



Longbranch Research Associates *presents:*

So-Called Experts

a book always in progress & free

by Stephan Michelson

Chapter 14

Science

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We think expertise exists in science. We rely on science to differentiate between false and true claims, such as of the efficacy of drugs, or the purity of our water. We think that accepting “scientific” answers is more sensible than accepting answers, if they are different, from other sources (mysticism, religion, myth, gurus, talk-show hosts, etc.). But how do we distinguish truly scientific results from the fake results posited by those with some agenda other than truth, or some skill other than scientific inquiry? I will discuss a few issues here, issues that are talked about at dinner, and on the radio. For example, climate science or, the lay-term for the virtually unanimous conclusion of climate scientists, “global warming.”

As I argued in Chapter 13, “economic consequences” quickly become political consequences. Those who might lose money when their products are found to be faulty spend money to bury such findings. Regulatory agencies are told not to regulate. Money can buy “findings” that masquerade as scientific, and it can buy government’s reaction to science. However, not all opposition to new science comes from moneyed interests. Some comes from scientists themselves. That scientists disagree, debate, argue, is all to the good, unless it is generated by those who have personal stakes in positions that are about to become discredited.

There are, thus, two thrusts to this chapter. Both were previewed in Chapter 3, where I moved from health issues to health research issues. One is the difficulty that experts face when they contradict the received wisdom of a scientific field. This “difficulty” may just be the unwillingness of people to let go of false notions with which they have become comfortable. It may be stubbornness, the inability of people to understand, or admit, that they have been wrong. It may be that institutions, by design, reward conformity.

The second difficulty for new ideas to emerge—for rethinking who is really “expert”—does come from economic interests. In the United States, the Environmental Protection Agency, the Consumer Products Safety Commission, the Food and Drug Administration, and other such agencies that have the power to force products off the market, are under tremendous pressure not to do so. The Justice Department, in failing to punish the humans behind the 2008 financial crisis, exacted some penalty from their firms, which is to say, from stockholders who knew nothing about and could have done nothing about the firms’ corrupt activities. The malefactors, the really bad people who made decisions that hurt others, have simply gotten away with it. When I argued, in Chapter 6, that bankers are by and large stupid, that their jobs are clerical, and they do not do them well, I was not referring to executives of large banks. I meant the bankers you and I are likely to come in contact with. Presidents of large banking corporations are not clerks. Crooks, yes, but their skill, if not in banking, is in manipulating power. At that they are good.¹

It is possible to identify people who have been harmed by the failure of these agencies. One needs to show that a certain product caused damage, and was known to be causing that damage when the agency failed to suppress it. It is easiest in the financial case, where there are clear records of home-buyers who were first induced into their homes, and then forced out of their homes by unwarranted actions of bankers. It is harder to identify people who *might be* harmed by some product, and therefore hard to organize (and financially support) opposition to it.

In Europe, regulators suppress activity that is thought to be harmful until it is proved not to be. In the United States the burden is on the complainers. Activity is allowed to continue until it is proved to be harmful. Inaction favors the polluters, so their goal is to prevent action. That goal suggests a well-known strategy: Deny the harm. One of the tactics to do that, to “credibly” deny the harm, is to bring forth so-called experts. Science experts. They will say that the real experts exaggerate—or mis-state—the possible or projected harm.

When the real harm done by commercial activity is detected, when denial loses credibility, band-aides are applied. In one example, below, coal ash should not have been allowed to be deposited near potable water supplies. Then, the amount that needed to be recovered should have been determined by legitimate experts, not by the perpetrator itself. What “should have” happened, didn’t. A similar circumstance was the oil leak caused by the explosion, in April, 2010, of a British Petroleum off shore oil well. How much oil was being spilled? It was BP’s rig, they should know; and perhaps they did. The numbers they gave out were far below the truth.²

1 See William D. Cohan, “How the Bankers Stayed Out of Jail,” 316 *The Atlantic* 2, September, 2015 at 20.

2 Over 5 million barrels of raw oil were leaked into the Gulf of Mexico. See “Deepwater Horizon oil spill of 2010” at www.Britanicca.com.

As I have been saying, expertise is hard to find. It is especially hard to find if no one is looking for it, or willing to finance it; or if no one (that is, no powerful-one) would benefit from actually knowing the facts. If truly expert conclusions will be ignored, why seek them?. Along with the burden of proof comes the burden of finance. The bias in the rules—placing that burden on the many and dispersed harmed, rather than on the few and concentrated harmers—is a political triumph of the malefactors.

Science Research—Two Stories

I start with three illustrations of attempts to discredit unwelcome expertise. I will assume that the battle to show that ulcers are caused by bacteria, not by stress, had no commercial opposition; just entrenched science interests. Of course there was some commercial opposition, but let's just take this as a "pure" case of scientists resisting science. On the other side, it was (deliberately?) faulty research that brought the use of Bendectin to trial. It was alleged, supported by pseudo-science, that this sleep aid caused birth defects. It did not. Children born to mothers who had used Bendectin had no more such defects than those born to mothers who had not used it. It is hardly an exaggeration to conclude that one can determine which side of a "cause-effect" relationship a study will come down on by knowing who funded it. We know *a priori* what each litigation so-called expert will say, but not who is correct. That being the case, who funded them is not a sure indication of which side's "experts" are truly expert. Nor, as in the ulcer story, are there always "sides." Finding scientific truth is difficult. We look to "experts" to clarify, to lead us to the "right" answers. If only we can know who the real experts are!

The tobacco industry set the standard for obfuscation.

The industry understood that the public is in no position to distinguish good science from bad. Create doubt, uncertainty, and confusion. Throw mud at the "antismoking" research under the assumption that some of it is bound to stick. And buy time, lots of time, in the bargain.³

Chemical, pharmaceutical, energy (especially coal and oil), food and just about any industry you can name follows their example. It is interesting to report, as I do below, that not all public science disputes are this malicious. It is probably more important to report that many are.

As an example of industry-sponsored studies aimed not at the truth, but at discrediting research on the other side, I briefly review the case of Syngenta, the maker of the pesticide Atrazine. Following in tobacco's footsteps, Syngenta has spent millions of dollars to discredit scientists who found that Atrazine causes great harm

3 David Michaels, *Doubt Is Their Product*, Oxford University Press, 2008, at 9. The tobacco story, with others, is also told in Naomi Oreskes and Erik H. Conway, *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming*, Bloomsbury Press, 2010.

to fetuses—hence to children born in areas where they are exposed to it. Evidence that Syngenta plotted to do this came to light during litigation which, despite all its flaws, remains a way to flush out masquerade experts. If one has the money and the expertise to do so.

I will also quickly provide similar information about Vioxx.

The concept of demonizing the other side to the public was not initiated by tobacco. In the late 1800s, John D. Rockefeller, fearing that electricity would destroy his monopoly on kerosene as the primary source of light, emphasized electricity's dangers. Then Thomas Edison, who supported low voltage direct current (DC), argued that alternating current (AC) was dangerous, because of its high voltage.⁴ The critics of Bendectin, opponents of water fluoridation, and parents who will not vaccinate their children (irrationally fearing autism) show that the demonizers are often wrong. When cigarettes were similarly challenged, one can understand public skepticism. Unlike my father, who stopped putting boric acid in his eyes when told the advice he had been following for decades was wrong, most smokers dismissed the warnings. Cigarette companies brought forth doctors and other so-called experts to argue that the critics were wrong. Cigarettes, they said, caused no harm. The cigarette companies knew otherwise. Being right was not the point.

Ulcers

Ulcers, according to conventional “knowledge,” were caused by stress. In Australia, Barry Marshall and J. Robin Warren isolated bacteria that were present in all patients who had ulcers, and in some patients who did not. They devised a theory of a bacteriological basis of ulcers, in which the bacteria were not always triggered, but were always the cause. In September, 1983, Marshall presented his results at an international conference of microbiologists in Brussels. Given the conventional wisdom of the time, the idea that ulcers were a bacterial infection was revolutionary.

Marshall and Warren's work was based on too few observations, said the skeptics. In 1985, the *New England Journal of Medicine* rejected Marshall's article describing a second study he had conducted in The United States, calling it inconclusive.

4 Choosing one characteristic on which to base his decision was typical of Edison. He preferred cylinders to flat recordings (eventually, 78 rpm records) because the speed of the groove passing the cylinder needle is constant. Recorded discs have a constant circular velocity, but the groove is passing under the needle at a faster rate on the outside of the disc than the inside (which is why records play from the outside in). However, cylinders consume space needlessly, break more easily and, most importantly, cannot be manufactured in quantity. As with electricity, Edison was not wrong in his criticism of flat records, but wrong in his judgment that the characteristic he emphasized was the important one.

If I can't persuade experts, [Marshall] vowed, I'll just keep treating patients until the results are so overwhelming that no one will be able to ignore them.⁵

How had the notion that ulcers were the result of stress become so fashionable? Marshall explained:

You can always find stress in someone's life if you want to. You ask a few questions and eventually it's, "Yes, I admit, I was worried about something recently." So they tried to find evidence for stress causing ulcers, and whenever they had an experiment which worked, it would just be blown out of all proportion, and everyone would get so much publicity out of it that you would think, "Ah, at last, it's proven." But the data was very bad. And in fact there was plenty of evidence showing that stress didn't make much difference.⁶

Marshall and Warren waited 21 years after they published their results in *Lancet*, the major British biology journal, to be awarded a Nobel prize for their work.⁷ Why had the reaction of the profession to their discovery at the time been so under-whelming? Medical researchers had their minds made up. Most of them could not accept research showing that they were wrong. This is one reason why credentials cannot be relied upon. So-called experts are humans, comfortable in their "truths." And so, for years, ulcers were incorrectly treated. Although, especially as validated by the Nobel prize, this is a notable case, it is hardly unique in medicine, and medicine is hardly unique in science.

Atrazine

The negative reaction to research results is not always—perhaps not usually—based on mental inertia. Sometimes the research is incorrect. Sometimes it is correct, but attacked to protect economic interests. One example is the curious litigation that, it is said, was about (and was settled with monetary damages to compensate for exposure) Atrazine, a pesticide used especially in the growing of corn. It is "curious" litigation because it was not about Atrazine, but about Galecron, another pesticide from the same manufacturer, Ciba-Geigy. The part of Ciba-Geigy that produced these pesticides spun off into a separate corporation, Syngenta. The parties settled in federal court in Louisiana. Some plaintiffs went back to state court arguing that the settlement, which was explicitly for

5 Suzanne Chazin, "The Doctor Who Wouldn't Accept No," <http://www.metamath.com/math124/statis/Marhelio.htm>, Diablo Valley College (1997).

6 Kathryn Schultz, "The Wrong Stuff," *Slate*, September 9, 2010.

7 The 2005 Nobel award in physiology and medicine noted that "with tenacity and a prepared mind [they] challenged prevailing dogma." They had published "Unidentified Curved Bacilli on Gastric Epithelium in Active Chronic Gastritis," 321 *The Lancet* No. 8336 (1982) pp 1273-1275.

any and all claims (including, without limitation any CLAIMS defined herein) against CIBA GEIGY CORPORATION and individual defendants⁸

did not cover claims of injury from Atrazine. Oh yes it did. As litigation, this case is buried in arguments about the power of a federal court to remove a case from a state court. The documents revealed in the state case (known as *Price v. Ciba-Geigy*) not only contained information about Atrazine, but about Syngenta's machinations in trying to discredit plaintiffs' main science witness, Tyrone Hayes.

"Discredit" does not only mean the sponsorship of inferior research guaranteed to come to the opposite conclusion, but sending people to Hayes' lectures and other public appearances to cast doubt on his findings in the public eye. Syngenta followed the tobacco company script, even though tobacco companies had finally been defeated. In defeat, those companies agreed to send money to states forever to pay for their sins.⁹ Despite Syngenta's disgraceful behavior, and one could say despite the clear evidence that Atrazine, when it moves from the corn field to the water supply, has shocking deleterious health effects (noticeable first in amphibians, but also in humans), the EPA has not seen fit to ban it. Economic interests prevail.

Hayes' story was told in a *New Yorker* article which may generate some public pressure on the EPA. For our purpose, the more important aspect is its description of the price paid by a good researcher, an expert—with the credentials to match—just trying to discern the truth, when that truth comes into conflict with commercial interests.¹⁰

The company documents show that, while Hayes was studying atrazine, Syngenta was studying him, as he had long suspected. Syngenta's public relations team had drafted a list of four goals. The first was "discredit Hayes."

Syngenta's efforts have so far succeeded. Following the principles spelled out above—cast doubt on those who find fault with a product, try to discredit their work, and insist that nothing be done because the science is not clear—nothing has been done. Atrazine is still used to protect the corn crop, and it still ends up in the water supply. In 2016 one can say that the drinking water of over 30 million Americans is contaminated with Atrazine,

8 Quoted in the appeals court opinion, *Henson v. Ciba-Geigy Corp.*, 261 F.3d 1065 (11th Cir. 2001) at 1067.

9 This 1998 agreement between five tobacco companies, most states, five U.S. territories and the District of Columbia, settled the basic scientific "debate." That "debate" had been concocted by the tobacco companies to delay government action, and for that it worked well. But good science did win out eventually.

10 Hayes is a full professor of biology at The University of California at Berkeley. I have maintained throughout this book how little that title means, in terms of indicating expertise; but my skepticism is not meant to imply that an academic cannot be an expert, only that the two things are different. See Rachel Aviv, "A Valuable Reputation," *The New Yorker* February 10, 2014 starting at 52. Quotes at 54 and 58.

The E.P.A. approved the continued use of atrazine in October [2013], the same month that the European Commission chose to remove it from the market.¹¹

Vioxx

It is worth adding, though this should be no surprise, that the treatment Tyrone Hayes got for being an honest researcher is not unusual in the chemical industry, broadly defined to include pharmaceuticals. The positions Eric Topol held at The Cleveland Clinic were abolished when Merck expressed its dislike of his research to the Clinic's Board. Topol was one of the first people to question the safety of Vioxx, Merck's billion dollar drug. He did so based on data publicly available through the Food and Drug Administration, but censored when used by Merck's own data analysts. Merck did not like an expert saying its drug was dangerous, and set about to stop it, but *not* to make the drug safer.¹²

Being fired from two positions, including provost of the medical school he had founded, was perhaps the last indignity thrown at Topol, but not the first. "They came at him with a cleaver" exclaims Specter.¹³ They accused Topol of "data dredging," which is to imply that he reached spurious conclusions. However, data dredging is a procedural term, describing how one found his variables, not whether they are valid.¹⁴

That is the old tobacco method—question the reliability of the research that is questioning the reliability of your product. Ultimately, although Topol had to relocate to California, Merck pulled Vioxx from the market. It paid billions of dollars into a fund for victims of their bad drug (after spending over a billion dollars defending the drug)—never admitting fault, of course.¹⁵

11 Syngenta repeatedly denies that Atrazine is banned in the European Union, and also in Switzerland. Apparently they still believe that telling a lie often leads people to believe it. See Danny Hakiom, "Pesticide Banned, or not, Underscores Trans-Atlantic Trade Sensitivities," *New York Times*, February 23, 2015.

12 There were legitimate grounds for debate. Suppose Vioxx raised the likelihood of premature death from 1 percent (from other drugs) to 2 percent. These may not be the precisely correct numbers, but one can say "Vioxx is twice as likely to kill you as other drugs," or "Vioxx increases your chance of medication induced death by 1 percentage point." Both statements are correct. The missing information is how much good it does for the 98 percent who survive it, compared with the 99 percent who survive other drugs.

13 Michael Specter, *Denialism*, Penguin Press (2009) at 40.

14 Specter explains: "by which they meant a pedantic report full of numbers that proved nothing." When Statistical Analyst B finds variables that appear to explain an item of interest (here, heart attacks), Statistical Analyst A, in his zeal to "prove" some other theory, fails to control for Analyst B's variables. When Analyst A cannot refute the finding itself, he demonizes the way it was found, which was by actually exploring the data.

15 Alex Berenson, "Merck Agrees to Settle Vioxx Suits for \$4.85 Billion," *New York Times*, November 9, 2007. That was not the end of it:

In 2011, the company agreed to pay \$950 million to resolve allegations from the U.S. Department of Justice (DOJ) that it improperly marketed Vioxx. The next year, Merck settled a consumer class action suit over the med for \$220 million.

Finally, in 2016, it settled the last remaining cases. Emily Wasserman, "Merck reaches \$830M settlement in long-running Vioxx litigation," www.FiercePharma.com/regulatory/, January 15, 2016.

Coal Ash

Each year, the nation's coal-fired power plants generate more than 140 million tons of residual waste known as coal ash. Coal ash is a toxic sludge comprised of carcinogenic and neurotoxic chemicals such as arsenic, lead, hexavalent chromium, cadmium and mercury. Coal ash waste poses health risks to humans and threatens to destroy the environment. Coal ash is stored in over a thousand wet ash ponds and dry ash landfills in nearly every state. Despite its dangerous toxicity, however, most ponds and landfills are unstable, and most states do not have regulations prepared to keep the toxic coal ash safely out of air and drinking water.¹⁶

In North Carolina, for example, thousands of tons of coal ash are stored on flat land next to rivers. And then they spill into those rivers. What a surprise!

Duke [Energy] estimates about 39,000 tons of coal ash spewed into the Dan [River] after a drainage pipe collapsed Feb. 2 [2014].¹⁷

They recovered 3,000 tons of the ash, less than ten percent. Nonetheless, the cleanup was declared "complete." In fact, much more ash than this has been spilled.

North Carolina regulators say Duke Energy illegally pumped 61 million gallons of contaminated water from a coal ash pit into the Cape Fear River, marking the eighth time in less than a month the nation's largest electricity company has been cited for environmental violations.¹⁸

Obviously "citations" have no effect. Is this what "regulation" means, a "tut tut" when a producer pollutes a river? One thing that would help make capitalism work, reining in the external costs manufacturers love to produce, can only happen if regulators are empowered to impose those costs on those creating them. To do that, they would have to hire people expert in determining violations, and let them act on those violations. One cannot say if there are experts in regulatory agencies. One can say that if there are, it hardly seems to matter.

An example is another external (to the producer) cost of storing coal ash: pollution of well water.

In April 2015, state health officials began informing families living near unlined, leaking Duke Energy coal ash sites across North Carolina that their water is unsafe to drink or

16 Blake Korb, "Holding Our Breath: Waiting for the Federal Government to Recognize Coal Ash as a Hazardous Waste," 45 *John Marshall Law Review* 1177 (2012).

17 <http://abcnews.go.com/US/wireStory/epa-duke-dredging-coal-ash-nc-river-24603534> (2/17/2014).

18 www.cbsnews.com/news/duke-energy-pumped-coal-ash-into-nc-river-regulators-say

use for cooking due to contamination of their wells, in many cases by carcinogens or possible carcinogens.¹⁹

When Governor McCrory learned that state officials were criticizing Duke Power, he stopped it. He claimed that toxicologist Ken Rudo, created

a too-severe standard for the presence of hexavalent chromium in ground water. . . Officials this year decided that standard was too high.²⁰

The scientist set a standard for a “safe” level of a harmful substance in water that might be used for drinking. The governor, who had worked for Duke Energy for nearly three decades, rescinded the standard, surely because it would require Duke to correct the situation. The politicians would not impose the real cost of creating electricity, which should include safe disposal of the coal ash, on the electric utility.

Clean Water for North Carolina, a non-profit group working, since 1984, in opposition to governmental leniency on water standards, expressed the outrage one would expect:

Why are officials disregarding the recommendations of the professional toxicologists and epidemiologists on their staff, whose job is to understand the science and use it to protect public health?²¹

We know the answer: In a battle between experts and politicians, the experts will lose.

Overuse of Antibiotics

The cry to delay action based on an assertion that science was not clear about some fact is common. I have chosen an example in which not only is science clear, but there is no dispute between parties about that. Antibiotics are over-used, and that over-use harms us in two ways. First, the bad biota these drugs are supposed to combat develop defenses, and therefore the drugs lose potency. Second, the antibiotics do not discriminate the way we would like them to. They kill good biota as well as bad.

No individual’s use of antibiotics can be held responsible for any bad effects. This is a public issue, one where individuals choosing correctly, as they see it, make bad decisions for the community, for the rest of us. We have seen other examples in this book, as in the sizes of cars we all purchase, larger being safer per individual,

19 <http://selcgis.maps.arcgis.com>, April 23, 2015, crediting the Southern Environmental Law Center.

20 <http://www.foxnews.com/health/2016/toxicologist> . . . August 10, 2016.

Hexavalent chromium leaches into the environment at greater levels than arsenic and is considered a genotoxic carcinogen, meaning that it is linked with both cancer and damage to the DNA structure itself.

Mike Adams, *Food Forensics*, BenBella Books (2016) at 24.

21 <http://cwfnc.org/drinking-water/state-reversal> . . . , downloaded August 12, 2016.

but more dangerous for all. Vaccination against measles is another example where the public has an interest (the “herd effect” of vaccination only works if the herd is vaccinated). If individuals can decide, they will inflict harm on others, as they have.

Consider the use of antibiotics as prevention, not cure, in livestock. The rancher has found it economical to spend a little money inoculating each head to prevent any of them from catching a disease. The result is that the antibiotic stays in the meat, and enters our bodies when we eat it. In this way the antibiotic becomes less effective in humans, as if humans had over-used it.

We look to a government agency, the Food and Drug Administration (FDA), to regulate the use of antibiotics by the cattle industry. When the FDA does not move on this issue, certain farmers can raise cattle (or pigs) without them, and try to convince the public that their better methods deserve a higher price.²² Once again, those with higher incomes and better access to information (and willingness to change their behavior based on what they consider expert advice), do find market solutions. Having done so—ignoring that most people cannot find the solution they so easily purchase—they then proclaim that government serves no interest. Let the market do it.

I think this is a function government has been devised to serve—the protection of the public from corporations that do bad things to make profits. This issue of chemicals and biologics in our food is not essentially different from Atrazine and coal ash in our water, and indeed government has handled it the same way—by ignoring it. How well the government does its job is an issue. One thing, though, is certain: If federal agencies are not given the mandate and the resources to regulate, to the benefit of all, then they will not do so.

Another approach would be to sue the FDA, asking courts to tell the agency to do its job. The FDA could then say that the science is not clear, but they have not taken that position. The National Resources Defense Council (NRDC) *did* sue, asking no more than that the FDA hold hearings that would start a process in which the FDA might ultimately withdraw its approval of non-therapeutic use of antibiotics.

For over thirty years, the FDA has taken the position that the widespread use of certain antibiotics in livestock for purposes other than disease treatment poses a threat to human health. In 1977, the FDA issued notices announcing its intent to withdraw approval of the use of certain antibiotics in livestock for the purposes of growth promotion and feed efficiency, which the agency had found had not been proven to be safe.

...

[T]he FDA never held hearings or took any further action on the proposed withdrawals.

22 Chipotle, the restaurant chain, uses non-antibiotic pork, does charge more for it, but has made it a feature patrons are willing to pay for. Some grocery chains are doing the same thing.

In the intervening years, the scientific evidence of the risks to human health from the widespread use of antibiotics in livestock has grown, and there is no evidence that the FDA has changed its position that such uses are not shown to be safe. . . . In December 2011, the FDA withdrew the original notices on the grounds that they were outdated . . .²³

The FDA does not dispute the science:

Research has shown that the use of antibiotics in livestock leads to the development of antibiotic-resistant bacteria that can be—and has been—transferred from animals to humans through direct contact, environmental exposure, and the consumption and handling of contaminated meat and poultry products. Consequently, the FDA has concluded that “the overall weight of evidence available to date supports the conclusion that using medically important antimicrobial drugs for production purposes [in livestock] is not in the interest of protecting and promoting the public health.”²⁴

By 1977 the FDA had studied the issue and agreed that sub-therapeutic doses of antibiotics, administered on a herd basis, had the harms indicated above. The agency initiated a procedure that could end in withdrawal of its permission to use these drugs this way. And then nothing happened. For over thirty years. Industry had accomplished its delay—for delay of withdrawal of permission leaves permission in place. We know why: the “industry” regulates the regulators more than the regulators regulate it. This is called “regulatory capture.”

If the agency will not protect us, perhaps the courts will. The district court did its job, granting plaintiffs’ motion for summary judgment .

If, after a hearing, the drug sponsor has not met his burden of proving the drug to be safe, the Secretary must issue a withdrawal order. . . . Defendants are hereby ordered to initiate withdrawal proceedings for the relevant NADAs/ANADAs. Specifically, the Commissioner of the FDA or the Director of the CVM must re-issue a notice of the proposed withdrawals (which may be updated) and provide an opportunity for a hearing to the relevant drug sponsors; if drug sponsors timely request hearings and raise a genuine and substantial issue of fact, the FDA must hold a public evidentiary hearing. If, at the hearing, the drug sponsors fail to show that the use of the drugs is safe, the Commissioner must issue a withdrawal order.²⁵

That is the best we can do. After decades of overdosing livestock, and therefore humans, the court cannot order the FDA to reverse its original permits, but it can order that the process that could lead to their withdrawal proceed. That being too

23 *Natural Resources Defense Council, Inc., et al., v. United States Food and Drug Administration, et al.*, 884 F.Supp.2d 127, S.D. New York, 2012 at 130. To be clear, this is the judge’s writing, not either party’s.

24 *Ibid.*, at 132.

25 *Ibid.* at 142, then 151.

much for industry and its government agency friends to bear, the FDA appealed. And won!

One can hope that the Supreme Court takes this case, and reverses the second circuit. Its majority opinion is truly awful, saved by a very good (and correct) dissent by Chief Judge Katzmann, who summarizes:²⁶

Today's decision allows the FDA to openly declare that a particular animal drug is unsafe, but then refuse to withdraw approval of that drug. It also gives the agency discretion to effectively ignore a public petition asking it to withdraw approval from an unsafe drug. I do not believe the statutory scheme can be read to permit those results . . .

Judge Katzmann wryly adds:

There is a certain irony in the FDA's argument that the formal withdrawal process is too time-consuming, given that the agency has now delayed even beginning that process for thirty-seven years.

There are reasons many of the issues in this book come back to litigation. One is that we look to government to do things that enhance our lives, such as protecting us from dangerous chemicals. When an administrative agency fails to do that, a public interest group has standing to ask the court to order them to. Another is that legislatures, which should be expert in crafting unambiguous laws, are not. Someone needs to determine what the law really means, and that job falls to courts. Yet another is that courts do determine who, among proffered experts, really is one. They may not do so correctly at all times, but they do take on this task. When courts fail us, especially here, where the court ignores that there is not even a dispute among experts, the system falls apart.

Football Injuries

The tobacco model—discredit anyone alleging that you or your product does harm—is so ingrained into modern management, that one has to wonder if it is taught as a legitimate response in management schools. Bennet Omalu, after performing autopsies of several young former National Football League (NFL) players, noted that:

each had a high concentration of an abnormal form of a protein, called tau, on his brain.²⁷

He published his findings with several co-authors. They called this “chronic traumatic encephalopathy,” or C.T.E., suggesting that it was the result of

26 *NRDC v. FDA*, 760 F.3d 151 (2nd Cir., 2014) at 177, following quotation at 180.

27 Nicholas Schmidle, “Can Football Be Saved?” *The New Yorker*, January 9, 2017 at 38.

repeated concussions.²⁸ The NFL's immediate reaction was to enlist credentialed "experts" to deny that there was a relationship between football concussions and brain injury.

At a congressional hearing, in 2009, Linda Sanchez, a Democratic representative from California, compared the league's "blanket denial" about C.T.E. to the defenses once mounted by Big Tobacco.²⁹

The NFL did finally admit the football-concussion-brain damage link in December, 2009. The NFL players' union filed a class action law suit in 2011, which was apparently settled in 2016, but perhaps not.³⁰

Youth participation in contact sports has been declining. One reason that parents have not permitted their children to play tackle football is surely the publicity about concussions. The NFL created a set of procedures called Heads Up Football (HUF), and sponsored a study of its effect. The NFL then claimed that the study

showed the program reducing injuries by 76 percent and concussions by about 30 percent.

"That study, published in July 2015, showed no such thing . . ." ³¹

Another example of a research firm providing results that please its clients, rather than results that are correct? Or is it a case of an over-zealous reporter turning a positive report into a negative headline?

Having read the final research report,³² I favor more the latter than the former view. As the report's title implies, youth teams and leagues can adopt procedures that greatly reduce football injuries. It appears that Pop Warner (PW) practice procedures, more than HUF game procedures, produced these favorable results.

Our findings suggest that in the 2014 season, utilization of the HUF program and PW practice contact restriction guidelines resulted in the lowest injury rates. The HUF+PW group, which utilized both programs, saw the greatest benefit during practices.

28 Bennet I. Omalu, DeKosky, Minster, Kamboh, Ilyas; Hamilton, and Wecht, Cyril H. "Chronic traumatic encephalopathy in a National Football League player," *Neurosurgery* 57 at 128, (July, 2005); and Bennet I. Omalu, DeKosky, Hamilton, Minster, Kamboh, Ilyas; Abdurzak, and Wecht, "Chronic traumatic encephalopathy in a national football league player: part II," *Neurosurgery* 59 at 1086 (November, 2006).

29 Schmidle (2017), at 40.

30 Joe Nocera, "Is the N.F.L.'s Concussion Settlement Broken?" *New York Times*, October 7, 2016.

31 Alan Schwartz, "N.F.L.-Backed Youth Program Says It Reduced Concussions. The Data Disagrees," *New York Times*, July 21, 2016.

32 Zachary Y. Kerr, Susan Yeargin, et al., "Comprehensive Coach Education and Practice Contact Restriction Guidelines Result in Lower Injury Rates in Youth American Football. . .," 3 *Orthopaedic Journal of Sports Medicine* 7 (2015).

The study, sponsored by the NFL, was about HUF procedures. Thus, the authors explain,

However, because PW affiliation was originally not considered in our recruitment of leagues in the study, we lack a group of leagues that were affiliated with PW, but did not utilize the HUF program. As a result, we cannot examine the effect of PW practice guidelines independent of the HUF program.

Nor did they determine whether non-HUF teams, some of which were PW teams, utilized HUF methods. We can hold the researchers responsible for willingness to do a half-rate study at a half-rate price. One would prefer that researchers realistically consider alternative explanations for the effects they find.³³ But much research is performed by persons with credentials, not expertise. And in the press we read only their conclusions, as if all “studies” were equal.

Climate Science

Climate science is not a new field of study. The temperature implication of an increase in atmospheric carbon dioxide was spelled out—fairly accurately, climate scientists say—in 1896 by Svante Arrhenius.³⁴ Humans have had the knowledge that they *could* affect the global environment, and that they *would* through coal and gasoline powered industrialization, for over a century. They—we—have not had the political capacity to do anything about it. The primary reason for that inaction is the short-term economic consequences it would bring about, or their political implications. Much though we talk about “future generations” as if we know how to make decisions today that will be best for them tomorrow, we have no mechanism by which we could inculcate our decisions with that information. It may be crude, but is nonetheless accurate, to say that money interests in carbon energy will buy the political outcomes they want, regardless what would be “best” by any expert’s calculation. I’m not saying something you do not already know.

Then there is a special class of so-called experts, the “climate deniers.” Some are talk-show hosts. Some are politicians. Some are “pundits,” “talking heads,” people to whom radio and television stations, even magazines, mistakenly believe they are obliged to give a platform, because they espouse a “different” view. Is physics really a field in which we want “balance” for all points of view?³⁵ We surely want anyone with any opinion to be able to express it; but that does not make such a view worthy of extended debate, or such a person an “expert.” It does not make

33 Failure to consider alternative explanations is rampant in sponsored research, especially that presented in litigation.

34 Arrhenius’ paper, along with others going back to 1827, have been collected into David Archer and Raymond Pierrehumbert, editors, *The Warming Papers*, Wiley-Blackwell (2010).

35 What is the “balanced” view between universal vaccination and no vaccination—randomly vaccinate half the children? Why choose a “middle ground” between correct and incorrect, between expert and ignorant?

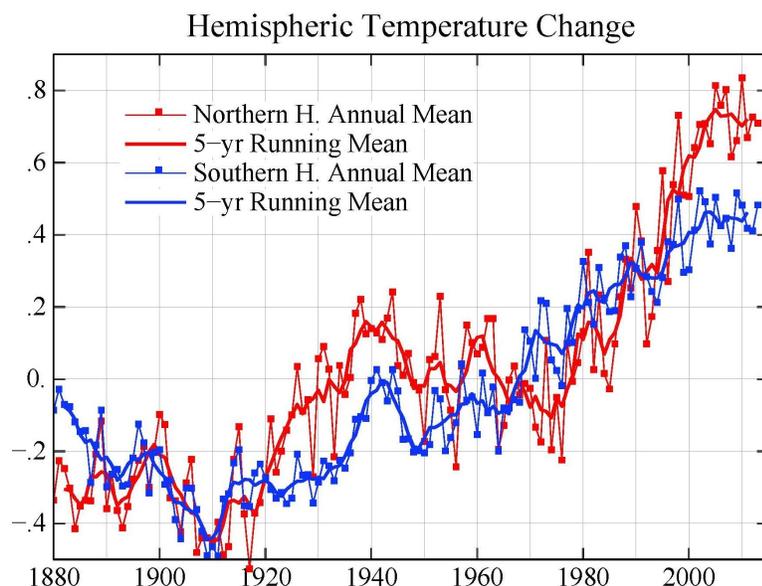
every view deserving of wide dissemination, even though every view, and its justification, should be available. The biggest mistake in the economic/political debate is making no attempt to discern who has expertise.

On many topics, finding the real expert is easy. Take those who since 2008 have predicted runaway inflation, generated by Federal Reserve policy. It has not happened. Or those who, since 2011, say, have said the decline in interest rates brought about by that policy would soon reverse. In February 2015, those rates were even lower. People who are wrong year after year should be called out on it, and not be treated as if they are experts. Kooks abound, as they always have, but why should media, whose purpose is supposedly to inform, if not educate, cater to them?

Members of the public hold to different conclusions. There are outright deniers that there is climate change. There are people who “think” there is no such change but, if there is, it is a natural event, unaffected by humans. Both positions are wrong, and those who hold them are creating problems for future generations. Here is a summary of what we know and how we know it:

Evidence for climate change abounds, from the top of the atmosphere to the depths of the oceans. Scientists and engineers from around the world have meticulously collected this evidence, using satellites and networks of weather balloons, thermometers, buoys, and other observing systems. Evidence of climate change is also visible in the observed and measured changes in location and behavior of species and functioning of ecosystems.³⁶

Climate change—global warming—is a fact. It is not a theory, it is not the result of a statistical model. It can be directly measured. Here, in degrees centigrade of change, is one current calculation, separately for each hemisphere:³⁷

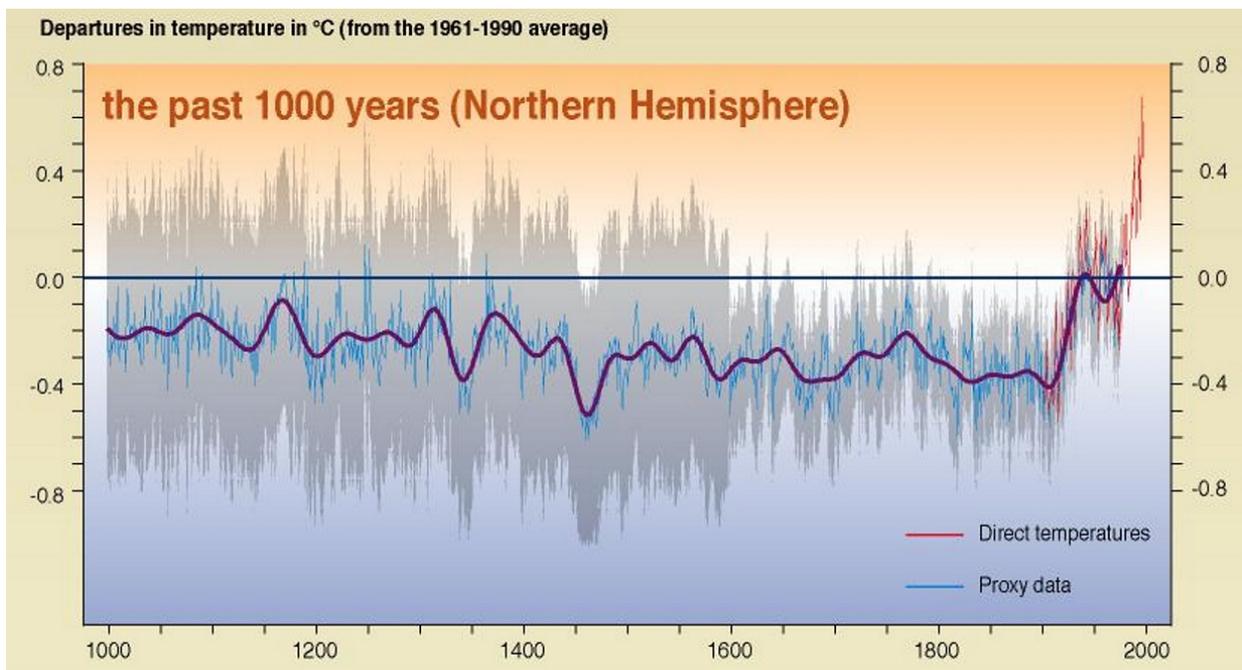


36 Melillo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe, Eds., 2014: *Climate Change Impacts in the United States: The Third National Climate Assessment*. U.S. Global Change Research Program, U.S. Government Printing Office doi:10.7930/J0Z31WJ2, at 7.

37 Graphic and explanation can be found at <http://data.giss.nasa.gov/gistemp/>.

upward slope starting with carbon-based industrialization in the twentieth century. The data are unequivocal on two points. One, surface temperatures (measured here), water temperatures, all earth temperatures are increasing. Two, the increase is recent, a-historical (this great of an increase cannot be found in any previous records) and is correlated with the burning of carbon as a source of energy.

Here is a picture—the famous Michael Mann “hockey stick”—covering the past 1000 years:³⁸



All right, there are many measurements, and they say that the climate is changing. So what? Is anyone harmed by it?

Climate change is already affecting the American people in far reaching ways. Certain types of extreme weather events with links to climate change have become more frequent and/or intense, including prolonged periods of heat, heavy downpours, and, in some regions, floods and droughts. In addition, warming is causing sea level to rise and glaciers and Arctic sea ice to melt, and oceans are becoming more acidic as they absorb carbon dioxide. These and other aspects of climate change are disrupting people's lives and damaging some sectors of our economy.³⁹

Climate change is happening, and it is adversely affecting us here in the United States. I get that, but unless human activity is causing this change, how can we expect other human activity to stop it?

38 Intergovernmental Panel on Climate Change, *Climate Change 2001—IPCC Third Assessment Report* (2001), <http://www.ipcc.ch/ipccreports/tar/slides/05.16.htm>.

39 *Third National Climate Assessment*, also at 7.

Although climate changes in the past have been caused by natural factors, human activities are now the dominant agents of change. Human activities are affecting climate through increasing atmospheric levels of heat-trapping gases and other substances, including particles.⁴⁰

It is not “conspiracy theory” to indicate that pushing the fact-based point as far into the future as possible is deliberate strategy. For example, in 2002, Frank Luntz, then as now a Republican Party consultant and frequent television guest, wrote a memorandum advising Republicans how to argue with people who see Republican-espoused policies leading to environmental degradation.⁴¹ The major heading is “Winning The Global Warming Debate—An Overview.” It starts:

1. *The scientific debate remains open. Voters believe that there is no consensus* about global warming within the scientific community. Should the public come to believe that the scientific issues are settled, their views about global warming will change accordingly. Therefore, ***you need to continue to make the lack of scientific certainty a primary issue in the debate***, and defer to scientists and other experts in the field.

Deferring to “experts” would be reasonable, but what Luntz means is to bring on *so-called* experts to deny the obvious. Luntz advocates “recruiting experts who are sympathetic to your view,” just as lawyers do when searching for expert witnesses. Keep in mind, when you hear political debates on science issues, that the “experts” have not been selected for their expertise. They have been selected for their conclusions, regardless how they came to them. Proponents assert that those who hold that conclusion are competent to do so. It is up to you to determine who the real experts are, as most of them are not.

Luntz knows that his side will lose the basic scientific debate. But he cannot come to propose policy based on that science.

*The scientific debate is closing [against us] but not yet closed. There is still a window of opportunity to challenge the science.*⁴²

Challenge the correct science, the science we know is correct, and will eventually prevail in the public mind! That is why some people advocate the term “climate delayers,” as opposed to “climate deniers.” Even *they* know they are wrong.

40 *Ibid.*, at 736. This is the first of twelve supplemental messages comprising Appendix 3 of this report. The message itself—what I have quoted is the summary—extends from page 737 to 742, including a number of compelling charts with explanations..

41 Internet references to the entire memorandum point to <http://www.ewg.org/briefings/luntzmemo>. However, it is not there, and not at ewg.org at all. What do you suppose happened? A lot of it, from which I am quoting, is at <https://www2.bc.edu/~plater/Newpublicsite06/suppmats/02.6.pdf>.

42 Luntz memo at 138, italics in original.

As in the rest of this book, when looking for experts one needs to know “expert in what?” There is no “scientific uncertainty” about the basic climate facts, and there was no such disagreement when Luntz wrote his memo. The basic facts have indeed closed against the conservative view, but the public is not aware of that, and conservatives seem unprepared to tell them.

There is, as there should be, disagreement about the extent to which action is needed now, by whom. Luntz advocates doing nothing until all nations agree to do something, “*The ‘international fairness’ issue is the emotional home run*” he writes. It is like allowing one senator to hold up a nomination, say, of a supremely qualified economist to be a Governor of the Federal Reserve, or an expert jurist to take a position on a high court bench. If the rule is that all countries (or senators) must agree, then we are guaranteed never to take action. Ultimately, this is a formula for (or an explanation of) governmental mediocrity.

As long as politicians debate the facts, bringing forward non-experts to negate real experts, there can be no discussion of remedies. The politics of delay are deliberate and, sad to say, effective.

I have broken the climate facts required for governmental action into four parts, where “fact” gets more difficult to discern:

- **Easiest:** Is there climate change? Yes. Anyone who contends otherwise not only is not an expert, but has no ability to understand experts.
- **Easy:** Should we care? Has this climate change caused hardship or cost money in The United States? Yes. The connection between specific activities and the more global “climate change” does add a level of complexity. Anyone who challenges that connection should be required to answer: What evidence would you believe, should it be produced, that the harm has been caused by this general change in the climate? It is not stupid for deniers to want to be shown the connection. It is stupid if they cannot specify what proof would look like, or if they continue to deny after that proof has been provided.
- **Easy:** Has human activity generated, or largely generated the phenomena that have caused this harm? Yes. As indicated above, we have known the science, that industrialization would likely have climate consequences, for well over 100 years. Now we have data. It would be wrong to dismiss the data as showing only a relationship in time between industry and harm—although as data that is correct, that is all data can do—because the

theoretical science predicted it. The explanation preceded the facts.

- Hard: Then can human activity reverse the deleterious effects of climate change? I think the answer is no. Not because the science is lacking. Not because there are no economic solutions. All we need to do is make bad behavior expensive, and we will see less of it. But, as explained in Chapter 12, the American conversation is so inexpert, rational discourse seems impossible. And as I explained in Chapter 13, economics becomes politics, where the voices of real experts are drowned out—or “balanced,” if you will—by the voices of charlatans. Do we want “balance,” or do we want truth?

One might hope for an entire new generation of voters, educated to look for fact rather than assertion as the basis for assessing to whom to give legislative and executive power. But I have discussed the silencing of expertise in materials provided to students, and the lack of expertise in being able to deliver real education. Very little of what one learns while growing up comes from school. Most comes from home and from sources that more or less randomly creep into peer groups. No one in the group knows how valid these strange ideas are, or has the skill to find out. Once more we are left needing a more educated public, one able to distinguish real expertise, and to demand that people they engage (teachers, police, legislators, etc.) have it. And once more this basic level of understanding, enough to differentiate the real experts from the charlatans, is both lacking and difficult to come by.

STAP

Here are two science facts that have become political facts:

- Stem cells have not yet become specialized. They can take on any function a cell can have (this is called “pluripotency”).
- A good source of stem cells is an aborted fetus.

The political difficulty of doing research on stem cells is obvious. Therefore it is also obvious that if one could “make” stem cells, new research possibilities would be open. As of this writing, no one knows how to do that.

By the second decade of the twenty-first century, some researchers were at work on a new idea:

[O]rdinary cells could be turned into stem cells by subjecting them to profound stress.⁴³

43 Dana Goodyear, “The Stress Test,” *The New Yorker*, February 29, 2016 at 46. Thus the acronym STAP stands for “stimulus-triggered acquisition of pluripotency.”

A particularly energetic researcher, Haruko Obokata, managed to cut out the creators of this idea, becoming the lead author of two articles in *Nature*, declaring this method a success. Stem cell researchers were stunned by this announcement, and were unable to replicate it. *Nature* retracted the articles.⁴⁴ Obokata's employer, Riken, set up an independent group to study it:

An investigative panel under Riken concluded in December 2014 that what researchers originally claimed were STAP cells, were likely ES cells. It failed to determine whether the ES cells were introduced by accident or deliberately.⁴⁵

That is, whether this was research fraud or research carelessness is not known, but that it was faulty research propelled by a desire (perhaps need) to publish is clear. One of the co-authors established himself in a university position before the falseness of the research became known. Another committed suicide afterward. Obokata probably will never find work in this field again.

Despite these unfortunate results, it is reasonable to conclude that, in this case, good science exposed bad science, un-propelled by competing financial interests. Sometimes people just try to get it right. This chapter needs such a story, lest a reader think that all science research is corrupt, or that I am saying it is.

Combating Science Ignorance

Those who argue against correct science findings—with the small exception of those who, as in the ulcers example, cannot bring themselves to understand how wrong they had been—usually know they are wrong. They are highly paid to be wrong. But that debate, be it over Bendectin or tobacco or Atrazine or Vioxx, is carried out by very few people. The rest of us are the audience, not participants.

There is a growing literature about that debate. It claims that it is trying to disentangle the supposed from the real experts discussing a certain issue. For example, in Chapter 3 I referred to Marcia Angell, a real expert, using her expertise not to participate in but to referee debates in the health field. And to write them into stories, because that is how one gets the rest of us to know about them.

Michael Specter, a *New Yorker* staff writer, apparently wants to be in that class, a meta-expert. He advocates that science should rule, if only we knew the answers provided by that “real” science. His book⁴⁶ starts off with stories of real

44 “STAP retracted,” *Nature News and Comment*, July 2, 2014. Part of the editors' comments:
We — research funders, research practitioners, institutions and journals - need to put quality assurance and laboratory professionalism ever higher on our agendas, to ensure that the money entrusted by governments is not squandered, and that citizens' trust in science is not betrayed.

True, but *Nature* gives us no clue how they intend to do that.

45 Tomoko Otake, “Obokata breaks silence,” *Japan Times*, January 27, 2016.

46 *Denialism* (2009), cited above.

scientists, experts, being pummeled by commercial interests. It is an interesting approach, introducing us to the battle for public understanding, the battle between experts and so-called experts. Specter, then, will take us through some issues and tell us (sometimes correctly) what “real science” says, which ultimately means who are the real experts. He is for a rational approach to issues, and a scientific determination of answers. Aren't we all, if only we knew which side that is.

I appreciate a writer who says he is going to “stick up” for science. In the Introduction to this book I mentioned Michael Crichton, who tried to do the same thing, in the form of novels, but then got his climate science all wrong. Specter gets climate science right. Then he loses it when discussing food.

Rush Limbaugh, I have pointed out (in Chapter 12), just *knows* things, regardless what “experts” say, and so he is not engaged in the debate about scientific conclusions. I discussed, rather, his style of argument. One of his methods is to build straw debaters, give them language no one uses, arguing for positions no one holds. Having done that, Limbaugh can have a field day making such straw characters look silly. He then pretends he has demolished the real arguments of real people. It is an effective technique, which keeps listeners ignorant. They think they have heard the debate, and thus know which side “wins.”

Specter, sad to say, does the same thing. For example, he tells us that organic fruits and vegetables have the same nutritional content as those grown traditionally. He adds (incorrectly) that the crop yield (per acre) of organic produce is lower. There is simply not enough land, he says, for everyone in the world to consume organically grown food, and no reason to, as they have no better nutritional content. His argument is neither logical nor correct.

If one looks at all the ways arable land is lost, corporate agriculture is surely on the list. More importantly, Specter quotes no one in the organic “movement” who has contended that the same exact species grown side-by-side, organically and not, will have differences in their vitamins, minerals, or other good things. I have never heard anyone make such an argument. Specter has chosen to define his own debate, rather than engage in one that exists.

Besides the fact that organic farmers may not grow the same species, the “trick” here (one an outsider like Specter should be quick to catch) is what has *not* been measured. Much of what science is about is measurement, and much of what false science is about is measuring the wrong things.⁴⁷ The climate deniers can always find some place on earth that is getting colder, and tell us that contradicts the generality, pictured above, that everywhere on earth is getting warmer. Then there

47 An interesting book that illustrates this is Leila Schneps and Coralie Colmez, *Math On Trial: How Numbers Get Used and Abused In The Courtroom*, Basic Books, 2013. There is no difficult mathematics in this book. Most of the stories are about understanding the data, what was measured and what was not.

is the question of when, over what time period we should observe climate (or organic produce) to draw conclusions. We can be sure that, observed over a long period, the places that appear to be colder today will become warmer; but we can also be sure that other places will become colder. Science is about the generality, whereas its opposition argues by anecdote; we might say by anomaly.

The difference between organic and non-organic produce, in addition to the plant species, is in pesticide residue, not vitamin content. Pesticide residue is in the fruit or vegetable itself, and also in the land and the creatures that feed off the land. Nothing Specter writes speaks to the issues that concern the organic movement.

Making up the straw organic-denier, and then striking it down, discredits Specter's writing. He constantly refers to short time periods and few characteristics, to argue that there is no advantage to natural, organic produce. He also proposes that the rise of "heritage" crops is unnecessary, because many countries have seed banks. We will not lose the special characteristics some of these crops have (characteristics such as good taste, for example?).

Specter obviously has no knowledge of, or respect for history. Seed banks are important, but not only for the future. The question is how to have an agricultural industry that makes good food available to us. Fruits and vegetables other than those grown by corporate farms might be best on your table, not in a museum.

Failing to convince us about the outcomes, Specter argues about the process. Humans have been manipulating the genetic structure of food forever. One might further say we have traditionally used a painfully slow method, crossing one strain with another to generate a product with desired characteristics. Science allows us to make such genetic modifications directly, with less expense and over less time. That seems like a good thing, doesn't it?

Here is the rub. Characteristics desired by whom? By producers, of course. And that is what led to tomatoes that have a thick skin and all ripen at the same time (so they can be mechanically picked). That work has produced the world's worst tasting tomatoes. They are not harmful, they are just not good. We are led to ask if it is even possible to have an agricultural industry that makes good food available to us and, if so, how.

Manipulating genes more directly, so-called GMO (genetically modified organisms) or GE (Genetically Engineered) produce is not necessarily bad for you. Avoiding all such produce makes no sense. But being skeptical of it does make sense. Just what is the company trying to achieve? What about other things that it is *not* trying to achieve? No doubt corn is sweeter and stays sweet longer than it used to. That much we can measure. What is not being measured? Indeed, what cannot be measured, because it takes too long to have any effect? I do not know and, more

importantly, I do not know how to find out. Let's not dismiss the skeptics just because we are ignorant, especially as we are purposefully kept ignorant. GMO producers will measure only what they want to emphasize, not what we want to know. Those who oppose GMO products need to measure what the corporations will not. Then we can decide what to eat based on facts.

One of the ways GMO has modified food plants is to make them resistant to pesticides. That characteristic allows—indeed commands—the farmer to use pesticides to maximize his crop. To make sure that the farmer purchases pesticides along with seeds, the seeds come coated with the pesticide. Then what happens?

The continuing massive overuse of pesticides – along with the failure to use refuge set-asides, the failure of GE corn to produce desired levels of Bt toxin and financial incentives for corn-on-corn planting cycles – have collectively resulted in the selection of pesticide-resistant weeds and insects, leading to ever more pesticide applications. This is now termed “the chemical treadmill.”⁴⁸

When pesticides are measured in the picked product, we are told they are minute. Better would be a calculation of how much we get over a year, or over ten years, if all of our fruits and vegetables are produced that way. Nor are effects on the water supply counted, when only the fruits and vegetables are analyzed. Whether (or when) the land can be used for any other crop is also a question. Keep the unit of analysis small. One cigarette will not kill you, either.

Specter understands that, after World War II, we became a beef eating country, and cattle production changed. Corn was substituted for grass, allowing calving year-round and apparently not changing the product. But the product *was* changed. Where from grass-fed beef you get Omega 3 fatty acids, from corn-fed beef most of that is Omega 6. Specter does not deny this difference. He says, effectively, “so what?” That is a good question, but it has good answers (some discussed in Chapters 3 and 4 of this book), that Specter ignores.

A proponent of science should not embed non-sequiturs in his argument:

Farmers in developing countries often see their crops rot in the fields long before they can be eaten or rushed across rutted dirt roads to markets many hours away. To those people, the Western cult of organic food is nothing more than

48 Ramon J. Seidler, “Pesticide Use On Genetically Engineered Crops,” September, 2014, available at http://static.ewg.org/agmag/pdfs/pesticide_use_on_genetically_engineered_crops.pdf. David Bronner (of Dr. Bronner's Soaps) is also critical of Michael Specter, writing that his articles

fail to engage with the fundamental critique of genetically engineered food crops in U.S. soil today: rather than reduce pesticide inputs, GMOs are causing them to skyrocket in volume and toxicity.

Advertisement “Herbicide and Insecticide Use on GMO Crops Skyrocketing While Pro-GMO Media Run Interference,” *Mother Jones*, November/December 2014 and *The New Yorker*, October 27, 2014.

a glorious fetish of the rich world—one with the power to kill them.⁴⁹

The first sentence is correct. As I discuss in this book's epilogue, it should lead to the conclusion that, to feed their populations, under-developed countries need to enhance their infrastructure. Their people would eat better if they had roads (and trucks, and gas stations) that would link the fields to population centers. These economies also need business structures, entities that can take on the transportation, others that can finance the operation, others that can organize distribution. This has nothing to do with the second sentence, which is about the technology—organic or synthetic—under which those crops are raised.⁵⁰

Finally, I know of no organic proponent who is trying to save the world. Telling us that not everyone can eat organic produce does not speak to anyone's choices. I seek first to feed my family. Secondarily I care about what my government feeds those to whom it provides food (the military, prisoners, school children). That not everyone can obtain organic food is not a reason for me to forego it. Also, Specter is wrong about the science: Non-pesticide agriculture is the more productive method, uses less water, and leaves the environment free of bad chemicals. Again, it is a question of measurement. For the individual farmer, today, pesticides seem to be the solution. But that is why so many people drink Atrazine-laden water. Measures of the vitamin content of the corn ignore the pesticide residue in the corn, and also the pesticides in the land and water, that eventually are found in animals, including humans. As long as no one measures the Atrazine and other pesticide run-offs, and projects that quantity over a long time period, then we cannot believe claims that such a technology is more productive than ones that are pesticide-free.

The Effect of Industrial Structure

Let us not deny that corporatizing food has been to the detriment of food-eaters. Decisions are based on profit, not quality. They may be the "best" decisions in the sense of corporate self-interest, not for humans; of producers, not consumers. That is why the components of school lunches has become a large issue. Do we really think the same companies that have put too much sugar and salt into our foods care, in other ways, about how healthy those foods are? The unfortunate fact is that most people have left the content of school lunches to "the experts." Really, how "expert" were they, or did they just know what they were told, and do what they were told to do? By the second decade of the 21st century it became apparent that

49 Hence the title of Chapter 3, "The Organic Fetish," *Denialism*, at 110.

50 Besides being logical (and correct), a good defense of science should be grammatically correct. In "That is both more likely and less dangerous *that* it seems" (at 119), the italicized word should be "than." In "Surely, though, radiation—a process that *effects* the entire plant—ought to frighten people more than the manipulation of a single gene," (at 135), the italicized word should be "affects." Specter needs an editor!

school lunches were not devised to maximize health, but to eliminate hunger as inexpensively as possible. Bad criterion, bad results.

So we circle back to the same problem. We are looking for expertise, for advice that will help us make good decisions. There is a market for advice about what to eat, what to drink, what to buy in any category. Some of that advice is about taste, but some is about science, or it pretends to be. That market, combined with internet dissemination, does bring evaluations of science questions to the public.

Should we trust magazine editors to have chosen, in their writers, persons with knowledge and the expertise to draw out science facts? Just as others called upon to select experts, they do not always do it well.⁵¹ Let's start with original research, where one of the authors is a well-known, respected academic. How far into the research methodology should the editor delve to uncover, say, that the data do not actually support the conclusions?

A study asking whether a canvasser can influence an interviewee's position—in this case whether the canvasser's sexual orientation would influence responses to questions on that subject—blew up in May, 2015. It had been performed by a graduate student, Michael LaCour, and “supervised” by Professor Donald P. Green of Columbia University. It had been published in *Science*, a leading magazine.⁵² Largely on the basis of that publication, LaCour was on his way to a position on the faculty of Princeton University.

However, the data LaCour used is surely fake, and his statistical manipulation was fraudulent. One writer noted:

But it's a dog eat dog when it comes to publishing science, and only interesting results are published. If your results are not positive, or not spectacular, it suddenly becomes much more difficult to publish; and if you don't publish, you're no one. We need to somehow ease this pressure from researchers, and make publishing what it should be: a way to

51 Every day, on average, a scientific paper is retracted because of misconduct. . . . Science fetishizes the published paper as the ultimate marker of individual productivity. And it doubles down on that bias with a concept called “impact factor” — how likely the studies in a given journal are to be referenced by subsequent articles. The more “downstream” citations, the theory goes, the more impactful the original article.

Adam Marcus and Ivan Oransky, “What's Behind Big Science Frauds?” *New York Times*, May 23, 2015 at A19. See also Bouree Lam, “The New Science of Bad Science” (also about publication retractions), 316 *The Atlantic* 2 (September, 2015) at 19.

52 Michael J. LaCour, Donald P. Green, “When contact changes minds: An experiment on transmission of support for gay equality, 346 *Science* No. 6215, December 12, 2014. By May 26, 2015, the editors placed this notice in red at the top of the page: “An Expression of Concern has been published for this article.”

communicate your scientific results, not the be all end all of every career.⁵³

Commenting on LaCour's appointment to Princeton, Dr. Ivan Oransky noted

They don't care how well you taught. They don't care about your peer reviews. They don't care about your collegiality. They care about how many papers you publish in major journals.⁵⁴

Dr. Green had asked for, but not insisted on getting the data. Really? He allowed a paper to be published in his name, never having inspected the data on which it was based? If you have read Chapter 3 of this book, you are not surprised. Nor did Green ask this graduate student how he was funded to do this study:

But it's a delicate matter to ask another scholar the exact method through which they're paying for their work.⁵⁵

Quite the contrary. As I have explained, in trying to discern who is an expert, one method is to look at where his financial support came from. One cannot draw a definitive conclusion from knowing that source, but determining who funded a study should not be a "delicate matter." It should be, front and center, a matter of public knowledge.

An unusual but telling article makes this point.⁵⁶ Systematic reviews (SRs) asked whether consumption of sugar-sweetened beverages (SSB) led to weight gain or obesity. The subject of *this* review was whether the conclusion of a SR was affected by its source of funding.

The SRs with conflicts of interest were five times more likely to present a conclusion of no positive association than those without them.

That is what sponsors want: Not "No, they're wrong, this stuff is good for you" but "We really cannot tell, it requires more study." It's the tobacco model.

This wimpish attitude of Dr. Green towards a fabricated study that bears his name is at the heart of why one should not trust the imprimatur (in this case, of Columbia University) on any study. There is no getting around it: one has to examine the basis of what is presented to you as "knowledge." Sometimes, as I showed in

53 Mihai Andrei, "Bad Science – Study on Gay Marriage Was Fake, Gets Retracted, *ZMEScience.com*, May 26, 2015. <http://www.zmescience.com/science/bad-science-michael-lacour-26052015/>.

54 Quoted in Andrei's article at *ZMEScience.com*., and also in Benedict Carey and Pam Belluck, "Maligned Study on Gay Unions Is Shaking Trust," *The New York Times*, May 26, 2015.

55 Quoted in Carey and Belluck's *New York Times* article.

56 Maira BesRastrollo, M. Schulze, M. RuizCanela, and M. MartinezGonzalez, "Financial Conflicts of Interest and Reporting Bias Regarding the Association between Sugar-Sweetened Beverages and Weight Gain: A Systematic Review of Systematic Reviews," *PLOS|Medicine* (December 31, 2013), doi10.1371.

Chapter 12, or above in the stories of Tyrone Hayes (a good researcher) or Haruko Okobata (a bad researcher), it is just made up.

Not that all funding buys pre-conceived results. One would like to think that academic science is not quite as corrupt as the law. On the other hand, if you missed it, read Chapter 3 of this book, on health research. Or Chapter 9, on education. Or the Eric Topol story earlier in this chapter. I want you to conclude that you cannot trust, from its source, that information is correct. Most people are honest and just want to do their job well. But many of those who aspire to be recognized as experts seek the recognition more than the expertise itself. It is, after all, the recognition, not the expertise, that pays the bills.

Let's call "meta-science" the consolidation, review, and extraction of information from published science. Because we cannot trust that the editors were expert in their selection of experts, the burden falls back on us to figure out whether what we are reading is correct, or even believable. That someone like Michael Specter advocates scientific answers to life's questions does not mean that *his* answers meet this criterion. That someone's research has produced new "knowledge," published in *Nature* or *Science*, does not mean that it is knowledge at all.