevalence of chronic pain (up to 50% of the general population) (1), and our continued inability to adequately manage chronic pain in many sufferers. It is well known that social factors can robustly modulate chronic pain in humans (2, 3), but without any animal

models, the mechanisms by which they do so remain obscure.

As to the means, the offense appears to be our use of the “writhing test,” developed in 1959 (4). This very common, but unfortunately named, assay involves the intraperitoneal injection of very dilute acetic acid, which inflames the viscera and muscle wall. The stereotypical, reflexive constrictions of the abdominal musculature produced have historically been termed “writhes,” but “stretches” would be a more accurate description, since there is virtually no motion perpendicular to the long body axis. The writhing test is likely the least intense pain model in current use, in that the behavior can be totally abolished by low doses of opioids and moderate doses of over-the-counter analgesics (5). The mouse formalin test also responds to weak analgesics. In fact, rather similar assays are indeed performed on human volunteers, involving, for example, the injection of hypertonic saline into the cheek (6). Ironically, we chose the writhing test precisely because it is of the mildest intensity available, to improve our ability to see the subtle changes produced by social factors. Thus, what is implied by the phrase “writhing in pain” really does not apply in our experiments.

As to alternatives not involving pain, the possibility that we might study empathy using reward and “signs of pleasure and relaxation” begs the availability of valid dependent measures of these states in mice. In any case, our original purpose was not to provide evidence of mouse empathy, but rather to study the social modulation of pain itself. If in fact we have succeeded, serendipitously, in developing a mouse model of empathy, then the full power of mouse genetics can now be applied to elucidating not only the neurobiological mechanisms underlying social modulation of pain in humans but also mechanisms underlying psychopathy and autism, disorders featuring impaired ability to empathize.

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## CORRECTIONS AND CLARIFICATIONS

**Reports:** "Washing away your sins: threatened morality and physical cleansing" by C.-B. Zhong and K. Liljenquist (8 Sept., p. 1451). In Table 1, the Study 3 data were entered incorrectly. The percentage who chose antiseptic wipes in the ethical recall condition was 37.5%, not 33.3%, and the percentage who chose antiseptic wipes in the unethical recall condition was 75%, not 66.7%.

**ScienceScope:** "New Vatican astronomer" by C. Holden (25 Aug., p. 1031). The article incorrectly reported that George Coyne had been fired from his position; in fact, the astronomer had asked to be replaced after 28 years as director of the Vatican Observatory. He will remain as president of the observatory's foundation.

**Reports:** "Measurement of forces inside a three-dimensional pile of frictionless droplets" by J. Zhou *et al.* (16 June, p. 1631). Although reference (24) was cited in the context of the theoretical aspects of the paper, the authors wish to note that the group of Brujic, Edwards, Makse, *et al.* also used microscopy of droplet contacts to measure the distribution of forces within a three-dimensional sample. See also J. Brujic, S. F. Edwards, D. V. Grinev, I. Hopkinson, D. Brujic, H. A. Makse, *Faraday Discuss.* **123**, 207 (2003).

**Reports:** "Complete photo-induced breakup of the  $H_2$  molecule as a probe of molecular electron correlation" by W. Vanroose *et al.* (16 Dec. 2005, p. 1787). In Fig. 2, molecules were drawn in the wrong orientation. In Fig. 3D, the image was misplotted. The correct figures appear here.

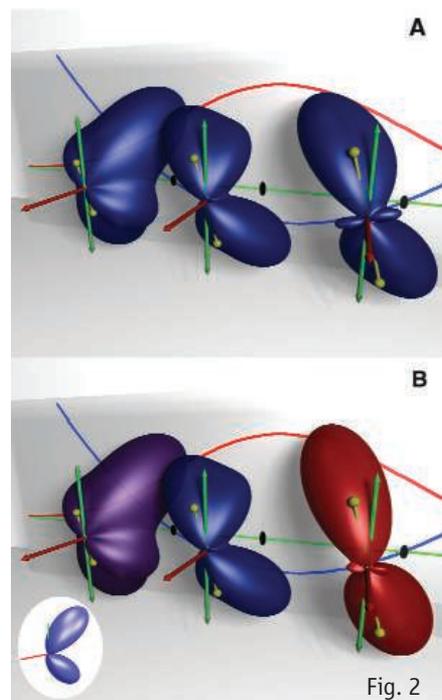


Fig. 2

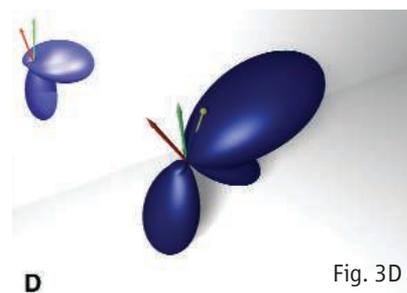


Fig. 3D