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If You Seek the Truth, Don't Trash the Science

By JOHN SCHWARTZ

There's a coffee mug on my desk that's a daily reminder of what's wrong with science these days. It's a freebie sent to reporters like me who cover the subject, and it comes from a man named Steven Milloy who runs a popular site on the World Wide Web devoted to knocking down "junk science."

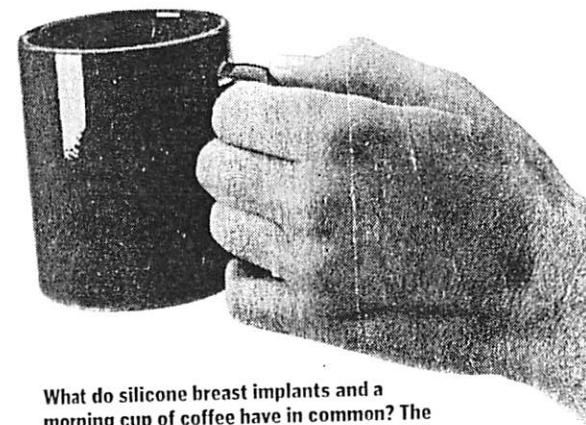
The mug gives the Web address, *www.junk-science.com* (motto: "All the junk that's fit to debunk"), and the rest of the mug is decorated with acronyms and phrases that exemplify Milloy's idea of debunked junk: DDT, EMFs (electromagnetic fields), Gulf War Syndrome, alar, global warming, silicone breast implants and more.

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There's a huge irony at work here, of course. It's science, after all, that has effectively laid some of those controversies to rest (no authoritative study has found that EMFs from overhead power lines cause cancer, for example). But others, such as global warming, are still part of a serious ongoing debate. And so it should be. If there is one clear way in which science is abused, it is by reducing its deliberate, complex method of discovery to the kind of epigrams that you can display on a coffee mug. Yet, here is the self-proclaimed "Junkman" calling the ball dead on controversy after controversy.

When I called him up and asked him about it, Milloy emphasized that he was simply trying to attract people to his site, where they could read more. And while that might be true, the problem with terms such as "junk science"—which, like "political correctness,"

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What do silicone breast implants and a morning cup of coffee have in common? The false starts and missteps of the scientific method, at least.

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A Sleazy Art

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originated in conservative circles—is that they are used not to spark debate but to cut it short. Science, on the other hand, is in large part about keeping the conversation going.

What happens if we cut short the conversation on topics such as global warming? It is pretty well established that temperatures are on the rise. But there are huge gaps in our knowledge about whether human activity has caused that rise, and what human activity might be able to do to reverse the process. Can we afford to dismiss the topic now, putting off any study of what prudent steps we might need to take to be certain that there's nothing to worry about?

Good science is all about taking those steps, and gradually accumulating a more detailed body of knowledge along the way. The scientific method involves coming up with ways to prove that something is true, independent of politics or opinion. Each theory gets examined and tested by others in an effort to see if the results can be duplicated. The theory that the sun revolves around the Earth, for example, was disproved by observations of the motions of heavenly bodies. The idea of a flat earth could be debunked by observing the slow emergence of the mast of a ship as it comes over the horizon.

Where we run into trouble is when we demand more of science than it can rightly give us—when we demand things like absolute certainty and speed. The more complex the issues, the harder it is and the longer it takes to do the science. It's a process full of false starts and missteps.

Take just one example. In 1981, Harvard epidemiologist Brian MacMahon and his colleagues published a

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report in the *New England Journal of Medicine* suggesting that coffee might cause pancreatic cancer. The findings were unexpected, and the media went wild. But science abounds with surprises. (After all, researchers believed that ulcers were caused by stress and stomach acidity until Australian researchers ferreted out the real culprit, the bacterium *helicobacter pylori*. Their results were reproduced, and today, treatment has shifted from stomach-acid blockers to antibiotics.)

Scientists tried, but weren't able to duplicate MacMahon's coffee/cancer results. And subsequent studies—including a 1986 followup by MacMahon—have not found any link between drinking reasonable amounts of coffee and pancreatic cancer. The issue is all but dead now. Failure? Those who shout "junk science" might say so. But that's the scientific method at work.

The incident underscores one of the problems with press coverage of science: Science is a long movie, and the news media generally take mere snapshots. As Victor Cohn wrote in his book "News and Numbers": "The first thing to understand about science is that it is almost always uncertain." Casual readers of the news look at this back-and-forth process of thesis, refutation and discovery and can be forgiven if they conclude that these guys just can't get it right. As one epidemiologist put it, "Some people think science ought to be clean and easy. It's not. It's messy." In fact, scientific discovery moves less as the crow flies than as a sailboat tacks, first this way, then that, but edging ever forward.

The uncomfortable fact that scientific findings can be all over the map, especially in its early stages of looking at a problem, has made it ripe for exploitation in the courtroom. Trial lawyers jumped into breast-implant litigation, for example, and won multimillion-dollar judgments against the makers for claims that the devices had caused autoimmune diseases such as scleroderma and lupus. They often relied on hired "experts" whose work has not stood up to the scrutiny of their peers.

The explosion of litigation in the courtroom based on weak science was decried by commentators such as Peter W. Huber of the Manhattan Institute for Policy Research, who brought the phrase "junk science" to the nation's attention in a series of books that argued

for reform of the nation's courts. State tort reform efforts and decisions by the U.S. Supreme Court have given judges greater responsibility for narrowing the roster of scientific experts and evidence presented to juries.

In the case of implants, however, the companies themselves had little to fight back with at first, since they had not performed the kinds of studies that could have established their products' safety. A series of studies published since the mid-1990s has found no strong link between implants and autoimmune disease, and juries that review that scientific evidence have increasingly decided cases in favor of the implant makers.

Now implants are considered the *ne plus ultra* of junk science by critics such as Milloy and George Mason University Law School associate professor David Bernstein. Publicist David Fenton, who trumpets to his trial-lawyer clients any study that suggests implants pose a risk, has been demonized as a spinner of junk science. The fact remains that, although recent studies undermine the wild claims of serious illness caused by implants, they do not rule out the possibility that implants increase the risk of more rare autoimmune diseases or atypical diseases, and research continues at the National Institutes of Health, the Food and Drug Administration, and elsewhere—just as it should.

The pressure on the scientist in the lab from both the left and right has been so great that some of the people at the National Cancer Institute last year held a small seminar on doing science in controversial areas. None of them would talk to me on the record about it, though—every time their names show up in the paper, they say, they are called to give depositions in another lawsuit. As scientists on the government payroll, they realize that the public has a right to scrutinize their work. At the same time, one told me, "you have to keep your eye on the science, keep moving forward."

Thanks to attitudes like that, science still enjoys a reputation of impartiality, and we continue to look to research as the underpinning for our social policies and our legislative crusades. But, at the same time, that idealism can't help but look almost quaint in a world in which science is spun from all sides. Science is, in many ways, inherently political—it is the foundation of national policy, and the government budget processes that set research agendas are debated by lawmakers. Interest groups and disease-oriented organizations lobby for their causes, lawsuits hang on the results of studies—and scientists are left to try to do their work in a minefield.

So I wasn't surprised to see that junk science and politicized science were central to the agenda of last week's conference held by the Independent Women's Forum, titled "Scared Sick." The IWF contends that many women don't understand complex scientific issues and have developed unfounded fears about illnesses because of a cabal of liberals, environmental extremists, feminists and trial lawyers.

But the scientific foundation for those broad claims was scant—even, one might dare to say, junky. The proof that many women don't "get" science came down to a single survey cited by presenter after presenter, a report from the Harvard Center for Risk Analysis that found women tended to rank the risk of a series of environmental issues as a greater hazard than did men. Only lunch speaker Marcia Angell, executive editor of the *New England Journal of Medicine*, pointed out that the differences between the perceptions of men and women were quite small—and that the study could just as well indicate that men underplay risk.

What's a consumer to do? How can you hope to find out whether a given product is actually safe (which is all most of us are really interested in)? Anyone hoping to make sense of the science news and the political battles surrounding it has to develop antennae for judging each new story and study. The most reliable information is likely to come from that peer-reviewed journal, though that's no guarantee. A good story should say whether a finding is new, or confirms an existing body of research—anyone who stopped drinking coffee in 1981 out of fears of getting pancreatic cancer suffered through a lot of bleary-eyed mornings for nothing. And let's hope people aren't put off eating cancer-fighting fresh fruits and vegetables by the report last week about the possible health risks of pesticide residues on those foods.

But most of all, any reader's ears should prick up when they hear phrases like "politicized science" or "junk science" being tossed about. The claim may be right—but anyone who makes it should be vetted for politics and junk as well.