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Bioremediation Review

Richard Stone's article about the use of bioremediation for destroying oil on the beach in Alaska after the 1989 Exxon Valdez oil spill in Prince William Sound (News & Comment, 17 July, p. 320) is somewhat misleading with regard to the technical review of the project by the Environmental Protection Agency's (EPA's) Science Advisory Board (SAB). The headline and the text at the beginning of the article imply that the SAB draft report concluded that bioremediation was generally ineffective. In fact, the draft SAB report and EPA's own study clearly state that bioremediation *was* effective, but not at all sites. Given that this is the first detailed, full-scale assessment in the field of bioremediation of an oil spill of great magnitude, the finding that bioremediation worked at two of the sites is considered to be a positive and significant accomplishment. Field research in heterogeneous environments exposed to highly variable conditions frequently does not give identical results at different sites or at different times.

Admittedly, the studies and evaluations conducted by EPA have several limitations. Many of these limitations were known to the researchers involved in the field and laboratory assessments. Many are pointed out in the SAB report. In contrast to the text of the article, the SAB did not conclude "that the treatment's efficacy wasn't all it was cracked up to be." We did, however, seek to further define the limitations of the program, as establishing those deficiencies and shortcomings is a necessary step in increasing the frequency of success of bioremediation.

The SAB considers this EPA project to be a significant accomplishment that should lay the foundation for improved research and planning for emergency responses in the future. Implementation of the SAB recommendations by EPA should contribute to that understanding. In addition, the SAB urges EPA to join with other informed parties in sharing data and developing guidance and principles to respond to future oil spills.

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Biomimesis: An Apology

National science policy has been a primary focus of mine for many years. It is a subject to which I have dedicated considerable time and energy. The issue of overselling science is an issue in national science policy that deserves not only mine but others' time and energy. Over the past year, I have conducted a public debate with editors from *Nature*, *The Scientist*, and *Research/Penn State* about overselling science regarding biomimesis and bio-derived materials (Research News, 30 Aug. 1991, p. 968).

However, as a part of that debate, I am afraid that a colleague of mine, Patricia Bianconi, may have been unfairly caught in the middle, and to the extent that she feels her research has been a victim in this debate, I extend to her this apology, as I never intended for her research itself to be the focus of the debate.

In the policy memo I privately circulated to various agencies and persons, I used the world "duplicating." The statement was, "this result—duplicating work precipitating very small crystals of any one of a dozen phases including CdS in an inorganic gel. . . ." While I believe the work derives from the general experiments done by many on crystallization in gels, Bianconi's work had the special feature that she obtained an organized array of crystals of cadmium sulfide in an organic host. In this respect her work did not duplicate earlier research and contains novel and unreported findings. The significance of this work will, as in all science, be determined over the course of time. I recognize that some well-respected scientists find her results to be quite significant.

It was also imprecise for me to state that Bianconi had not "read or cited" the literature. I had no first-hand knowledge of whether she had or had not read the literature. It was not cited. In large part, the literature to

which I had referred was that setting forth the replamine process, published in the 1970s. My criticism of a failure to cite this literature was not aimed at Bianconi's *Nature* article (*1*) (where decisions of whether to cite articles should fairly be decided by authors and reviewers) but at the *Research/Penn State* article (*2*), which includes a lengthy text on the biological connections of Bianconi's work, without reference to the biomimetic work at Pennsylvania State University reported in more than 50 papers and eight patents leading to prosthetic devices as well as electroceramic composites, which have gone all the way to the marketplace.

My focus was on the use of "biomimetic" or other biorelated terms by her and others in conjunction with the research in question. I never stated or meant to imply or infer that she was careless or engaged in lazy practices or cheating of any kind. Similarly, I have never meant to imply, nor do I believe now, that she engaged in any form of scientific misconduct. Finally, I regret that the private memo I circulated to funding agencies and others contained the imprecise statements I have referenced above and that some of these statements were published in the open literature.

Unfortunately this whole affair has taken on an untoward tone. There have been errors, omissions, and exaggerations—perhaps on both sides. It is time to close this chapter for the good of Pennsylvania State University.

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Top Quark Search: More Clarification

I would like to clarify several points raised in Faye Flam's article "Researchers quell quark rumor: The top is still at large" (News & Comment, 24 July, p. 475) and in the letter by my colleague Krzysztof Sliwa (2 Oct., p. 13).

Early in the article the incorrect impression is given that Richard Dalitz and I were handed unpublished data from the Collider Detector at Fermilab (CDF) collaboration surreptitiously by Sliwa and that we two theorists went off and analyzed that data ourselves. On the contrary, the work on modifying the method of Dalitz and Goldstein (*1*) and applying that method to data was a three-way collaborative effort.

Through studies of some real data, and many studies of simulated data, we conceived a method for discriminating real top quark