Science for SALE

Scientists tell us to take vitamin E. Then they say, Not so fast. They say that the thinning ozone will cause skin cancer. But, no, the ozone is okay after all. Why are they doing this to us? For the money.

by John Sedgwick

IF YOU WANT THE truth, look to science. There you will find objectivity, rigorous methodology, and reliable statistics unsullied by ego or bias. Right?

So why do we read one day that the ozone layer is thinning and the next day that it isn't? First caffeine is dangerous, then it's safe; once, extra vitamin E was good for you, now it's not. We've been inundated with so many contradictory studies on so many important issues that no one knows what, or whom, to believe. "There is a lot of unreliable science out there," says George Annas, J.D., M.P.H., chair of the health law department of Boston University's School of Medicine, "and it is causing more confusion than ever. It either makes people totally cynical, or they believe everything and go crazy trying to keep up with it."

It is not that scientific standards or methods have eroded. White-coated scientists still lean over microscopes and pore over statistical analyses in an effort to bring order to the universe. It is, rather, that powerful new external forces—financial, social, political—are being brought to bear on science to make it less useful as an unbiased source of information.

If scientists get their funding from the Department of Defense, it's a good bet they're not doing research on peace...

To understand why this is so, one must first, as Deep Throat famously advised *Washington Post* reporters Woodward and Bernstein in their investigation of Watergate, follow the money. Behind many of the scientific controversies of our day lie some deep-pocketed organizations with a stake in the outcome. If you were puzzled by the latest news that breast implants are safe after all, it might interest you to note that the research was sponsored by the Plastic Surgery Education Foundation—which is an affiliate of the American Society of Plastic and Reconstructive Surgeons, hardly a disinterested party. Confused by news reports that baldness might lead to a heart attack? Turns out the Upjohn Company paid for that research, which coincidentally diverted attention from a previous report that the pharmaceutical company's baldness minoxidil treatment was associated with coronaries.

The close relationship between American corporations and research universities began only about 20 years ago. Until World War II, most scientific research was a small, privately funded affair. "In those days," observes Arthur Caplan, Ph.D., director of the Center for Bioethics at the University of Pennsylvania, "you could do it in a teacup for $4." With the rise of research universities and Big Science after the war, government took over the bulk of academic science funding through such massive federal agencies as the National Institutes of Health (NIH) and the National Science

PHOTOGRAPHS: TEST TUBES, INDEX STOCK; MODEL, DAVIES & STARR; PRICE TAGS, KEVIN MILLER/STILL LIFE STOCK

...And if they get it from a manufacturer of oat bran, should we expect to learn from their research that oat bran is dangerous?

Foundation, with private foundations providing most of the remainder. In the Eighties, however, contributions from private industry have eclipsed those of foundations. In just one decade, corporate contributions to academic research increased fourfold.

Leonard Minsky, executive director of the National Coalition for Universities in the Public Interest, believes the shift occurred when the Reagan administration joined with industry leaders and university presidents to work out a mutually beneficial pact. The government transferred some of the money it had been providing for biomedical research over to defense-related research and freed up licensing regulations, which encouraged private industry—chiefly the pharmaceuticals companies—to fund specific research projects at universities. In exchange for their financial support, companies would get exclusive—and therefore extremely profitable—licensing agreements for any commercially useful discoveries made by scientists working for them. Before that, licenses were never granted on an exclusive basis, so potential profits were much less.

The changes allowed companies to move much of their research and development into these settings, where their investments were actually tax deductible and much of the overhead was paid by taxpayers or university endowments. "The whole idea that this 'just happened' is wrong," says Minsky. "It was a created situation, one where government made a policy to push college- and university-based researchers into the arms of corporations for the purpose of creating industrial products."

The Reagan administration believed that it would help America's international competitiveness to make university research facilities—a resource that is sometimes called a $100 billion industry—available to private corporations. And the researchers were only too happy to go commercial, Minsky believes, because with the new arrangements, they could make tremendous profits in the form of stock options and consulting fees. "There has been a tremendous growth in entrepreneurship for scientists," says Dr. Caplan. "They see Donald Trump and Barry Diller and think, Why not me?" Such partnerships between industry and university might be sensible, economical even, except that the presence of so much money on campus has turned everyone's head.

While there is nothing evil in a scientist benefiting financially from his work, the money culture has tipped the balance in the lab from truth-seeking academic inquiry—the ivory tower of 20 years ago—to a more mundane research-for-hire financial arrangement. One result has been an increasing number of cases of scientific misconduct and outright fraud, as scientists are newly tempted to exaggerate their results, or fake them altogether, to get in on the big payoff. Surveys of research scientists conducted by the American Association for the Advancement of Science and Sigma Xi (a scientific honor society) indicate that up to a quarter of U.S. scientists have had direct knowledge of faked, falsified or stolen research. According to Minsky, there is evidence that fraud and misconduct now contaminate between 10 percent and 15 percent of all scientific research. A recent editorial in *The New England Journal of Medicine* acknowledged that conflicts of interest "are now widespread." The headline cases are familiar: AIDS researcher Robert Gallo, M.D., was accused of suppressing French data to support his claim to have been the first to discover the AIDS virus and secure for the NIH an exclusive patent on the resulting diagnostic test. (The U.S. government later acknowledged French co-ownership of the patent.) Roger Poisson, M.D., of St. Luc's Hospital in Montreal falsified data in order to enroll some of the subjects he would need to participate in the multimillion-dollar NIH-sponsored clinical trials that would test the effectiveness of lumpectomy as a treatment for breast cancer. Dr. Poisson, who says he simply wanted to get better treatment for his patients, was eventually barred from performing any U.S.-funded research for a period of eight years. One of the earliest cases to draw widespread notoriety was the conviction

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of Stephen Breuning, M.D., of the University of Pittsburgh. In the early Eighties, while studying the usefulness of different drugs in treating severely retarded children, he made up test results in order to qualify for more than $160,000 in government grants.

Misrepresenting the data isn't the only ethical breach on the rise. Scheffer C. G. Tseng, M.D., a researcher affiliated with Harvard Medical School, didn't fudge the negative results on the experimental eye medicine he was investigating, he simply did not reveal the outcome of his study until he had sold most of his stock in the company that was developing the product. Twenty years ago, there would have been no stock to sell. "There are real structural changes in the relationship of scientific research to commercial profits that are driving people to the ethical edge," says Caplan.

> **"The more alarmist the claim, the more likely a cause will get attention from media already saturated with outrageous news."**

Surely, society as a whole isn't threatened by a few money-crazed scientists. But the relatively high number of crimes against science may hint at a larger pattern of truth manipulation that is more insidious precisely because it is legal. Scientists aren't asked to cheat, but they are asked to give up control over what they learn. And the financial incentives might encourage an investigator to design his study—perhaps without even realizing it—so that it generates more palatable results.

Take the experiments on secondhand smoke, the potential hazard that, in this era of sudden frights, has caused much of America to be papered with "No Smoking" signs. In a large, barnlike laboratory at the University of California at Davis, an associate professor of anatomy, physiology and cell biology named Kent E. Pinkerton, Ph.D., has erected a device that is designed to bring scientific clarity to this hazy issue. The device is the smoking machine, one of just two possessed by American universities, and it fairly reeks of science. It is an amazing Rube Goldberg contraption that blows a precise amount of tobacco smoke into a plastic chamber containing pregnant rats in an effort to determine just how much environmental smoke it takes to damage the lungs and nasal passages of the rats' offspring. Every 10 minutes, six hours a day, five days a week, a fresh, specially formulated cigarette called a 1R4F drops into a revolving cylinder, a metal coil lights it up and a mechanical puffer sets it smoldering. "The machine is very pure in the sense that the cigarettes are right at the proper humidity, and they are smoked in a very precise manner," says Dr. Pinkerton. "If they were smoked irregularly, or not properly conditioned, you'd get all sorts of variations and fluctuations of the smoke."

One might think that the results of such an experiment would be incontrovertible, that in this laboratory science would yield up the truth. But the outcome of any experiment in large part depends on the assumptions that go into it, and virtually all of them are open to question. To begin with, of course, there is the assumption that experiments on pregnant rats can reveal anything about pregnant humans, who are, after all, Pinkerton's true subject. One might also ask, Why rats? Why not mice or chimpanzees? (Pinkerton says he chose rats because, of all laboratory animals, the most is known about their fetal and postnatal development.) The bigger assumption is that it makes sense to determine the hazards of secondhand smoke by trying to find, as Pinkerton is, the exact concentration at which the smoke begins to have no effect on the rats' physiology, rather than just determining if, in fact, environmental tobacco smoke is harmful.

The final results aren't in—it took more than a year just to set up the experiment—but since Pinkerton's prior research has shown that only minor damage occurs at fairly high concentrations of smoke, it is likely that the low concentrations being investigated now will have little to no effect. Therefore, his study is likely to show that the average rat (and therefore, person) would have to be exposed to the smoke much longer than she is when seated in the smoking section of a typical restaurant for her fetus to be harmed.

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Because of the way he set up this study, it will be easy to give Pinkerton's results, no matter what they are, a positive spin. That is, he is not asking if secondhand smoke is or is not safe. Rather, he will determine the *concentrations* at which secondhand smoke is safe for fetal rats. And there's nothing devious or even unusual about his approach.

By contrast, a group headed by Arthur Penn, Ph.D., at New York University Medical Center's Department of Environmental Research has taken a different tack in its studies on the effects of secondhand smoke: roosters instead of rats; arterial plaque formation instead of fetal lung development. Roosters are already known to form plaque at an impressive clip even without the presence of tobacco smoke; Dr. Penn's group is looking to see if that rate is accelerated under the influence of secondhand smoke. Preliminary results indicate that the answer is yes. "I talk to Art at scientific meetings," says Pinkerton, "and the whole NYU group is very vocal about the harm done by cigarette smoke."

> **"Perhaps the most cynical use of science is to advance a political agenda, especially in a fractious time like the present one."**

Such different approaches are inevitable and perfectly normal in science. They raise questions in this case only because of one complicating factor—the grant money that may influence how much the public will learn from the two different studies. Both Pinkerton and Penn have received major grants from the Center for Indoor Air Research (CIAR), an organization that has been funded primarily by tobacco companies. (There are a lot of these foundations churning out reports that are actually funded by organizations with an interest in the research they do.) It is what is termed "soft money." The grants are short-term, but they can be renewed depending on conditions that are not always clearly specified. Presumably, a scientist can keep the money coming in if the funder is pleased with his research.

Pinkerton's three-year grant has been renewed. Penn's has not. "It is possible that CIAR is not continuing Penn's funding because the results are too incriminating," Pinkerton says. "I know Penn's group is feeling the pinch." Did the funding source have any impact on how Pinkerton conducted his own experiment? "I don't know," Pinkerton says. "These are studies that should have been done a long time ago. But my work concerns only one species, examined only under the conditions we generate. This is not going to be the experiment to end all experiments about this issue."

Despite Pinkerton's demurrals, the source of a scientist's funding is bound to have its effects. Industry-sponsored research is inevitably suspect because the corporate sponsor usually reserves the right to deep-six any research that doesn't go its way. "That's a big thing," says Dr. Annas. "Whoever is doing the research should have the right to publish it however it comes out."

That right is rarely granted, though. Richard A. Davidson, M.D., M.P.H., of the University of Florida surveyed 107 drug company reports in the medical literature on the companies' own drugs and found that—surprise—every single one of them saw the product under review as superior to its competitors. One probable reason was that the companies pulled the plug on any research that seemed to be tending in a negative direction. So when you hear about the research hailing some new drug as a medical marvel, you ought to wonder whether it was preceded by five other reports that found it was a dud.

And corporate-backed researchers aren't the only ones to worry about. Nonprofit organizations are hardly immune to the temptation to make things look the way they see them. Environmental groups are inclined to exaggerate any environmental peril that is likely to help their fund-raising, be it the number of endangered species, the consequences of habitat destruction, or the threat to the ozone layer. The case for ozone depletion has never been scientifically proved, yet claiming that the entire planet is in peril makes a compelling call to action for environmental organizations looking for support. "Saving life as we know it," muses Annas. "That ratchets up the danger considerably and compels us to do something." Namely, contribute.

In fact, the more alarmist the claim, the more likely a cause will get attention from media already saturated with outrageous news. Noisy proclamations that something as ubiquitous as movie popcorn may be killing us will get almost anyone invited to appear on the *Today* show. No one uses this strategy better than Michael Jacobson, Ph.D., cofounder of the Center for Science in the Public Interest, an offshoot of Ralph Nader's lobbying organization that is funded by subscription dollars, sales of books, and grants from foundations like the Pew Charitable Trust and Consumers Union. Dr. Jacobson has made a name for himself with his nearly uncanny feel for the soft spots in the American consciousness. He was the source of the movie popcorn warnings this spring, which forced virtually all the major chains to switch over to canola oil and/or air-popping to reduce the fat content. Not long ago, he sent Italian restaurants into cardiac arrest when he described fettuccine Alfredo as "a heart attack on a plate."

Such barbs against most of the major food groups have not gone unnoticed by the nation's food providers. Jeff Nedelman of the Grocery Manufacturers of America calls Jacobson "the great ayatollah of the food industry." Compounding the confusion is the fact that whenever an advocate like Jacobson takes to the airwaves to warn the public against some threat to its health, most broadcasters also present the target of his attack, who is given an opportunity to reply. In Jacobson's case, he is usually countered by Elizabeth Whelan, Ph.D., the head of a largely corporate-funded group called the American Council on Science and Health. (Corporate funders include American Cyanamid, Pfizer Inc., Ciba-Geigy, Exxon, Union Carbide and Dow Chemical.) She goes on TV with him, a Mutt to his Jeff, to contradict every word he says. "We need each other," she admits. "He gives me more publicity than I could get on my own."

Perhaps the most cynical use of science is to advance a political agenda; especially in a fractious time like the present one, when there is so little consensus on the major issues confronting the country—the role of women, race relations, the gap between rich and poor. Proponents of one issue or another are looking for scientific absolutes to support their positions: a genetic explanation for poverty, for example. But these are not hard-science questions. There is no experiment that can prove what the role of women should be. Of course, that hasn't stopped organizations of every political stripe from trying to scientifically legitimize their positions, and as social scientists know, one can do a lot with numbers.

Polls are a popular source of "statistics" since they can be designed to maximize the probability of getting the outcome a pollster wants. It all depends on the way the questions are asked. In her book *Tainted Truth: The Manipulation of Fact in America, Wall Street Journal* reporter Cynthia Crossen cites the fact that at the height of the debate over whether disposable diapers are environmentally destructive, the American Paper Institute's diaper group had the Gallup polling organization put the following question to American mothers with small children: "It is estimated that disposable diapers account for less than 2 percent of the trash in today's landfills. In contrast, beverage containers, third-class mail and yard waste are estimated to account for about 21 percent of the trash in landfills. Given this, in your opinion, would it be fair to tax or ban disposable diapers?" Not surprisingly, 73 percent said it would not be fair.

Other numbers are no better. Estimates of homelessness range from 223,000 to 7 million, depending on what position is being supported. According to the Food Research and Action Center, an agency that might conceivably have an interest in magnifying the hunger issue, 11.5 million American children are either hungry or "at risk" for hunger, a factoid that got prominent attention on all three network news broadcasts. In the survey, one response that indicated risk, however, was a yes to the question "Did you ever rely on a limited number of foods to feed your children because you were running out of money to buy food for a meal?" By that standard, it is surprising that only 11.5 million children are considered at risk; think of all those peanut-butter-and-jelly sandwiches in lunch boxes.

Finally, consumers of scientific information must bear some of the responsibility for the confusion. To many Americans, "science" is the same thing as "truth." If it is, then all the contradictions must indicate that something rotten is going on. But science is not the same thing as truth, and contradictions are a natural part of the scientific process. For a scientist, the sun coming up tomorrow isn't a fact, it's a probability statement.

As for the growing concern over corruption, universities and federal agencies are finally establishing stricter conflict-of-interest guidelines to curb some of the worst excesses. "But it will take a major scandal for things to really change," Caplan says darkly, "a case where some disease is not attended to because of some self-interested scientists who lied or cheated because they wanted to make a buck." Until then, the best strategy is buyer, reader, viewer, beware. □

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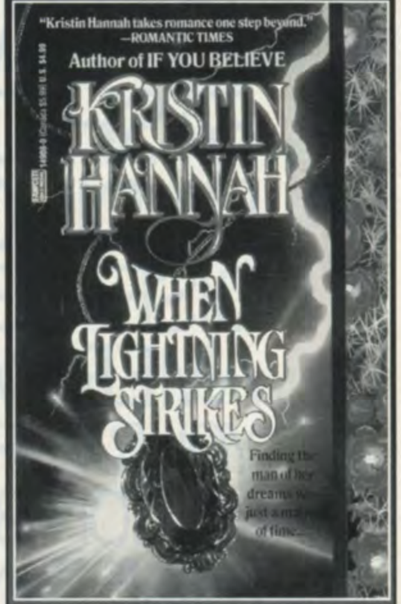
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