

Rachel's Environment & Health News #824 -- Part 1: Ending Government Regulation by Manufacturing Doubt August 18, 2005

By Peter Montague

Thirty years ago, scientists began reporting birth defects and unusual homosexual behavior in wildlife, which they couldn't explain. [See [Rachel's #146, #263](#).] By the late 1980s, Theo Colborn -- an expert on the Great Lakes -- thought she saw a pattern, and she pulled together a scientific meeting in July 1991 to discuss it. The result was the "Wingspread Statement" on hormone-disrupting chemicals which began:

"We are certain of the following:

"A large number of man-made chemicals that have been released into the environment, as well as a few natural ones, have the potential to disrupt the endocrine [hormone] system of animals, including humans.... Many wildlife populations are already affected by these compounds." [[Rachel's #263](#)]

Five years later, Colborn, joined by biologist Pete Myers and journalist Dianne Dumanoski, popularized the idea that industrial chemicals at low levels can interfere with hormones in wildlife and quite possibly in humans. Their book, "Our Stolen Future," caused New York Times science writer Gina Kolata to go ballistic. Reviewing the book, Kolata scoffed at the main hypothesis, that industrial chemicals may be interfering with the hormones that control and regulate growth, health and behavior in wildlife and humans, leading to increases in birth defects, problems of sexual development, breast cancer, prostate cancer, and even mental problems like attention deficit disorder, reduced IQ, and violent behavior.

Kolata said "the factual basis of the book's alarms... have been refuted by careful studies," though she did not cite a single study as evidence. To be fair, Ms. Kolata was merely reflecting the views of the chemical industry on the question of hormone disruption. The industry had a great deal at stake. If the theory of hormone disruption were true, the chemical industry could only be viewed as a major menace to public health and the natural environment.

Now, almost 10 years later, the debate over hormone disruption seems to be over. The Wall Street Journal conceded this summer that low levels of industrial chemicals are linked to rising rates of childhood cancer and brain disorders, among other maladies.

Here's the opening paragraph of the Journal's front-page story July 25, 2005:

"For years, scientists have struggled to explain rising rates of some cancers and childhood brain disorders. Something about modern living has driven a steady rise of certain maladies, from breast and prostate cancer to autism and learning disabilities.

"One suspect now is drawing intense scrutiny: the prevalence in the environment of certain industrial chemicals at extremely low levels. A growing body of animal research suggests to some scientists that even minute traces of some chemicals, always assumed to be biologically insignificant, can affect such processes as gene activation and the brain development of newborns.

"An especially striking finding: It appears that some substances may have effects at the very lowest exposures that are absent at higher levels.... This challenges an axiom of toxicology stated by the Swiss chemist Paracelsus nearly 500 years ago: The dose makes the poison." [1] [[See Rachel's #754, #755](#).]

The Journal went on to point out that many scientists are now convinced that insignificant levels of several individual chemicals can combine to produce significant effects.

The Journal explained: The harm from low-level exposure to a single hormone-disrupting chemical "will always be small," said Andreas Kortenkamp, who directs scientific research on hormone-disrupting chemicals for the European Union (EU). But exposure to low levels of many chemicals simultaneously will produce a cumulative effect on the human hormone system "that is likely to be very large," Kortenkamp told the Journal.

Given these facts, it seems safe to say that the chemical industry is now widely acknowledged as a major menace to public health and the natural environment. This presents the industry with an uncomfortable problem of financial liability.

Naturally, as a matter of self-preservation, the industry has developed a defensive response. Of course the industry has been studying these problems at least as long as Theo Colborn has been studying them. Industry scientists and lawyers knew the truth long before it made its way onto the front page of the Wall Street Journal -- just as the tobacco industry knew the truth about tobacco at least 50 years before they publicly acknowledged the problem of lung cancer.

The chemical industry response has been complex and exceedingly clever, intended to make it impossible for government to effectively regulate any industry. The strategy has succeeded in spades.

In the "old days" -- say, around 1975 -- a chemical like DDT could be banned because government scientists examined the scientific literature, balanced "the weight of the evidence," and concluded that DDT was probably causing serious harm to wildlife, such as the bald eagle, our national emblem.

Today it would be impossible to ban a chemical on such grounds because a series of laws and regulations passed

during the past 20 years have changed the standards for scientific "proof" that government regulators must meet.

Industry's main strategy for ending government regulation is the manufacture of uncertainty and doubt. "If, for example, studies show that a company is exposing its workers to dangerous levels of a certain chemical, the business typically responds by hiring its own researchers to cast doubt on the studies," writes David Michaels in Scientific American.[2]

Increasingly, the U.S. regulatory system can be paralyzed by doubt. The system assumes that anyone can do anything they want to do (so long as it is legal), until harm can be proven. Until harm can be proven, anything goes. If I move into your town and set up a small shop and start belching bright blue smoke into the sky, it is up to you to prove that blue smoke causes harm before anyone can question my operation.

Once suspicion of harm is raised, the burden is still on the government and the public to prove harm. If one study shows that blue smoke causes asthma in children, the government may begin to examine all studies of blue smoke and eventually act on the weight of the evidence. (If government ever takes action to control blue smoke, we blue smoke producers can demand our day in court, but that's a later chapter in this story.)

Given the way the system works, as a blue smoke producer, it pays me to discredit previous blue smoke studies, to change "the weight of the evidence." With blue smoke studies in doubt, regulators will be paralyzed. "On the one hand we have studies showing harm from blue smoke, on the other hand those studies have been questioned by the Blue Smoke Association. Until this scientific dispute is resolved, we can't take action." This is how the regulatory system works.

"Doubt is our product."

It was the tobacco industry that discovered the power of doubt in a regulatory system that can be paralyzed by uncertainty. In 1969, an executive of Brown & Williamson (now owned by R.J. Reynolds) actually described the strategy in a memo: "Doubt is our product since it is the best means for competing with the 'body of fact' that exists in the mind of the general public." [2]

It turns out that creating doubt is remarkably easy to do. Take the example of atrazine, the potent weed killer that has been used for nearly 50 years. An estimated 80 million pounds of atrazine are spread into the environment each year in the U.S. In some environments, it persists and retains its toxicity for decades.

The initial concern about atrazine was cancer. Atrazine clearly causes cancer in laboratory rats. And the workers in a Louisiana atrazine factory have unusually high rates of prostate cancer. But Syngenta -- the Swiss firm that makes hundreds of millions of dollars each year selling atrazine in the U.S. -- has successfully cast doubt on these facts, paralyzing regulators. Syngenta argues that atrazine affects rats via biological mechanisms that do not exist in humans,

and they say their workers have high rates of prostate cancer only because the company is extra vigilant looking for cancers among its workers.

Meanwhile, for years evidence has been accumulating, showing that atrazine scrambles the sex hormones of frogs, turning males into hermaphrodites. A hermaphrodite has sex organs of both genders. To prove otherwise, Syngenta hired a biologist named Tyrone B. Hayes, a biology professor at University of California, Berkeley. But Professor Hayes's experiments came out wrong and showed unmistakably that atrazine "demasculinizes" male frogs. Compared to unexposed frogs, males frogs exposed to atrazine have smaller larynxes (voice boxes), male hormone (testosterone) levels that are one-tenth of normal, and a mix of male and female traits -- they are hermaphrodites. Syngenta would not give Professor Hayes permission to publish his studies, so he ran a series of his own experiments on a wider variety of frogs, and published his results in prestigious journals (Nature, and the Proceedings of the National Academy of Sciences). "We showed that these animals are chemically castrated," Professor Hayes said. Four other groups of independent researchers in three countries reached similar conclusions.[3]

Syngenta solved this problem by creating doubt about Professor Hayes's studies. They hired scientists to reproduce the studies, but those scientists did sloppy work and were not able to reach the same conclusions that Hayes reached. An EPA panel of outside experts found numerous flaws and mistakes in the Syngenta studies. In at least two of the studies, the "unexposed" group of frogs had actually been exposed to atrazine. Not surprisingly, those studies did not find a significant difference between the "exposed" and "unexposed" frogs. In another of the studies, no conclusion could be reached because 80-90% of the frogs died, apparently as a result of inadequate care. As Professor Hayes summarized the situation, what Syngenta scientists did "was produce a number of studies that were purposefully flawed and misleading, and that changed the weight of the evidence." [3]

So it is rather easy to cast doubt on a scientific study -- simply try to reproduce the study using methods that are sloppy enough to assure that the results will not be reproduced. "On the one hand we have a study showing harm, on the other hand some scientists have been unable to reproduce these results." So regulators are paralyzed.

As David Michaels told a Texas reporter, "corporations and others who manufacture dangerous products and pollutants have realized that by adding manufactured uncertainty to the equation, they can essentially stop the regulatory process from moving forward." [4]

[To be continued.]

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[1] Peter Waldman, "[Common Industrial Chemicals in Tiny Doses Raise Health Issue](#)," Wall Street Journal July 25, 2005, pg. 1.

[2] David Michaels, "[Doubt is Their Product](#)," Scientific American Vol. 292, No. 6 (June 1, 2005), pgs. 96-101.

[3] Rick Weiss, "['Data Quality' Law is Nemesis of Regulation](#)," Washington Post August 26, 2004.

[4] Jeff Nesmith, "[New product for U.S. industry: 'manufactured doubt'](#)," Austin (Tex.) Statesman June 26, 2005.

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