Refining the Tools to Stymie Government Regulation: Industry's Misuse of Science in the 1970s

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In the early 1970s, a series of regulations were enacted that fundamentally transformed the relationship between American industries and the broader society. In the wake of growing attention to the negative impact of industrial pollution, environmental damage, and workplace safety and health, the National Environmental Policy Act and the Occupational Safety and Health Act were passed establishing two new federal regulatory agencies, the Environmental Protection Agency and the Occupational Safety and Health Administration as well as a new scientific agency within the National Institutes of Health, the National Institute for Occupational Safety and Health. This greatly increased the ability of the federal government to do independent scientific research about the impact of nearly a century of America's industrial development on the health and well-being of the population. Up to this point private industry largely conducted the research and evaluation of the chemicals, minerals and other materials that the workforce and the public were exposed to through the production of America's industrial infrastructure. The previous decades of American history were essentially a time on self-regulation by private companies who believed that they alone should be responsible for the research and the evaluation of the products and materials they were creating and introducing into American society. They believed that they alone were in the best position to protect the workforce and the public from whatever dangers might exist.

This moment stimulated a strong reaction by industry and other conservative forces in the United States. Trade associations and companies affected by the new forms of oversight reacted in a number of ways aimed at stifling the new efforts to regulate. Some companies that produced

objects made with established poisons or chemicals engaged in lobbying efforts aimed at weakening the power of OSHA, EPA and the FDA to set standards, inspect their plants or force them to warn the public of the potential dangers of their products. But in addition to this industry-by-industry approach, by the late 1970s, in the decade before the Reagan deregulatory revolution, conservative intellectuals and politicians formulated a broader approach to undermine the regulatory state and provide an intellectual rationale for their efforts. This paper will analyze efforts by American industry to counter government regulations to control their behavior. During this decade many of the basic tools -- lobbying, public relations, and most significantly for this paper, scientific manipulation, and creation of doubt about science still in use -- were refined and institutionalized.

The efforts that developed in the 1970s were rooted in the pre-OSHA and EPA era of self-regulation when American industry enunciated a set of standards and principles they held would guarantee "standards of behavior" that would protect the workforce and consumer from harm. One basic obligation was a commitment to educate workers and consumers alike "to a sane appreciation of the risk" of the materials they used in the production of their products. Their obligation, industry said, was to provide information about the dangers workers and consumers faced from the machinery and materials with which they came in contact. Through various trade associations, federations, and organizations like the Chemical Manufacturing Association, the National Safety Council, and the National Civic Federation, industries engaged in "preemptive reform," a "co-optation" of the positions that radical workers and unions, like the Industrial Workers of the World and the Congress of Industrial Organization, during the Progressive Era and Great Depression, respectively, included in their demand platforms addressing pay, work

hours, and conditions on the shop floor.[1] Progressive initiatives by industry regarding workers' compensation, safety campaigns and warnings to workers and the public, industry assumed, would quell the possibility of litigation for the liabilities of their product by consumers, workers' injuries on the job.

In the late 1960s labor and the left challenged the inherent inadequacy of this self-regulatory approach. Until this time major industry leaders insisted that businesses' existing codes of conduct rendered such legislation unnecessary. In the early decades of the 20th century, challenges from members of worker advocacy groups like the American Association for Labor Legislation, the increasing labor unrest sparked by the Industrial Workers of the World and other unions, along with socialists and progressives, prompted some major American corporations to find ways to temper unrest, either through direct suppression of strikes, or reforms endorsed by the National Safety Council and the National Civic Federation, among others. [2] The National Civic Federation, during this period specifically, brought labor representatives, government, and business leaders together, along with social workers, clergy, and scholars to create a program to legitimize the new industrial order through reform and ideological justification.

Among the first industry trade associations in the 1930s to communicate the dangers industry would confront if they continued to ignore demands to make the informational playing field fairer was the Manufacturing Chemists' Association (MCA), which represented the

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[1] See, E.R.A. Merewether and E.W. Price, *Report on Effects of Asbestos Dust on the Lungs and Dust Suppression in the Asbestos Industry*, (London: Her Majesty's Stationary Office, 1930), David Montgomery, *The Fall of the House of Labor: The Workplace, the State, and American Labor Activism, 1865–1925* (New York, NY: Cambridge University Press, 1987); Alice Kessler-Harris, *Out to Work: A History of Wage-Earning Women in the United States* (New York, NY: Oxford University Press, 2003); William Graebner, *Coal Mining Safety in the Progressive Period* (Lexington, KY: University Press of Kentucky, 1976); David Huyssen, *Progressive Inequality* (Cambridge, MA: Harvard University Press, 2014); Ira Katznelson, *Fear Itself: The New Deal and the Origins of Our Time* (New York, NY: W. W. Norton, 2013)..

[2] Melvyn Dubofsky, *We Shall Be All A History of the Industrial Workers of the World*, abridged ed. (Urbana, IL: University of Illinois Press, 2000); Martin Sklar, *The Corporate Reconstruction of American Capitalism, 1890–1916: The Market, the Law, and Politics* (Cambridge, UK: Cambridge University Press, 1988).

chemical industry. Its "Statement of Legal Principles" of the late 1930s said, "The manufacturer or one who holds himself out to be the manufacturer must know the qualities of his product," and that the "manufacturer cannot escape liability on the ground that he did not know it to be dangerous." Further, "a manufacturer who puts out a dangerous article or substance without accompanying it with a warning as to its dangerous properties is ordinarily liable for any damage which results from such failure to warn." [3]

As World War II ended and the country recovered from the Great Depression, management and labor arrived at what some scholars have called the "post-war accord," wherein labor unions traded efforts to control of the workplace to management in exchange for shorter hours, health insurance, better wages, and improved benefits.[4] If management were to control the workplace, then the safety of workers would be under its purview as well. The research arm of the Industrial Hygiene Foundation (IHF), the Mellon Institute, was among the foremost industry-sponsored research institutions in the country from the 1930s through the 1960s. They, along with Henry F. Smyth of Union Carbide, analyzed industry's obligations when confronted with potentially harmful substances: "It is clearly the duty of a manufacturer to delay production of a chemical until the health hazards are well enough defined so that protection of his workmen is possible." This duty was the "responsibility of industry," not federal or state governments. He suggested that it was appropriate when a product was initially being developed to do a quick test, but that if the material would be produced in massive quantities, the company was obliged to "perform more detailed studies."[5] The American Conference of Governmental Industrial

[3] Manufacturing Chemists' Association, "Legal Principles," in *To Class A Members*, National Paint, Varnish and Lacquer Association (July 18, 1939).
[4] Steve Fraser and Gary Gerstle, eds., *The Rise and Fall of the New Deal Order, 1930–1980* (Princeton, NJ: Princeton University Press, 1990).
[5] Henry F. Smyth and Mellon Institute, "Solving the Problem of the Toxicity of New Chemicals in Industry," *West Virginia Medical Journal* 7, no. 42 (1946): 177. States such as Ohio adopted these standards in a variety of laws: "Legal

Hygienists, an organization of industrial hygienists employed by government agencies, argued in 1952 that "adequate labels for warning and identification of harmful substances are necessary for the prevention and control of a public health problem."[6]

At this time, companies such as Standard Oil, Shell Corporation, Union Carbide, Monsanto, General Accident, the Fire and Life Assurance Corp, and Johns Manville, diverse in their enterprises, acknowledged that it was an obligation of industry to not only disseminate the information it had, but to find out possible dangers by conducting the research and studies necessary to expose the possible harm that use of their products could cause to workers and the public.[7] For instance, the representative from DuPont concurred with Theodore Hatch at an IHF annual meeting, noting that animal experimentation was an important way to establish the level of danger for products and chemicals.[8] Describing the process that should be followed in evaluating the toxicity of a compound, Henry F. Smyth of Union Carbine Corporation said: "Every new compound planned or made by research or development laboratories should be considered by the toxicology laboratory, at least to the extent of making predictions about handling hazards…. If the company is planning to develop the product even on a limited basis, then its acute toxicology should be estimated by range finding methods. This should be completed and predictions should be made about chronic toxicity before any of the compound is sold. Additional research devoted to the material should be proportioned to its probable uses, to

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Requirements for the Prevention and Control of Industrial Public Health Hazards," Ohio Health Statute, Division of Industrial Hygiene, 1946.

[6] American Conference of Governmental Industrial Hygienists, "Transactions," April 1952; reproduced in Federal Security Agency, Public Health Service, "Occupational Health," September 1952, p. 152.

[7] Charles Henri Hine, N. W. Jacobsen, and Shell Development Co., "Safe Handling Procedures for Compounds Developed by the Petro-Chemical Industry," *American Industrial Hygiene Quarterly* 15, no. 2 (1954), 141–144, 143.

[8] P. Zapp, "Panel Discussion: Health Problems Involved in the Manufacture, Sale, and Use of Toxic Materials," presented at Industrial Hygiene Foundation, 21st Annual Meeting, Philadelphia, PA, April 23–27, 1956, *Transactions Bulletin*, no. 30 (1957): 267.

the degree of human exposure in its use, to the degree to which it reaches the consuming public, and to the magnitude and subtlety of its toxic effects."[9]

Large corporations such as Shell, Dow, and others had their own laboratories and other companies contracted with universities, the Kettering Labs, and the Mellon Institute.[10] Additionally, diverse companies such as Standard Oil, DuPont, American Tobacco Raybestos, and John Manville were conducting research on the relationship between their products and cancer.

One of the arguments made by industry representatives during the congressional hearings in 1968, which ultimately established the Occupational Safety and Health Administration (OSHA), attempting to weaken this law, was that American companies were already behaving responsibly. For instance, J. Sharp Queener, safety director for the chemical titan Dupont and Representative of the US Chamber of Commerce, reviewed the "voluntary organized safety movement" established by U.S. industry for the country. He noted that DuPont and others had created toxicology laboratories to provide information about the dangerous properties of its products to help protect the workers.[11] The congressional committee also heard from the chair of the MCA's board of directors that since 1938 the chemical industry had produced "toxicology data on well over 3,000 different chemicals," the basis of its L-1 Manual (1945).[12] Not until 1986 did OSHA recognize the limitations of voluntary action by industry, and required that all

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[9] Henry F. Smyth, "The Communications Lines and Problems of a Toxicology Laboratory Working for Industry," *AMA Archives of Industrial Health* 15 (April 1957): 269–273, 271.
[10] Jack T. Garrett, "Toxicity Considerations in Pollution Control," *Industrial Wastes* 2 (January–February, 1957): 17–19.

[11] See, e.g., Statement of J. Sharp Queener, US Chamber of Commerce, US House of Representatives, Committee on Education and Labor, Select Subcommittee on Labor, Hearings on HR 14816 (Washington, DC, 1968), pp. 186, 206.
[12] Statement of John O. Logan, Universal Oil Products Co., Chairman of the Board of Directors, MCA, US House of Representatives, Committee on Education and Labor, Select Subcommittee on Labor, Hearings on HR 14816 (Washington, DC, 1968), p. 379.

manufacturers give material safety data sheets detailing the contents of all materials workers encountered in the industrial workplace.

The Social Context of Scientific Malfeasance

One of the early challenges to the idea of self-regulation by industries came in the form of the impact of chemical pollution on people breathing the air in towns with huge factories and growing numbers of automobiles, belching leaded gasoline and sulfur dioxide. What was sometimes described in the popular press as potential health crises, industry generally portrayed as nuisances. Industry representatives argued that this pollution was a price worth paying for the economic progress and modern conveniences industry made possible.

As the expanding labor, consumer, and environmental movements of the 1960s increasingly expressed mistrust of the denial by the chemical industry of any significant harm, some individuals within the industry expressed privately that they considered environmental pollution to be a very serious danger that companies would ignore at their peril.[13] Publicly, however, chemical companies towed the line insisting to the American people that they could be trusted to protect the natural environment and communities as well.

The chemical and electric industries produced massive advertising campaigns following World War II, in which they proclaimed a distinctive role for themselves in America's emerging affluence. The General Electric Company advertised repeatedly that "Progress is our Most Important Product," while the E. I. du Pont de Nemours and Company (DuPont) proclaimed that the "American century" was brought about by "Better Things for Better Living … Through Chemistry." During the first half of the twentieth century, many Americans were fairly

[13] Manufacturing Chemists' Association, "Ad Hoc Planning Committee on Environmental Health," Minutes, June 24–25, 1963, 2, MCA Papers in possession of the authors

hypnotized by the parade of technological advances and remained largely unaware of the ecological and health costs of such progress, despite actual environmental crises and increased scientific concern about pollution. Most were ready and eager to incorporate plastic toys, chairs, wall coverings, radio casings, and chemical industry products into their homes and lives. At the same time, Westinghouse and General Electric provided seemingly unlimited energy and equipment for appliances like refrigerators and electric ranges, as well as motors for every type of new gizmo. Among the public, few initially thought that increasingly ubiquitous substances such as chlorinated biphenyl, polyethylene, and vinyl chloride among others, could pose a possible danger. Fascination with this "good life" required a shared set of values that equated in the public mind an alignment between the progress of a shared society and the technological progress of electric motors and atomic bombs—along with ignorance of the health consequences of these products and the ways they were manufactured.[14]

Americans were largely apathetic as well to the hazards of oil rigs and smokestacks.[15] They began to wake up after a 1948 tragedy occurred in Donora, Pennsylvania. This small factory town near Pittsburgh, according to a report by the Pennsylvania Department of Environmental Protection, home to several steel mills and smelters, which included the American Steel and Wire Company's zinc works, was engulfed in "a poisonous mix of sulfur dioxide, carbon monoxide and metal dust … from the smokestacks from the local zinc smelter where most of the town worked." The street became dark at noon due to the resulting air inversion.

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[14] See, for example, "Duck and Cover—Bert the Turtle" (produced in 1951), https://www.youtube.com/watch?v=IKqXu-5jw60, or "Bombproof," https://www.youtube.com/watch?v=b114xlklDVg, accessed January 9, 2022. Paul Boyer, *By the Bomb's Early Light: American Thought and Culture at the Dawn of the Atomic Age (Chapel Hill: University of North Carolina Press, 1994)*

[15] Two industry spokespeople decried "the attitude of smugness which associates atmospheric pollution with industrial prosperity and ignores the desirability of its reduction." W. C. L. Hemeon and T. F. Hatch, "Atmospheric Pollution," *Industrial and Engineering Chemistry* 39 (May 1947): 568. See also Robert E. Swain, "Smoke and Fume Investigations: A Historical Review," *Industrial and Engineering Chemistry* 41, no. 11 (November 1949): 2383–2388.

"Twenty residents died and half the town's population—7,000 people—were hospitalized over the next five days with difficulty breathing"[16] as a cloud of toxins sat over the town.[17]

Americans were starting to notice the impact pollution was having on the environment. The city of Los Angeles was growing rapidly and the public began to worry about the long-term health effects of smog on Americans' health, which led to new worries for industry.[18] In the words of one industry trade journal, smog "cease[d] to be a joke to industrialists."[19] Overseas, industrial pollution was identified as the cause of the Meuse Valley Fog in Belgium as early as 1930, which killed an estimated sixty people and sickened several thousand. Even greater concerns were raised by the Great London Fog of 1952, when heavy smog, primarily caused by coal burning, blanketed the city. [20]

The Manufacturing Chemists Association, the trade association of the chemical industry, realizing that the effect of air pollution on health was a potentially significant political issue, sought to portray air pollution as "a nuisance problem and not a health problem." [21] The trade association of the section of the chemical industry primarily concerned with petroleum refining, The American Petroleum Institute (API), also addressed the increasing fear that the air pollution

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[16] W. Michael McCabe, "Donora Disaster Was Crucible for Clean Air," Pennsylvania Department of Environmental Protection, October 26, 1998, www.dep.state.pa.us/dep/Rachel_Carson/crucible.htm. It was estimated that the air contained between 1,500 and 5,500 micrograms per cubic meter of sulfur dioxide emissions (whereas today's Clean Air Act mandates a maximum average of 80 ug/m^3).

[17] Erin Peterman, "A Cloud with a Silver Lining: The Killer Smog in Donora, 1948," (Pennsylvania Center for thre Book, 2009), Available at: https://pabook.libraries.psu.edu/literary-cultural-heritage-map-pa/feature-articles/cloud-silver-lining-killer-smog-donora-1948, Accessed: March 25, 2024.

[18] Paul L. Magill, "The Los Angeles Smog Problem," *Industrial and Engineering Chemistry* 41, no. 11 (November 1949): 2476–2486. See Merlin Chowkwanyun, *All Health Politics Is Local: Community Battles for Medical Care and Environmental Health* (Chapel Hill: University of North Carolina Press, 2002).

[19] Robert T. Reinhardt, "West Coast: Smog Ceases to be a Joke to Industrialists Spending Millions of $ for Control of Waste Gases," *Iron Age* 163 (April 14, 1949): 104.

[20] See Devra Davis, *When Smoke Ran like Water: Tales of Environmental Deception and the Battle Against Pollution* (New York: Basic Books, 2002), especially 42–48.

[21] Manufacturing Chemists' Association, Air Pollution Abatement Committee, "Minutes of Meeting," April 21, 1954, MCA Papers in possession of the authors.

caused by industry was linked to serious illnesses. John C. Ruddock, chair of the API's Subcommittee on Atmospheric Pollutants, sought a way to reconceptualize the health issue as one of annoyance and nuisance. He repeatedly argued that aside from the incidents at Meuse, Donora, and London, no one as yet had been able to prove "aggravation of such diseases as asthma, tuberculosis, bronchitis, etc., nor does air pollution particularly affect the aged or the very young." He said that he was "sympathetic with all those who do not like 'smog,'" and agreed that air pollution should be reduced. "As true Americans, we do not like our rights infringed upon, whether it is the inability to see as far as we desire, or whether it is the discomfort and eye-smarting that occurs with air pollution." There were certainly many "poisonous and noxious fumes" in polluted air. However, he argued, they were dangerous only when above "a certain density and are either inspired or ingested."[22]

In the 1950s the API claimed, "We have found no single case, nor have we found any pathological effect attributable to atmospheric pollutant per se." [23] Yet during this very time, studies began to appear that documented the ways that smog from automobile and industrial pollution were impacting human health. Following the London smog of December 1952, studies were documenting people dying from the chemicals in the air that they were breathing. In London, the over four thousand deaths that are believed to have occurred within a four-day period were caused by one hundred forty tons of hydrochloric acid, 2,000 tons of carbon dioxide, and fourteen tons of fluorine compounds. Three hundred seventy tons of sulfur dioxide were

[22] John C. Ruddock, "Proceedings," Meeting of the Subcommittee on Atmospheric Pollutants, Medical Advisory Committee, American Petroleum Institute, National Archives, Record Group 90 (Public Health Service), Air Pollution Medical Branch, Project Records, 1955–1960, 241.5, box 6. See also Leon O. Emik, Chief, Laboratory Investigations, Air Pollution Medical Program, to Chief, Air Pollution Medical Program, "Visit with Dr. John C. Ruddock, May 15, 1958," May 29, 1958, National Archives, Record Group 90 (Public Health Service), Air Pollution Medical Branch, Project Records, 1955–1960, 241.5, box 6; John C. Ruddock, "Statement by Chairman, Subcommittee on Atmospheric Pollutants," June 22, 1959, National Archives, Record Group 90 (Public Health Service), Air Pollution Medical Branch, Project Records, 1955–1960, 241.5, box 6.

[23] Ruddock, "Proceedings"; see also Emik, "Visit with Dr. John C. Ruddock," and Ruddock, "Statement by Chairman."

converted into eight hundred tons of sulfuric acid. [24] Los Angeles studies from the 1950s also increased public attention being paid to the hazards of automobile and industrial smog by documenting where the majority of the pollution was coming from and demonstrating that it was produced not only by cars but by the burning of fossil fuels anywhere. [25]

The chemical industry was deeply concerned about what would be made of the increasing emergence of studies on pollution and its impact on public health. The Manufacturing Chemists' Association (MCA)'s Public Relations Advisory Committee, early in 1962, expressed a sense of the "urgency of the situation confronting us."[26] The MCA started introducing the idea of "acceptable" risk into its argument about the benefits of the chemical industry. As Dr. E. O. Colwell of the Aluminum Company of America said to the Air Pollution Abatement Committee, "Whether public health officials will admit it or not, there is a place for the term 'calculated risk' in this human health business." Mimicking the argument made by the representative for General Motors nearly thirty-five years earlier that leaded gasoline was a "gift of God," Colwell asked, "What price are we willing to pay for absolutely clean air?" It was both unnecessary and impractical "to make the air so clean that the most sensitive individuals will be comfortable if such is not economically sound," he argued. "The public we must satisfy would better risk a few cases of bronchitis or even emphysema than to risk mental and physical ills that would accompany the economic failure of an industry, a community, or a country"—as though a few improved practices and pollution control devices could destroy everything from a company to a nation. From the perspective of industry, the interests of the country were synonymous with the

[24] Jes Fenger, "Air Pollution in the Last 50 Years—From Local to Global," *Atmospheric Environment* 43, no. 1 (January 2009): 14.
[25] Chowkwanyun, *All Health Politics Is Local*; Davis, *When Smoke Ran like Water*, 80–84.
[26] Manufacturing Chemists' Association, Public Relations Advisory Committee, "Report of Glen Perry, Chairman," "Minutes of the 115th Meeting of the Directors of the MCA," February 13, 1962, MCA Papers.

economic interests of chemical companies, [27] or, as president of General Motors and then secretary of defense Charles Wilson said, "what was good for our country was good for General Motors, and vice versa."[28]

Rachel Carson's *Silent Spring*, published in September 1962, swiftly undermined the reassuring overall message of the chemical industry. Linda Lear, Carson's biographer, wrote that industry and the public read the book as "a fundamental social critique of a gospel of technological progress." Some found Carson's work so threatening that they hurled personal attacks at her. Ezra Taft Benson, the secretary of agriculture under Eisenhower and later a leader in the Mormon Church, asked "why a spinster with no children was so concerned about genetics," suggesting it was because she was "probably a communist."[29]

Silent Spring was not a communist tract, certainly. However, it provided an illuminating critique of the agriculture and chemical industries' determination to reshape the world through corporate greed and chemistry. Carson's book argued that with its creation of the industrial machine, the twentieth century was "the moment of time" when "one species—man—acquired significant power to alter the nature of his world," and that chemicals were "the sinister and little-recognized partners of radiation in changing the very nature of the world." [30] The book contained an explicit critique of farming practices following World War II, specifically the concentration of American agriculture in a few large companies. Single-crop farming—enormous, corporate-owned farmland tracts cultivating one crop that could be planted, fertilized,

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[27] Manufacturing Chemists' Association, Air Pollution Abatement Committee, "Minutes of Meeting," February 7–8, 1962, MCA Papers.
[28] Dan Pontefract, "What's Good for Our Country Was Good for General Motors," *Forbes*, November 26, 2018, https://www.forbes.com/sites/danpontefract/2018/11/26/whats-good-for-our-country-was-good-for-general-motors/?sh=43a0cf2b2075.

[29] Linda Lear, *Rachel Carson: Witness for Nature* (New York: Henry Holt, 1997), 429.
[30] Rachel Carson, *Silent Spring* (New York: Houghton Mifflin, 1962), 5–6.

sprayed with pesticides, and harvested with great efficiency—had destroyed the natural, balanced, diverse environment that had taken eons to evolve, Carson argued. Small farmers had minimized the threat of insects that thrived on a single plant by intermingling diverse crop species, as nature had done: they could not destroy an entire ecosystem of plants. Now, a single species of bug could. [31]

Rachel Carson's *Silent Spring* (1962) was the result of more than two decades of research on how chlorinated hydrocarbons threatened the environment and our ecosystem. Written as a popular text, her book explained the huge body of scientific literature showing that DDT and other chlorinated hydrocarbons were prevalent in our environment and were responsible for the death and disease of vertebrates and invertebrates alike. She also documented, most significantly, the damage and long-term threats to mammals, including human beings. It was impossible to know, she explained, the long-term effects of the accumulation of small amounts of these chemicals, alone or in combination. Additionally, she hypothesized that exposure to chlorinated hydrocarbons was associated with cancer. The book lit a fire of controversy because she compiled such extensive scientific literature in one place, and importantly, presented it in a prose that was accessible not only to scientists but to the general public as well. In so doing she helped propel the development of a popular environmental movement that made the accumulated science, previously of little popular interest, central and relevant to broad policy debates. [32]

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[31] Rachel Carson, *Silent Spring*, 10. The National Agricultural Chemicals Association, the trade association for pesticide manufacturers, and the Manufacturing Chemists' Association, which led the attack on Carson and her writings, sent "out a steady stream of brochures and bulletins denouncing things that Carson had never said and circulating 'fact kits' to members." See Lear, *Rachel Carson*, 431.

[32] David Rosner and Gerald Markowitz, "Persistent Pollutants: A Brief History of the Discovery of the Widespread Toxicity of Chlorinated Hydrocarbons," *Environmental Research* 120 (January 2013): 126–133.

Industry's early reaction to concerns about pesticides was simple: put responsibility for the danger onto consumers, by "educating" them. All they needed was "a strong program of education for customers and the general public in the appropriate use of products."[33]

Despite some chemical company representatives' willingness to keep their heads in the sand, James Sterner, chair of the MCA's Environmental Health Advisory Committee, acknowledged in 1967 that the available data indicated that the problems caused by chemical pollution would soon approach apocalyptic proportions. He suggested that given the fact that sulfur dioxide contamination was already a serious problem in some urban areas, it was likely to become extremely dangerous in the future. Polluted water from the runoff of pesticides used on farms and waste from hogs and other animals there, along with waste from industrial plants, had already caused the near death of major rivers like the Cuyahoga River in Ohio. Some rivers would "in another decade … have zero dissolved oxygen." Though some members of his committee might see his predictions as overly extreme, he noted, "There is a growing procession of thoughtful and critical scientists and citizens whose initial skepticism has changed to concern and even alarm." [34]

The MCA finally acknowledged in 1968 that air pollution was not merely a nuisance but a health problem, yet the industry continued to downplay the dangers. It agreed that people already suffering from respiratory diseases could be "adversely affected" by air pollution, but healthy people, "even though temporarily discomforted," would recover quickly from acute exposure to chemical pollution "without residual damage." It was "unlikely" that air pollution

[33] Manufacturing Chemists' Association, Minutes, Environmental Health Council, "Chart of Proposed Organization," v, vi, attached to MCA, "Recommendations of the Ad-Hoc Planning Committee on Environmental Health" draft, August 13, 1963.

[34] James Sterner, Chair, Environmental Health Advisory Committee, "Report to the Board of Directors of the Manufacturing Chemists' Association, Inc.," March 14, 1967, MCA Papers.

was "a sole or principal cause of any disease entity," and that at worst, particularly among the elderly, it could accelerate the death of those previously ill. The industry conceded no clear health risk from long-term exposure, however, no relationship between air pollution and allergic asthma, and no clear relationship in the United States between air pollution and bronchitis, despite the evidence accumulating from studies of major cities like Los Angeles.

The federal bureaucracy by 1969 included more than eighty agencies dealing with environmental problems like air and water pollution. Congress passed the Environmental Policy Act (NEPA) that year and created the Council on Environmental Quality to provide an "exhaustive study" of the impact on the environment of any proposed federal program. [35] Appointed by President Richard Nixon and chaired by Roy Ash, former CEO of Litton Industries, the President's Advisory Council on Executive Organization recommended in the spring of 1970 that an Environmental Protection Agency (EPA) be established as well, to be "an independent body concerned with pollution abatement and with the jurisdiction of all monitoring, research, standard setting and enforcement." [36] Nixon formally proposed the EPA as part of a reorganization plan in early July of that year, effectively outflanking the Democrats, who had staked out the environment as one of their primary issues.

The need for the EPA was confirmed in January 1970 when the nation learned of an enormous oil spill off the coast of Santa Barbara, California. On the evening news, millions of viewers saw dead seals washing up on shore, dead fish covering the beach, and huge numbers of birds covered in oil struggling in the water. [37] The first Earth Day demonstrations took place all around the country three months later.[38] That same month the EPA was established as a cabinet-

[35] J. Brooks Flippen, *Nixon and the Environment* (Albuquerque: University of New Mexico Press, 2000), 46.
[36] Flippen, *Nixon and the Environment*, 85.
[37] Flippen, *Nixon and the Environment*, 25.
[38] George Best to Environmental Health Committee, January 20, 1970, MCA Papers.

level agency. [39] Thus, in the short span of a decade the chemical industry, the leading symbol of the nation's technological and industrial progress, became the subject of considerable suspicion. Americans ranked environmental pollution near the bottom of the ten most important problems facing the nation in 1965. By 1970 pollution was the second most pressing issue for Americans, ranking just below crime reduction in public opinion polls.[40]

The chemical industry was also connected, in the eyes of the public, to the "military-industrial complex" by the late 1960s, and the divisive controversies of the war in Vietnam. When Dow Chemical Company created herbicides to defoliate forests that were believed to hide North Vietnamese and National Liberation Front troops and produced napalm as a weapon to use against civilian populations, student protests erupted on college campuses across the country. They called out the complicity of the chemical industry in "ecocide" in Southeast Asia and carried signs that declared "Dow = Death." [41] More broadly, the technologies that appeared to be at the core of the prosperity of the 1960s, and their use against peoples on the other side of the world, ironically made Americans less naïve about the deleterious impact of modern industrial and technological progress.[42] Suspicion about the impact of consumerism and chemicals on health and the environment was fueled by the growing skepticism about corporate America's involvement in the military-industrial complex.

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[39] See David Vogel, *Fluctuating Fortunes: The Political Power of Business in America* (New York: Basic Books, 1989), 69.

[40] Riley E. Dunlap, "Trends in Public Opinion Toward Environmental Issues: 1965–1990," in *American Environmentalism: The U.S. Environmental Movement, 1970–1990*, ed. Riley E. Dunlap and Angela G. Mertig (Philadelphia: Taylor and Francis, 1992), 92.

[41] Robert Gottlieb, *Forcing the Spring: The Transformation of the American Environmental Movement* (Washington, DC: Island Press, 1993), 96.

[42] In fact, David Vogel argues that the strong "performance of the economy" was critical to the "upsurge of citizen activism during the late 1960s and early 1970s." See Vogel, *Fluctuating Fortunes*, 96.

The 1960s saw the beginnings of a trend toward greater federal involvement in environmental protection. At the same time, consumer and labor activists united to push for the passage of two significant pieces of legislation. The first strict and wide-ranging federal legislation, the Coal Mine Safety and Health Act of 1969, covered the mining industry and included provisions for annual inspections of coal mines, mandatory fines for health and safety violations, and compensation for the miners afflicted with black lung disease. The second piece of significant legislation, the Occupational Safety and Health Act (OSHAct) of 1970, established the National Institute for Occupational Safety and Health (NIOSH) in the Department of Health, Education, and Welfare, and the Occupational Safety and Health Administration (OSHA) in the Labor Department. This was the first time the federal government created an agency like OSHA, with a mandate to protect the health of America's workers. Before this time, particularly during the years just after World War II, an implied labor-management "accord" virtually excluded issues of workers' health and safety from the official agenda in contract negotiations. Hours and wages were on the table, but health and safety concerns were seen as a challenge to the prerogative of management to keep control of the work process. The labor movement of the 1960s was seen as conservative because of its blue-collar disdain for the youth movements of the day, and its identification with the military. Still, there were indications of a more activist strain within the movement. In fact, it was the Vietnam War that placed new production pressures on American industry, resulting in long hours of required overtime, speed-ups, and a consequent increase in industrial accidents, which laid the foundation for greater attention by the rank-and-file to issues of safety and health. [43] The number of strikes reached a decade-long high in 1966

[43] Charles Noble, *Liberalism at Work: The Rise and Fall of OSHA* (Philadelphia: Temple University Press, 1986), 70. Coal miners working with the Black Lung Association and physicians such as Loren Kerr also demanded improvements in working conditions, and compensation was perhaps the most important action around safety and health in the decade.

and 1967, and the increasingly militant labor force, coupled with declining productivity, spelled trouble for business. [44]

When the head of the Oil, Chemical and Atomic Workers International Union (OCAW) local on Long Island, Anthony Mazzocchi, became the legislative director of the union in 1965, he "started getting tons of calls" about a wide range of safety and health issues. Concern was so great at the union's convention in 1967 that the delegates passed a resolution identifying the dangers union members faced in working with chemicals such as benzene.[45] OCAW was unusual though, as it was not only concerned with the safety of its own workers. Rather, it recognized that the community was threatened by the same hazards that affected workers. Mazzocchi noted that "the very pollutants that are contaminating our environment emanate from the workplace." [46]

Unlike the mines, foundries, and steel mills where the dangers from extraordinary heat, odious fumes, dust-laden air, and accidents were fairly obvious, the new chemical plants looked modern and clean. "But," Mazzocchi cautioned, "the industry we work in has a danger that most people are unaware of, and it's insidious."[47] Workers in the chemical industry were exposed not only to traditional and known toxins, but also to thousands of new unregulated, untested chemicals. [48] "Exposing a person to a toxic chemical that shortens his life is tantamount to murder, in my opinion," Mazzocchi said.[49]

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[44] Noble, *Liberalism at Work*, 70
[45] Interview with Anthony Mazzocchi, January 25, 2001.

[46] Tony Mazzocchi, "Introduction," in *A Collection of Documents from the OCAW Struggle for Worker Health and Safety* (Washington, DC: Alice Hamilton College, 1998).
[47] Tony Mazzocchi, "Foreword," in *Hazards of the Industrial Environment*, proceedings of conference sponsored by District 8 Council, Oil, Chemical and Atomic Workers International Union, Holiday Inn, Kenilworth, NJ, March 29, 1969, 2.
[48] Mazzocchi, "Foreword," 2.
[49] Interview with Tony Mazzocchi, January 26, 2001, New York City

Mazzocchi recognized that the workers had knowledge of the ways their companies were trying to hide the danger to the community. They were the true repositories of information about unhealthful workplace practices as they regularly worked with these dangerous materials. Workers reported "being instructed to permit certain emissions, into the air and into sewers, after dark but not during daylight hours." Management instructed them to curtail dumping activities when inspectors were present or when the media were around. "Workers in some plants tell of being ordered to inject perfumes into exhaust gases going up the stacks so that people in the vicinity cannot smell the gases." [50]

In the middle of the twentieth century, one of the most important labor organizing efforts combined the health concerns of both consumers and workers. Two Chicano agricultural workers in California's Central Valley in the late 1960s and early 1970s, Dolores Huerta and Cesar Chavez, organized the largely migrant farmworkers into one of the most prominent unions in America, the United Farm Workers (UFW). The workers organized a national boycott of lettuce and grapes over the health hazards that the pesticides sprayed on crops posed to both consumers and the workforce, and over the working conditions of the largely Filipino and Mexican field workers. [51]

The threat of chemicals to the general public had been firmly established in the public mind by the mid-1960s. Lead paint poisoning in children from low-income Hispanic and African-American families living in poorly maintained tenement housing had become a symbol of the harm being done. The toxic lead, sulfur, and carbon monoxide of automobile exhaust was

[50] Ray Davidson, *Peril on the Job: A Study of Hazards in the Chemical Industries* (Washington, DC: Public Affairs Press, 1970), 184–185.
[51] See Laura Pulido, *Environmentalism and Economic Justice: Two Chicano Struggles in the Southwest* (Tuscon: University of Arizona Press, 1996), especially chap. 3.

now understood to be an important component of urban smog, which affected children in crowded neighborhoods where cars stalled in traffic released this poison stew into the air. Once symbols of economic progress, smokestacks from oil, chemical, and heavy industries were now more likely viewed as signifiers of the excesses of the new industrial order. Pesticides were not viewed widely as a great advance but as a potential cause of environmental destruction and cancers affecting both rich and poor, if to varying degrees. Within this context, workers and consumers joined in parallel struggles to take on these industrial threats to human health.

Agriculture had undergone a fundamental reorganization over the course of the twentieth century. Many of the family farms that had formed the basis of rural American life in the nineteenth and early twentieth centuries had been replaced by gigantic industrial farms. In 1949, the Chief of California's Bureau of Adult Health, Herbert Abrams, explained the health effects of this metamorphosis. A new class of pesticides – organophosphates – were being used with increasing frequency, and these extremely toxic chemicals were already shown to cause sickness and even death among farmworkers. [52] Edward R. Murrow's classic 1960 documentary *Harvest of Shame* depicted the horrendous conditions under which East Coast migrant workers toiled virtually their whole lives. Through stirring interviews with white and Black vegetable and fruit harvesters, he documented how a migrant workforce lived completely isolated, without the labor laws and protections workers in other regulated industries were afforded. Their housing lacked indoor toilets and running water, and they were made to sleep in beds crawling with lice, mice, and even rats. The migrant workers, Murrow notes, many of whom had been working with their parents in the fields since the age of eight, had no political power, no means of escaping their poverty, and were among the most exploited people in the country. Working all night long and

[52] Linda Nash, *Inescapable Ecologies: A History of Environment, Disease, and Knowledge* (Berkeley: University of California Press, 2007), 128.

traveling from one field to another in overloaded trucks, they labored for one dollar per day, allowing them to buy their children milk just once a week. The exploitative nature of the relationship between farm owners and their workers is poignantly captured by one line in the documentary: "We no longer own slaves," he remarks, "now we rent them." [53]

It is telling that, despite the film's powerful impact, there was little mention of the hazards these families faced from being in constant contact with agricultural chemicals, day after day, month after month, for years. Although Rachel Carson's book alerted the country as to the hazards of pesticides two years after *Harvest of Shame* aired, it was not until the late 1960s that the sixteen thousand pesticide chemicals registered in California, to be used by farmworkers or near them, became a national concern, largely because of the efforts of the California workers themselves. [54]

The United Farm Workers union was mostly organizing Filipino and Mexican workers in the mid to late 1960s, whose demands included that the unsanitary working and living conditions that existed in their fields and communities cease to be ignored. Then in 1968, due to heavy spraying of the pesticide parathion onto the fields where they labored, nineteen orange-grove harvesters became gravely ill. By the following year, after several other illnesses emerged, worker safety and health had become the primary demand for their organizing drive, an even higher priority than recognition of their union. According to historian Linda Nash, it was through these workers' organizing efforts that pesticide poisoning came to "symbolize the ways in which the modern environment could permeate the body."[55] A UFW pamphlet stated that

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[53] CBS News, Edward R. Murrow, narrator, *Harvest of Shame*, documentary, 1960, Youtube.com/results?search_query=harvest+of +shame, accessed February 20, 2023.
[54] Linda Nash, "The Fruits of Ill-Health: Pesticides and Workers' Bodies in Post-World War II California," *Osiris*, 2nd series, 19 (2004): 203–219. We thank Erik Wallenberg for this and other references to the farmworkers' struggle.
[55] Nash, *Inescapable Ecologies*, 164, 166, 167

"motivated by profit [growers] continued to subject our people to systematic poisoning." [56] However, like Mazzocchi and the chemical workers, the UFW was clear that "the polluted agricultural landscape posed risks not only to farmworkers but also to everyone who passed through it or consumed its products." Part of the UFW organizing strategy was to launch a boycott of grapes and lettuce to alert consumers to the threat of pesticides and engage consumers in the labor struggle. The result, Nash notes, was that "farmworkers and environmentalists now wielded disease to demand the reorganization of the local environment and the larger society."[57] In 1969, years before California or the U.S. government provided worker protections, the union signed a contract with one grower banning the use of dieldrin and DDT, among other pesticides covering the farms in Delano and its surrounding areas.[58] The next year, the UFW signed contracts with one hundred fifty grape planters, covering thirty thousand grape harvesters which, as environmental historian Chad Montrie wrote, gave "workers the power to approve use of organophosphates, refuse dangerous work, and determine reentry periods for workers laboring in sprayed vineyards." [59] Family farms had been replaced by industrialized agriculture as the locus of food production. Just as consumers had come to reassess the chemical industry's role as a force for good in American life, they now saw the fruit orchard, once a symbol of healthy living, replaced by industrialized agriculture "that could produce disease and sometimes even death." [60]

The movement to enact the momentous OSHAct of 1970 came about because of the efforts in the 1960s of the UFW, Mazzocchi and the chemical workers, and other labor activists.

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[56] Quoted in Chad Montrie, *Making a Living: Work and Environment in the United States* (Chapel Hill: University of North Carolina Press, 2008), 124.
[57] Nash, *Inescapable Ecologies*, 164, 166, 167.
[58] Montrie, *Making a Living*
[59] Montrie, *Making a Living*, 125; Erik Wallenberg, "Staging Nature: Environmental Crises in War, Housing, and Labor" (PhD diss., City University of New York, 2023), 355.
[60] Nash, *Inescapable Ecologies*, 164, 166, 167.

It established the right of all workers, including agricultural workers, to a safe and healthful workplace. The majority of agricultural workers were Black and Latino and had not been covered under the Social Security Act. The obligation of the federal government to ensure the health and safety of workers through regulation, inspection, and safety standards was also enshrined by the OSHAct. It guaranteed that information about the substances workers encountered on the job, and the possible harm resulting from this exposure, previously held as proprietary trade secrets, would be accessible. The act mandated that OSHA "set the standard which most adequately assures, to the extent feasible, on the basis of best available evidence, that no employee will suffer material impairment of health or functional capacity even if such employee has regular exposure to the hazard dealt with by such standard for the period of his working life." [61]

The passage of EPAct and OSHAct, and Richard Nixon's somewhat surprising signing of them into law, are key moments in the industrial history of the country. They established the federal government's authority to intervene directly in the control of the production process that was traditionally the purview of private industry. Prior to these pieces of legislation, standards for exposure to workplace toxins, and waste product disposal through chimneys, hazardous waste dumps, or release into rivers and streams were mostly established by either voluntary or industry-friendly groups like the American Conference of Governmental Industrial Hygienists, The American National Standards Institute, the Lead Industries Association (representing the lead industry), and the National Paint, Varnish and Lacquer Association (NPVLA) (representing the wider paint industry); by state and local authorities; or by the practices, informal and usually irresponsible, of the corporations and factory managers themselves. Through the new rules for

[61] Noble, *Liberalism at Work*, 93–96. The section referred to is 6B[5].

standard-setting set by OSHA, the government was able to highlight the failures of industry to establish safe workplace standards (many of them decades old) and started revising downward levels of exposure considered to be safe for a variety of toxins, including lead, silica, asbestos, cotton dusts, PCBs, vinyl chloride, and a variety of carcinogens.

Meanwhile, the EPA actively encouraged legislation to protect the nation's water, air, and general environment. It established regulations and standards that had the legal power to control emissions of toxic vehicular and factory exhaust into the atmosphere, and to curb reckless dumping of toxic waste onto the ground and into streams. Early on, the EPA began to enforce the new Clean Air Act by "establishing limits on air pollutants and enforcing them," and soon thereafter, in June 1972, they banned the use of DDT in the whole country.[62]

Individual companies that were found to have dumped waste on public lands or polluted water supplies could get away with small fines, or none at all, in most states. Now, companies began to realize that federal officials were looking over their shoulders and that they could face actual penalties, both political and financial, for their misdeeds.

The legislation establishing the EPA and OSHA was a direct challenge to a swath of companies that had formerly escaped accountability for their actions, even when those actions caused illness and, in some cases, death. Much of U.S. industry up to this point had a virtual monopoly over the research that informed decisions about the control of toxins that went into workers' and consumers' bodies and the environment. Before the 1970s the federal government had relatively little control over what additives and chemicals workers were in contact with or went into products being offered to the American consumer. Even the Food and Drug

[62] Dennis C. Williams, "The Guardian: EPA's Formative Years, 1970–1973," U.S. Environmental Protection Agency, September 1993, https://www.epa.gov/archive/epa/aboutepa/guardian-epas-formative-years-1970-1973.html, accessed July 22, 2023.

Administration was limited in its ability to regulate food additives and pharmaceuticals until 1960.[63]

The EPA and OSHA fundamentally changed the landscape of toxic regulation in the country. They went about their work with an energy and enthusiasm reflective of their corps of relatively young activists. What may at first have seemed to be distant, abstract threats to the autonomy of industry were suddenly palpable and real. OSHA addressed long-standing dangers like silica and asbestos, along with newer chemical hazards like vinyl chloride.

This legislation represented a broad shift in American society, one that questioned fundamental beliefs about the integrity of the industrial sector of the U.S. economy. Additionally, specific industries impacted by the new regulatory environment found their primacy fundamentally threatened by a wide cross-section of society that no longer trusted them. A brief review of some of the substances identified by OSHA for early regulation will demonstrate the increasing sophistication of American industry's efforts to confound government regulation. These industries, particularly the large manufacturers of products and chemicals such as asbestos, silica, polychlorinated biphenyls (PCB), vinyl chloride, and lead, challenged not only the necessity for regulation but also the science behind those regulations.

The Science of Silica

Silica was long identified as a cause of silicosis, the severe fibrosis of the lungs, and is perhaps the historical mother of dust-caused diseases. It disabled and killed thousands of workers in foundries, granite cutting, potteries, construction, hard-rock mining, glassblowing,

[63] The Miller Pesticide Act of 1954 limited the amount of pesticide residue that could remain on food crops and in 1958 the Delaney Amendments to the Food and Drug Act banned the use of carcinogenic materials such as certain plastics used in food wrappings.

and scores of other processes where sand, granite, and other silica-bearing rock products were used in far-flung corners of the country.[64]

Silicosis is one of the oldest industrial diseases. First identified as an epidemic in the granite-cutting sheds of Vermont in the early twentieth century, by the 1930s it was considered "the king of occupational diseases" by medical clinicians, insurance companies, workers, and the government, threatening over 500,000 workers in America during the throes of the Great Depression. Silica was among the first hazards to be addressed when the Occupational Safety and Health Act of 1970 established NIOSH and OSHA. In 1972, OSHA issued a silica standard.

NIOSH recommended a new silica standard in 1974 in the face of massive opposition by the industries that regularly used silica as an abrasive for cleaning pipes, oil storage tanks, and other equipment in Oklahoma and Texas oil fields, polishing metal castings produced in Midwestern foundries, and removing paint and rust from the cables of bridges, the hulls of ships and old paint from bridges throughout the country.

These industries responded immediately, and overwhelmingly. Old-line industry associations like Pittsburgh's Industrial Health Foundation initially argued that no standard should be issued due to uncertainty about the current standards' effectiveness and that lowering the exposure limit was premature without better epidemiology.[65]

Industry soon created a brand-new organization, cynically named the *Silica Safety Association*, which claimed publicly to be organized "to insure the health and safety in the workplace" but which was focused privately, as one of its leaders confirmed, on "the continued use of sand in abrasive blasting operations." The SSA's true purpose was to halt the attempt of

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[64] For background on silica and silicosis see, David Rosner and Gerald Markowitz, Deadly Dust: Silicosis and the On-going Struggle to Protect Workers' Health (Ann Arbor: University of Michigan Press, 2006).

[65] David Rosner and Gerald Markowitz, *Deadly Dust: Silicosis ad the On-Going Struggle to Protect Workers' Health*, (Ann Arbor: University of Michigan Press, 2006, Chapter VII.

the government to regulate its signature product: "This NIOSH Proposal," the SSA claimed in early 1975, "can be whipped if we all pull together." [66] Which they did. Over the next four years, the SSA lobbied Congress, NIOSH, OSHA, and other federal agencies, to combat the scientific reports of the perils of the use of silica, and to delay and defeat the efforts of OSHA, under its esteemed administrator Eula Bingham, to enact the proposals of NIOSH.

The SSA's leadership, by 1980, had claimed credit for "delaying and diluting OSHA's regulations." Ronald Reagan's election to the presidency was a boon for the Silica Safety Association's efforts to defeat NIOSH's recommendations. Reagan made "regulatory relief" a cornerstone of his administration and he promised an end to the "burden of onerous government regulation." He replaced Eula Bingham at OSHA with Thorne Auchter who, in the first year of his administration, abandoned over one hundred projects, and weakened or recalled eight standards. The SSA claimed credit for delaying and forestalling the adoption of proposals in 1981: "To date, the efforts of SSA have been the major influence in the continuation of sandblasting in the states." [67] By 1983 the SSA took credit for saving its members "anywhere between $150 to $300 [for] every sandblaster you have had working for you each year." Companies were saving money "by not having sandblasters and others working in the area of Abrasive Blasting medically examined, and" what they deemed "other unnecessary procedures." The SSA declared victory that same year: "Federal regulations have been far between; so as we say about sleeping dogs ---."[68] This "safety" organization closed its offices and put its records in storage within six months. New research since the 1970s showed that silica exposure at the current limit increased the risk of silicosis as well as lung cancer, indicating the extreme

[66] Gerald Markowitz and David Rosner, "The Limits of Thresholds: Silica and the Politics of Science, 1935 to 1990," American Journal of Public Health, 85(1995), pp.253-262.
[67] B.C. Wright, "Silica Safety Update – History – Current Endeavors – Future Plans," Mayb26, 1981, SSA Papers.
[68] Silica Safety Association Newsletter, February 22, 1982, Silica Safety Association MSS.

weakness of the current standard. Revision of the silica standard would not happen until the Obama administration of the next century when OSHA, under administrator David Michaels, was able to finally pass a lower exposure limit.

The Case of Asbestos

Along with silica, asbestos was one of the oldest identified industrial toxins. Asbestos was among the first substances that federal agencies sought to regulate because it had garnered so much attention in the prior decade both in the medical press from Paul Brodeur's *New Yorker* article, and other reports in the popular press. [69] By the 1960s it was shown to cause three horrifying diseases: mesothelioma, an extremely rare cancer of the lung linings shown to be linked to asbestos by 1960; lung cancer, clearly linked to exposure to asbestos by the 1950s; and asbestosis in the 1920s. [70] Asbestos-related disease was no longer just an occupational hazard. The households of workers, including children, were exposed to asbestos brought home on clothing and were documented as having developed mesothelioma.

Asbestos was broadly distributed throughout the American landscape by the middle of the twentieth century despite the nearly century-long recognition of its deleterious impact on workers' health. Literally millions of pounds of this dangerous material that wrecked workers' lungs were in the homes of millions of Americans who used asbestos products in their caulking, shingles, wall boards, roofing materials, and pipe covering, as well as millions of truck and car clutches, brakes, and insulation. Asbestos had the focused attention of thousands of news

[69] Paul Brodeur, "The Magic Mineral," *New Yorker*, October 12, 1968, 117–165. In 1971, OSHA lowered the "permissible exposure limit," or PEL (the average exposure of a workers over an eight-hour day), substantially and lowered it further the next year.
[70] Paul Brodeur, "The Magic Mineral," *New Yorker*, October 12, 1968, 117–165. In 1971, OSHA lowered the "permissible exposure limit," or PEL (the average exposure of a workers over an eight-hour day), substantially and lowered it further the next year.

reports and articles by the time OSHA and NIOSH were organized in 1970.[71] Because asbestos was so treacherous and the literature so extensive, OSHA's first action in 1971 was enacting an "Emergency Standard" for asbestos [72]

Groups such as the Cosmetics, Toiletry and Fragrance Association (CTFA), representing the manufacturers of many talcum powder products found in body deodorants, baby powders, and facial powders, and the Friction Materials Standards Institute (FMSI), a trade association of brake and clutch manufacturers, saw themselves as targets of attack by the government. Industries invested in profiting from asbestos in their products reacted swiftly. The Asbestos Information Association (AIA) was a new trade association that formed as a direct response to OSHA in late 1970 as an informational and promotional service, but it shortly became an advocacy group to lobby against the efforts of the government to regulate the use of asbestos. Matthew Swetonic, a graduate of Columbia University's journalism school, had worked in the publicity department of the giant Johns Manville asbestos company before becoming the new AIA's executive secretary. In 1973 he explained to members of the Asbestos Textile Institute: "In our original concept the Association would limit its activities to providing accurate, unbiased information on asbestos and health to the press, the public and to interested politicians and other government officials. . . . [But] *fortunately—and properly—the Association has had the wisdom to alter its original limited concept of its proper functions, and now endeavors to assume*

[71] See, for example, the extensive literature on the history of asbestos, including David Rosner, Gerald Markowitz, and Merlin Chowkwanyun, " 'Nondetected': The Politics of Measurement of Asbestos in Talc, 1971–1976," *American Journal of Public Health* 109, no. 7 (July 2019): 969–974; David Rosner and Gerald Markowitz, " 'Unleashed on an Unsuspecting World': The Asbestos Information Association and Its Role in Perpetuating a National Epidemic," *American Journal of Public Health* 106, no. 5 (May 2016): 834–840; and Barry Castleman, *Asbestos: Medical and Legal Aspects*, 5th ed. (Boston: Aspen, 2004).
[72] U.S. Department of Labor, Occupational Safety and Health Administration, "Occupational Exposure to Asbestos," August 10, 1994, https://www.osha.gov/laws-regs/federalregister/1994-08-10, accessed December 24, 2022.

whatever activities and responsibilities it deems necessary to protect the interests of the asbestos manufacturing industry in the United States vis-à-vis asbestos-health [emphasis added]."[73]

Trade organizations' initial responses to the threat of regulatory action were defensive and fairly disorganized—sometimes organizing attacks on the scientists who delivered bad news about their products' safety; sometimes attempting cooperation with OSHA while lobbying for industry-friendly standards; sometimes challenging the science that identified asbestos fibers in their products; and sometimes they simply ignored the agencies, summarily flouting and dismissing their authority. Then, the AIA launched efforts to stifle the young agencies' efforts to regulate silica.

Swetonic depicted the asbestos industry as the "victim" of federal regulation. In a speech to the Asbestos Textile Institute, he began, "I am sure that many of you have asked yourselves . . . why has the asbestos industry seemingly been singled out as the prime target for so many assaults by government, labor, the press, certain segments of the medical profession, and by various environmental and consumer activist groups?" "Why us? Can asbestos really be all that bad? Are the products we produce truly going to kill millions of Americans. . . . Or is there some sort of nefarious conspiracy afoot to destroy the asbestos industry?" [74] His answer was plain: from the perspective of industry, they needed to fight back against this egregious victimization. Industry was undoubtedly successful in scaling regulations back, but new worker protection and pollution controls did substantially add to industry costs. Some industries like

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[73] Matthew Swetonic, "Presentation," Asbestos Textile Institute, June 7, 1973 Available at: at: https://www.toxicdocs.org/d/4LwXVawbaOOOvNO24mgRZ7Bx?lightbox=1, accessed: March 25, 2024. For extended discussions of the role of Hill & Knowlton in developing strategies for toxic industries, see Allan Brandt, *The Cigarette Century: The Rise, Fall, and Deadly Persistence of the Product That Defined America* (New York: Basic Books, 2007); and Robert Proctor, *Golden Holocaust: The Origins of the Cigarette Catastrophe and the Case for Abolition* (Berkeley: University of California Press, 2011).

[74] M. Swetonic, "Presentation, Asbestos Textile Institute," typescript, June 7, 1973, https://www.toxicdocs.org/d/rpow6N87j9jBLvzJpNpoqDzpV?lightbox=1, accessed January 28, 2023.

asbestos, while not completely dead, had their markets significantly restricted by lawsuits and regulations. Others, like Altria, formerly Phillip Morris, have coopted arguments critiquing their own ends and claim to have moved "beyond smoking," selling themselves as a "harm reduction company." [75]

The Friction Materials Standards Institute (FMSI), a trade association representing the brake industry, established an Asbestos Study Committee (ASC) almost immediately after the creation of OSHA, to focus on the possible impact on clutch and brake manufacturers of OSHA regulations. ASC worked with the Asbestos Information Association to forestall any drastic regulation. [76] One of the ASC's first acts was to meet with OSHA officials who had, in 1971, issued an emergency PEL (Permissible Exposure Limit) of 12 fibers per cubic centimeter, and who issued a permanent standard to further reduce the PEL to 5 fibers per cubic centimeter a year later, with an even greater reduction set to take effect in 1976 to 2 fibers per cubic centimeter.[77]

The concern over asbestos in brakes dates back to the early 1930s, when E. R. A. Merewether identified the dust produced by "the sawing, grinding and turning in the dry state of articles composed wholly or partly of asbestos such as motor car brake and clutch linings" as a cause of asbestosis when inhaled, the fibrotic condition that slowly strangles the lungs of the afflicted worker.[78] Merewether's observation early on that a material containing any asbestos could prove hazardous was confirmed in the immediate postwar period when officials noted that

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[75] See Altria Group, "Reduce the Harm of Tobacco Products," marketing material, https://www.altria.com/en/moving-beyond-smoking/reduce-the-harm-of-tobacco-products, accessed November 15, 2023

[76] Friction Materials Standards Institute (FMSI), *Bulletin No. 406*, "Asbestos Study Committee," ca. 1975. All of the FMSI documents were attained through discovery proceeding in a variety of asbestos lawsuits, in some of which we participated, and we are making all of them available at https://www.toxicdocs.org.

[77] FMSI, Asbestos Study Committee, "Minutes," February 10, 1972.

[78] [E. R. A. Merewether], "Memorandum on the Industrial Diseases of Silicosis and Asbestosis," London, His Majesty's Stationary Office, 1932, p.12, https://www.toxicdocs.org.

"asbestos has been incorporated into … protective clothing, brake linings, cements, …and other forms of insulation" and that contact with asbestos dust caused by "the breakdown of the native mineral" was also associated with lung cancer.[79]

The ASC received a report that Arthur Rohl and his colleagues at the Mount Sinai School of Medicine had presented a paper at an American Industrial Hygiene Association meeting, at the same time that the permanent standard was published in the Federal Register in 1972. The paper, according to the ASC, revealed that "the dust concentrations during the blowing off of brakes are in excess of the five fibers per cc [cubic centimeter] allowance." The ASC members acknowledged that exposure to asbestos dust for workers installing and replacing brakes was possible, if not probable. [80]

For the ASC this raised questions about whether, under the new OSHA regulations, manufacturers had a duty to warn workers of potential hazards they faced. [81] Thus they developed a new justification for not notifying workers: they announced publicly that when "locked in" to lacquers, plastics, fabrics, or other finished products, asbestos was not dangerous as it would not be released into the air.[82] The committee members acknowledged in private,

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[79] "Wartime Operations Emphasize Industrial Hygiene Problems of Asbestos Industry," *Illinois Labor Bulletin* 3 (1943): 10–11. See also V. J. Castrop, "Fume and Dust Exposure," *National Safety News* 57 (February 1948): 20–21, 52, 73–79; H. Wyers, "Asbestosis," *Postgraduate Medical Journal* (December 1949): 631–638; "Asbestosis and Cancer of the Lung," *Journal of the American Medical Association* 140 (August 13, 1949):1219–1220; Richard Doll, "Mortality From Lung Cancer in Asbestos Workers," *British Journal of Industrial Medicine* 12 (1955): 81–86; "Hygienic Guide Series," *American Industrial Hygiene Association Journal* 19 (1958):162.

[80] FMSI, Asbestos Study Committee, "Minutes," August 17, 1972.

[81] Title 29, Labor, Chapter XVII— Occupational Safety and Health Administration, Department of Labor, Part 1910— Occupational Safety and Health Standards, "Standard for Exposure to Asbestos Dust," *Federal Register* 37 (1972): 11321: "Caution Labels shall be affixed to all raw materials, mixtures, scrap, waste, debris, and other products containing asbestos fibers or to their containers, except that no label is required where asbestos fibers have been modified by a bonding agent, coating, binder, or other material so that during any reasonably foreseeable use, handling, storage, disposal, processing, or transportation, no airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section will be released."

[82] Title 29, Labor, Chapter XVII— Occupational Safety and Health Administration, Department of Labor, Part 1910— Occupational Safety and Health Standards, "Standard for Exposure to Asbestos Dust," *Federal Register* 37 (1972): 11319: "Employers in general strongly contend that finished products that effectively entrap asbestos fibers, so that these would not be released in the normal use of the products, should not be required to be labelled."

however, there existed inherent danger in "handling [by employees] of the products with supposedly locked-in asbestos during … drilling, grinding, inspection and boxing." There was also the further potential release of asbestos through "the handling of the brake lining or clutch facing by the customer" away from the shop floor. One ASC member proposed that "a notification be put in boxes in brake linings or clutch facings," but this idea was promptly rejected when another member objected, saying "he felt it was another 'red flag' that would bring more harm to the industry than the alleged good that would come from enclosing such notices." [83]

Despite reassurances to the public that "locked-in" asbestos was safe, the executive director of the FMSI, E. W. Drislane, wrote the ASC concerning an internal survey that exposed "the problem [that] in many cases subsequent operations will be performed—cutting, grooving, drilling and grinding [and that] these subsequent operations can produce concentrations of asbestos fibers in excess of the current exposure limits."[84] "Most members of the Committee" viewed the OSHA standard as "exceeded in many areas such as inspection, drilling, and grinding where there is not adequate dust collection machinery."[85]

"Ike" , chair of the ASC and an engineer with the Raybestos-Manhattan Corporation, gave a major address in mid-1973 to the whole membership acknowledging that he knew "of no way any of us can be absolutely sure that his friction products, regardless of whether they are sold as original equipment or on the replacement market, …[would expose] workers or bystanders to airborne asbestos fibre." He was "appalled to learn … of instances where this problem had occurred." [86]

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[83] FMSI, Asbestos Study Committee, "Minutes," August 17, 1972.
[84] E. W. Drislane to Asbestos Study Committee, "Interpretation of OSHA Labelling Requirements," November 6, 1972.
[85] FMSI, Asbestos Study Committee, "Minutes," February 16, 1973.
[86] FMSI, Annual Meeting, "Minutes," June 27–28, 1973.

Further evidence, which the ASC knew about, of the possible threats to mechanics, including cancer, was provided by the Rohl paper on garages in New York City. The ASC granted that "some of the housekeeping conditions in these shops [were] deplorable." They also said that New York conditions were "perhaps no worse than in other shops throughout the country."[87]

The FMSI had learned by the mid-1970s that international and national experts, NIOSH, the International Agency for Research on Cancer, the International Labor Organization, and other researchers, concurred that the PEL was not relevant to the question of cancer. Additionally, the leading asbestos researcher and a major figure in industrial medicine, Irving Selikoff, echoing this, wrote that the "only safe concentration is zero fiber per cc." [88]

As the date approached in April 1975 for the proposed PEL reduction to 2 fibers per cubic centimeter, the FMSI confronted a dilemma, as they faced mounting pressure to concede that there was no level of exposure below which workers would be safe from cancers caused by asbestos. The push was coming from the International Labor Organization and NIOSH, among others; Selikoff anticipated an "epidemic of asbestos related death and disease in years to come." The growing consensus that "no known dose level [of asbestos exposure was] 'safe'" distressed the FMSI Board of Directors. Moreover, Selikoff and his colleagues were "actively promoting" the idea that the danger was "associated with asbestos emissions"—to mechanics, specifically—"from brake lining wear and from brake service operations."[89]

Pressure increased further after NIOSH called a meeting in Washington of union representatives, researchers, the major asbestos companies, a trade association representative,

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[87] FMSI, Asbestos Study Committee, "Minutes," June 14, 1974.
[88] FMSI Board of Directors, "Minutes," June 25, 1974.
[89] FMSI, Board of Directors, "Minutes," June 17, 1975; "Asbestos Study Committee Report," June 1975

and an automobile company in July of 1975.[90] The medical literature, they discovered, "revealed at least four cases of these rare tumors [mesotheliomas] in persons who were employed in jobs involving automobile braking servicing."[91] The industry also learned from a separate article that "during brake-lining maintenance and repair, workmen in garages, service stations and brake repair shops are exposed to asbestos and thus may be subject to serious cancer risk. Others, at some distance from the repair work, are perhaps subject to the same hazard."[92]

A direct comparison between the warnings recommended for auto repair shops and gas stations by the AIA and FMSI, and those of the government, reveals the influence of the asbestos industry. In 1976 NIOSH proposed signage at the work entrances to these spaces that featured the specific warning: "Asbestos; Dust Hazard; Avoid Breathing Dust; Wear Assigned Protective Equipment; Do Not Remain In Area Unless your Work Requires it; Breathing Asbestos Dust May Cause Asbestos and Cancer."[93] The AIA and FMSI used similar language, but with an essential variation: they omitted the word "cancer." Rather, they opted to use OSHA's words from the 1972 standard: "Breathing Asbestos Dust May be Hazardous to Your Health." [94] Consequent to the AIA and FMSI's opposition, they presented the danger to workers as less

[90] Department of Health, Education and Welfare, CDC, NIOSH, "Minutes of Occupational Exposures to Asbestos Dust From Brake Linings Meeting," July 21, 1973.
[91] Department of Health, Education and Welfare, CDC, NIOSH, "Minutes of Occupational Exposures to Asbestos Dust From Brake Linings Meeting," July 21, 1973. See also J. W. Lloyd, NIOSH, to "Dear Colleague," "Current Intelligence Bulleting 5: Asbestos Exposure During Servicing of Motor Vehicle Brake and Clutch Assemblies," DHHS (NIOSH), Publication No. 78-127, August 8, 1975 (in FMSI file). At the meeting, Dr George Wright, representing the Johns Manville Corporation, "emphasized that manufacturers have a responsibility to ascertain what happens to their products after being sold to others." He was not surprised about "the [high] fiber counts reported" and expressed the belief that one might subsequently encounter the full spectrum of asbestos- related disease among grinders.
[92] Arthur N. Rohl, "Asbestos Exposure During Brake Lining Maintenance Repair," ca. January 1976, enclosed in Selikoff to Drislane, January 14, 1976. Rohl says in a handwritten note, "Dr. Selikoff has asked me to send you the results of our asbestos fiber counts during brake repair work." (This reference is to the early draft of paper published in mid-1976).
[93] NIOSH, "Recommended (Interim) Procedures for Asbestos Brake and Clutch Servicing," enclosed in FMSI, Bulletin No. 581, October 12, 1976.
[94] Markowitz and Rosner, "Unleashed Upon an Unsuspecting World," p. 837.

important by excluding cancer from their warnings. As a result, they trivialized and denigrated the findings of Irving Selikoff, NIOSH, and many other scientists' who cautioned that laboring with and near asbestos products put workers' lives at risk.

A somewhat different process unfolded in regard to the danger of talcum powder containing asbestos. In 1968, twenty-two talcum products were analyzed by Louis Cralley and his associates, who found all of them to have "an appreciable fiber content, ranging from 8 to 30%.... The fibrous material was predominantly talc but probably contained minor amounts of tremolite, anthophyllite and chrysotile as these are often present in fibrous talc mineral deposits."[95]

Given the increasing suspicion that asbestos was carcinogenic even in minuscule amounts, in August 1971 the FDA called a broad range of scientists and representatives from cosmetics manufacturers to Washington to "discuss in detail analytical methods for the determination of minor amounts of 'asbestos like' materials in talc with particular reference to cosmetic grade talcs," or, as one CTFA member put it, "the asbestos in talc problem." Several parties attended the meeting: government officials from the Bureau of Mines, the US Geological Survey, the FDA, and NIOSH; talc manufacturers, including Pfizer and Johnson & Johnson; representatives from the Consumers Union and John Manville; and scientists and physicians like Seymour Lewin of New York University, and Irving Selifoff and Arthur Langer of Mt. Sinai. [96]

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[95] L. J. Cralley, M. M. Key, D. H. Groth, W. S. Lainhart, and R. M. Ligo, "Fibrous and Mineral Content of Cosmetic Talcum Products," *American Industrial Hygiene Association Journal* 29 (1968): 350–354, quote on p. 353.

[96] "Asbestos in Talc Methodology Conference at FDA, Washington, DC," Pfizer Memo on [August 3] Meeting, August 10, 1971, https://cdn.toxicdocs.org/ Rj/RjqZD73bLJ2LRDzpaZeKexZb7/RjqZD73bLJ2LRDzpaZeKexZb7.pdf (accessed March 15, 2019); [Johns Manville] Research and Engineering Center, Memo for File: FDA [Food and Drug Administration] Meeting - Asbestos in Cosmetic Talcs, August 3, 1971—Washington, DC," August 11, 1971, ttps://cdn.toxicdocs.org/GJ/ GJ48dMXmZpZ3qj8Mpg3v7xY7/GJ48dMXmZpZ3qj8Mpg3v7xY7.pdf (accessed April 3, 2019).

The meeting addressed the developing unease of consumers, researchers, industry, and the FDA over how to assess the perils of asbestos contaminants in their products.

As early as the 1930s there were inklings that asbestos was a poisonous toxin in talc, when several clinical reports emerged showing that talc miners and millers were contracting a form of pneumoconiosis with similar symptoms to asbestosis. For instance, a 1933 study of workers in two mills published by Waldemar Dreessen determined that "[t]he silicate dusts of tremolite talc [i.e., talc mixed with tremolite, one of the six major forms of asbestos] and slate induce a fine, diffuse bilateral fibrosis of the lungs which is definitely demonstrable in the X-ray."[97] Fifteen cases of talc millers and miners with pneumoconiosis were reported by F. W. Porro and his colleagues in 1942.[98] The National Safety Council, a group founded by industry in 1912, traditionally friendly to management and intended to provide companies with information and assistance around continuing safety and health issues in their plants, released a pamphlet in 1963 that read: "Talcosis is usually associated with tremolite talc." They observed that the diseases "[produce] changes in the lungs and symptoms similar to those of asbestosis." [99] By the mid-1960s, occupational health researchers had identified talc miners as having a greater risk of lung cancer. Morris Kleinfeld and his associates conducted research "to ascertain the health hazards associated with exposure to dust in talc mining and milling." Their findings were that "the data on carcinoma of the lung and pleura shows an overall mortality from carcinoma of the lung and pleura to be approximately four times that expected."[100]

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[97] Waldemar C. Dreessen, "Effects of Certain Silicate Dusts on the Lungs," *Journal of Industrial Hygiene* 15 (1933): 66–78, quote on p. 78.
[98] F. W. Porro, J. R. Patton, and A. A. Hobbs, Jr, "Pneumoconiosis in the Talc Industry," *American Journal of Roentgenology and Radium Therapy* 47 (1942): 518.
[99] National Safety Council, "Dusts, Fumes, and Mists in Industry," Data Sheet 531, 1963, p. 7, https://cdn.toxicdocs.org/wq/wqy2qoZBDG0a2bYMGM9GX48KJ/wqy2qoZBDG0a2bYMGM9GX48KJ.pdf (accessed March 15, 2019).
[100] M. Kleinfeld, J. Messite, O. Kooyman, and M. H. Zaki, "Mortality Among Talc Miners and Millers in New York State," *Archives of Environmental Health* 14 (1967): 663–667, quote on p. 665.

Results had started coming in by August 1972 from both within and without NIOSH signaling a problem. NIOSH had conducted independent tests of "nine commercially available baby powders" finding "possible asbestos fiber contamination of commercial baby powders." [101] Seymour Lewin, contracted by the FDA, started reporting his findings of the contamination of talcum powders a month later. A lot was at stake for the consumer, as well as for the industry. In February 1973, The Wall Street Journal published a full summary of Lewin's conclusions, informing its readers that "10% [of the 200 talcum powders tested] contain 2% to 4% asbestos impurities, with a handful running as high as 10% to 20%."[102] Aside from economic worries, the political atmosphere gave both the FDA and the manufacturers cause to fret. Suspicion of big corporations was escalating, with the ire of activists targeting everything from the military to large companies to prominent research universities. Attorney Ralph Nader exemplified advocacy for everyday consumer interests, particularly concerning safety and health, and became the public face of the revived consumer movement thriving from the early 1960s through the 1980s. Nader established himself with a searing investigation of automobiles titled *Unsafe at Any Speed* that shook the entire industry, and sweeping legislative reforms followed. [103] He later led young investigative teams—"Nadar's Raiders"—who wrote detailed critical reports on more targets, including government agencies such as the Department of Veterans Affairs and the Federal Trade Commission.[104] The FDA was not exempt from this muckraking. Public Citizen, an entity

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[101] Memorandum of meeting with FDA, companies, and CTFA [Cosmetic, Toiletry, and Fragrance Association], https://cdn.toxicdocs.org/rr/rr5nNZexD4dQE8wEvyXZj28a/rr5nNZexD4dQE8wEvyXZj28a.pdf (accessed February 24, 2019).
[102] Jonathan Spivak, "FDA Plans to Impose Limits on Asbestos in Certain Cosmetics," *Wall Street Journal*, February 26, 1973, 16.
[103] Ralph Nader, *Unsafe at Any Speed: The Designed-In Dangers of the American Automobile* (New York, NY: Grossman Publishers, 1965); Justin Martin, *Nader: Crusader, Spoiler, Icon* (New York, NY: Perseus/Merloyd Lawrence, 2002).
[104] Edward F. Cox, Robert C. Fellmeth, and John E. Schultz, *"The Nader Report" on the Federal Trade Commission* (New York, NY: R. W. Baron, 1969); Paul Starr (with assistance from James F. Henry and Raymond P. Bonner), *The*

spawned by Nader, established the Health Research Group led by physician Sidney Wolfe, which focused on the safety of pharmaceuticals and approval process transparency, utilizing new legislation like the Freedom of Information Act to access material that had been classified previously.[105]

Some activist groups, most prominently within the women's health movement, focused their scrutiny on the safety of contraception and synthetic hormones [106] Both the FDA and corporations had to confront the new accountability culture: product safety for corporations, and the ability to ensure safety when corporations could not for the FDA. Exchanges on methodology between the FDA and the CTFA took place within this context.

The FDA announced its proposed ruling in the Federal Register in the fall of 1973: "Any drug, drug ingredient, or drug packaging material containing talc that fails to meet the specifications . . . as determined by the method set out . . . shall be deemed to be adulterated in violation of … the Act" and thus such a substance is not "generally recognized as safe." The FDA standard was exacting: they proposed the use of a polarizing microscope that could, they believed, accurately ensure "a purity of talc at least 99.9 percent free of amphibole types of asbestos fibers and at least 99.99 percent free of chrysotile asbestos fibers." [107]

Discarded Army: Veterans After Vietnam; The Nader Report on Vietnam Veterans and the Veterans Administration (New York, NY: Charterhouse, 1973).

[105] On Health Research Group, see Ava Alkon, "Late 20th-Century Consumer Advocacy, Pharmaceuticals, and Public Health: Public Citizen's Health Research Group in Historical Perspective," PhD dissertation (New York, NY: Columbia University, 2012); Nancy Tomes, *Remaking the American Patient: How Madison Avenue and Modern Medicine Turned Patients Into Consumers* (Chapel Hill, NC: University of North Carolina Press, 2016), 314–317; Wendy Kline, *Bodies of Knowledge: Sexuality, Reproduction, and Women's Health* (Chicago, IL: University of Chicago Press, 2010), 106–107.

[106] Kline, *Bodies of Knowledge*, 97–126; Vogel, *Is It Safe?* 50–63.

[107] Department of Health, Education, and Welfare, FDA, "Asbestos Particles in Food and Drugs, Notice of Proposed Rulemaking," *Federal Register* 38 (September 28, 1973): 27079-80, https://cdn.toxicdocs.org/R2/R26RZ08ZMoL6YjvN5rNgneVZB/R26RZ08ZMoL6YjvN5rNgneVZB.pdf (accessed February 24, 2019).

The reaction of the industry to the proposed rule was negative and immediate. Just two weeks after the Federal Register announcement, there was an attack on the methodology of the FDA leveled by the CTFA Subcommittee of Scientific Advisory Committee on Asbestos in Talc, calling it "not completely reliable and discriminatory," claiming it was unclear that the practices used truly measured actual asbestos fibers. They suggested that the FDA's methods could be actually detecting nontoxic or nonfibrous substances. Committee members further argued that, even if accurate, the counting process would take an unacceptable amount of time—possibly six hours—for a technician to arrive at a "tentative identification" of the asb estos fiber content. "The tedium effect on the person counting is obvious," insisted the committee. [108]

The round-robin testing revealed "strong inconsistency" between "the different scientists applying the method to the same group of coded talc samples." The CTFA "concluded that the method published in the Federal Register does not provide a truly reliable means for the detection of asbestos in talc." Since the methodology was "tedious and may consume as much as one half day per sample," the "subcommittee urge[d] that the Food and Drug Administration defer finalizing the proposed optical microscopic method and proceed [to a] program which would combine FDA and Industry in a strong effort to develop a truly reliable method." The CTFA subcommittee assessed "that a satisfactory method will take at least six months to a year to develop" if the FDA and industry could work together. [109]

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[108] Minutes, CFTA Subcommittee of S[cientific] A[dvisory] C[ommittee] on Asbestos in Talc, October 11, 1973, https://cdn.toxicdocs.org/2q/2qJmmaLor40O5gyRvVLaLv2O7/2qJmmaLor40O5gyRvVLaLv2O7.pdf (accessed February 24, 2019).

[109] George Sandland, "Report of CFTA Talc Subcommittee on Method to Detect Chrysotile and Tremolite in Talc," December 10, 1973, https://cdn.toxicdocs.org/By/By580NKq569YeJOEo3yvEx8km/By580NKq569YeJOEo3yvEx8km.pdf (accessed February 24, 2019).

This tension over the FDA recommendation between industry and the government had real consequences. The industry objections in March 1975 to the FDA's earlier notice of rulemaking in the National Registry undercut the efforts of the FDA to adopt more stringent standards. "The Food and Drug Administration has . . . examined numerous talc samples of undefined grade in the past two years, using the proposed methodology," the Federal Register pronounced, "and finds that approximately two-thirds of such samples are within these limitations" of 99.99% chrysotile free and 99.9% amphibole free. This implied the possibility that one-third were contained asbestos. "The Commissioner therefore concludes that the proposed limitations would not impose an unreasonable burden on manufacturers of talc if these limitations were adopted." Because industry was objecting, however, "The Commissioner . . . decided to delay any final regulation for talc until an acceptable method for determining the presence of asbestos particles can be developed for this substance. [110]

This was a major win for the industry. It now proceeded to promote its own method, known as J4-1, which defined cosmetic talc in this way: "Cosmetic talc is a white, essentially odorless, fine powder, ground from naturally occurring rock ore, consisting mainly of magnesium silicate . . . with lesser amounts of naturally associated minerals . . . and containing *no detectable* fibrous asbestos minerals [emphasis added]." The J4-1 standard was less rigorous than that of the FDA; it was reliable to only 0.5% as opposed to the methodology of the FDA which claimed accuracy to 0.01%. This meant future talc products could actually contain asbestos below the 0.5% detectable limit. Moreover, by evading precise statements, and instead using vague language in describing the asbestos content of manufacturers' products, the CFTA

[110] "Asbestos-Form Particles in Drugs for Parenteral Injection," *Federal Register* 40, no. 51 (March 14, 1975): 11865-66, https://cdn.toxicdocs.org/By/By4GYmaDEJ4wNRExn4Z1DpBp8/By4GYmaDEJ4wNRExn4Z1DpBp8.pdf (accessed February 25, 2019).

was able to promulgate its own definition of the purity of talc. "After extensive discussions of advantages and disadvantages of listing a 0.5% maximum limit as opposed to 'nondetected' terminology, the Standards Committee voted for the use of . . . 'nondetected.'"[111]

Nonetheless, one industry representative did acknowledge the deception in choosing "nondetected" as the safety designation of cosmetic talc products: Pfizer's H. D. Stanley penned an internal memo in which he disclosed that he "particularly object[ed] to the section . . . that reads – containing no detectable asbestos minerals." He pointed out that a "nondetected" level depended, ironically, on the level of adequacy of the methods used to define and detect it. The use of an insensitive method would sanction manufacturers' claim that asbestos had not been detected, and in doing so would cause "serious breaks in communication between the buyer and the seller," who would be convinced that the product was genuinely free of asbestos.[112]

This highly significant observation got to the heart of the problem faced by the cosmetics industry. Using the wrong methodology, noted Arthur Rohl, a researcher in Irving Selikoff's department at Mt. Sinai School of Medicine, meant that billions of asbestos particles would go undetected. According to Rohl "Even at the lowest level of detection by x-ray diffraction, i.e., 0.25%, there would be about 10^9 fibers/mg. Cosmetic talcum powder, for example, which had been step-scanned and chrysotile not found might contain billions of fibers released during dusting with a half-gram dose." [113] Thus the degree of danger in talc products depended on how

[111] CTFA Standards Committee, Minutes, August 21, 1975, https://cdn.toxicdocs.org/V3/V3pEx8RX2wqVY3BQXJMGqrq08/V3pEx8RX2wqVY3BQXJMGqrq08.pdf (accessed February 25, 2019).
[112] H. D. Stanley to R. E. Norwood, July 27, 1976, Bates no. PFI_KA_00000784, https://cdn.toxicdocs.org/zb/zb02zbxnMgamYQzjoGgY1DMb6/zb02zbxnMgamYQzjoGgY1DMb6.pdf (accessed February 25, 2019).
[113] A. N. Rohl, "Asbestos in Talc," *Environmental Health Perspectives* 9 (1974): 129–132, quote on p. 130.

one calculated the risk. Objections within the industry to the methods that found asbestos in talc were observed and recorded by the researchers themselves.

The J-41 method created by the CTFA was adopted by the industry despite the CTFA's own admission that its methodology was insufficient for the task, and by 1977 the FDA had essentially given up its effort to regulate asbestos in talc. Johnson & Johnson's John Schelz, chair of the CFTA Taskforce on Round Robin Testing of Consumer Talcum Products, found that J4-1 had failed its test for identifying "asbestiform amphibole contaminants" with practicality, accuracy, and reliability in a round-robin test of talc samples. "*These objectives have not yet been achieved* [emphasis in original]," he wrote, suggesting a partial retest. [114] The J4-1 method, one that the industry itself has recognized as not capable of determining low-level pollution, remains the industry standard despite this. The industry methodology was no better at determining low-level exposures than the methodology first proposed by the FDA, and may even be less accurate than the methods they critiqued as overly time-consuming. The debate over the absence or presence of asbestos has continued for half a century, and the implications of this for consumer safety, regulation, and science have motivated symposia, conferences, and scientific papers ever since. This is not, however, merely a scholastic issue. For example, in 1995 the president of the CTFA, Edward Kavanaugh, in response to a petition from the Cancer Prevention Coalition, a citizen advocacy group asking the FDA to label cosmetic talc products as possible carcinogens, reiterated the industry's enduring position. He maintained that such warnings were "not necessary to protect the health of consumers and would unnecessarily alarm consumers

[114] CFTA Task Force on Round Robin Testing of Consumer Talcum Products for Asbestiform Amphibole Minerals, Minutes, May 17, 1977, https://cdn.toxicdocs.org/Mx/MxRLgx1X6b9z7D59NGKKenwV/MxRLgx1X6b9z7D59NGKKenwV.pdf (accessed February 25, 2019).

regarding the use of safe cosmetic products."[115] There was no action taken by the FDA in response to the petition's appeal. The issue of asbestos in talc has been brought back into public focus by the recent lawsuits against various talc manufacturers. The actions and inactions of industry, and their knowledge, or lack thereof, identified half a century ago have consequences that haunt us to this day.

The Case of Vinyl Chloride

In the evolving political, epidemiological, and environmental context of the 1970s, a mounting refrain of voices in the world of professional health began pointing to a breadth of industrial toxins and chemicals—"old" worker perils—as new or neglected threats to the public. Chlorinated hydrocarbons, chemicals containing hydrogen and chlorine atoms connected to a ring of six linked carbon atoms, were among the most significant of this new category of chemicals. Included in this class of chemicals that became gravely concerning in the postwar era were persistent pollutants like polychlorinated biphenyls (PCBs), a wide variety of plastics such as polyvinyl chloride (PVC), and pesticides like DDT. Upon entering the business in the 1940s one Monsanto scientist observed that all chlorinated hydrocarbons were seen as toxic in their use and/or production.[116] Some of these substances, including Lindane, pesticides like DDT, as well as vinyl chloride, despite having been developed years earlier, began entering the environment in huge quantities in the years following World War II.

The industry became aware of a paper presented at the 1970 International Cancer Congress in Houston by Italian researcher Dr. Pierluigi Viola of the Regina Elena Institute for

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[115] E. Kavanaugh, President, CTFA, to Dockets Management Branch, FDA, https://cdn.toxicdocs.org/v8/v87x2KryZog2wV3Byrr3rd5q/v87x2KryZog2wV3Byrr3rd5q.pdf (accessed: January 14, 2019).

[116] Elmer Wheeler, "Interview with Elmer Wheeler on May 12, 1972," MCA Papers, https://www.toxicdocs.org/d/p22BG1L0waJY6xQZMMXdrb0D6?lightbox=1, accessed May 11, 2022.

Cancer Research in Rome on the carcinogenic effects on animals of vinyl chloride exposure. Rats, according to Viola's report, developed tumors of the bones, skin, and lungs when exposed to 30,000 ppm of vinyl chloride monomer gas [117] The MCA's Occupational Health Committee invited Viola to Washington to present a summary of his work in May 1971, within a month of the publication of his findings in the journal *Cancer Research.* [118] Executives were troubled by his conclusions and hoped his findings would be considered inapplicable to humans and other animals exposed to much lower vinyl chloride levels.

The MCA learned a few months later that "further studies [by Viola] on the toxicity of vinyl chloride have confirmed the carcinogenicity of this monomer" even though it "has not been confirmed in the human body."[119] Robert Wheeler of Union Carbine understood that "publishing of Doctor Viola's work in the U.S. could lead to serious problems with regard to the vinyl chloride monomer and resin industry." This link to cancer concerned Wheeler because "the Delaney amendment bans the use of any material in food that can cause cancer" and, more generally, "the present political climate in the U.S. is such that a campaign by Mr. R[alph] Nader and others could force an industrial upheaval via new laws or strict interpretation of pollution and occupational health laws."[120]

Viola finding tumors at 5,000 ppm was a hard pill for the industry to swallow, but reports of research by another Italian scientist in 1972 presented a potential disaster. The economic viability of several vital chemical companies was now dependent on PVC. The production of PVC in the U.S. doubled between 1966 and 1971 from 1.2 billion to 2-4 billion pounds; for

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[117] [Walter D. Harris], Handwritten notes, "Given to R. J. O. [D]?, 5/17/76," MCA Papers.
[118] See P. Viola, A.Bigotti, and A. Caputo, "Uncongenic Response of Rats, Skin, Lungs, and Bones to Vinyl Chloride," *Cancer Research*, 31(May 1971), 516-22.
[119] Pierluigi Viola to Kenneth D. Johnson, (October 29, 1971), MCA Papers.
[120] Robert Wheeler to Dernehl, Eisensenhous, Steele, et. al., Union Carbide, Memorandum, "Manufacturing Chemists Association Occupational Health Committee, VC Conference" (November 23, 1971), MCA Papers.

instance, in the case of B. F. Goodrich, rubber was replaced by the chemical division as the most profitable sector, and half of that division's sales were of PVC. [121]

In late 1972 the American chemical industry received a series of reports from European vinyl manufacturers, who had hired the director of the Bologna Centre for the Prevention and Detection of Tumors and Oncological Research Cesare Maltoni in the wake of the Viola reports to investigate the merit of his findings. The Europeans had been receiving preliminary results of Maltoni's confidential work during the summer of 1972 indicating that rats were getting cancers in sites other than their zymbal gland and at vinyl chloride exposure levels that were lower than in Viola's studies. The European producers almost immediately began enlisting their American counterparts in secrecy agreements intended to prevent any public discussion of this research.[122]

The European chemical companies, according to the Americans, were pointedly insistent on the necessity of a secrecy agreement.[123] The agreement demanded that "the members of our task group as listed on the attached sheet, are the *only* ones entitled to receive information about the European project. In turn, they should feel honor bound to make sure such information remains within their own companies unless and until formal permission has been granted for its release."[124]

Despite the common practice of researchers to possessively guard their findings until they have been published, most accept that they have an ethical obligation to share knowledge about potential harm in cases where human lives are at stake. Additionally, the

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[121] Blackford and Kerr, *B.F. Goodrich*, 321,324.
[122] See Imperial Chemical Industries to MCA (August 16, 1972); George Best to Prospective Sponsirs of Research (September 1,1972); George Best to Lindsell, ICI (September 20, 1972), MCA Papers.
[123] W.A. Knapp to J. C. Fedoruk and A.P. McGuire, Allied Chemical Corporation, Memorandum (November 20, 1972, MCA Papers.
[124] Kenneth Johnson to Technical Task Force on Vinyl Chloride Research, (October 19, 1972), MCA Papers.

demand for confidentiality was coming from vinyl manufacturers, not from scientists. The secrecy did not begin when the experiments began, but only after it became clear that vinyl chloride monomer was carcinogenic at half the accepted TLV. In this case, the secrecy was not intended to protect patents, product information, or even innovative experimental procedures; its only purpose was to avoid a legal and public relations disaster.

At a confidential meeting at MCA headquarters in Washington on November 14, 1972, Maltoni's results were revealed to American producers of VCM and PVC, and members were asked not to take notes. In fact, European representative D. M. Elliot of the British vinyl manufacturer Imperial Chemical Industries (ICI), "insisted that the work tables be swept clear of paper for note taking before he would discuss any- thing regarding the European group's efforts. Such was done." [125] The most unsettling fact Elliot presented was that Maltoni had revealed "the occurrence of primary cancers in both liver and kidneys with one positive at 250 parts per million," half the 500 ppm threshold that ostensibly protected workers from acroosteolytis (AOL)_and other harmful vinyl chloride effects. [126] Company representatives were given a chart in January 1973 showing that liver angiosarcomas were reported at exposures as low as 250 ppm. Maltoni found cancers at very low dosages in a variety of sites, and the MCA did not doubt the accuracy of his data.[127]

The minutes of an MCA "planning group" meeting in December 1971 show that this ad hoc body created a set of "principles" for its research in which protecting the industry took priority over the search for truth. First was "the need to be able to reassure the public that polyvinyl chloride entails no risk to the user." Second, workers needed reassurance

[125] W. Mayo Smith, Air Products and Chemicals (February 6, 1974), MCA Papers.
[126] W. Mayo Smith, Air Products and Chemicals (February 6, 1974), MCA Papers.
[127] "Notes from Meeting of representatives of MCA," ICI. University of Bologna (Maltoni), "Conclusions from European Information" (January 17,1973) MCA Papers.

"that management was concerned for, and diligent in seeking, the information necessary to protect their health." Third, the purpose of the research must be to develop "data useful in defense of the industry against invalid claims for injury for alleged occupational or community exposure." [128]

The industry needed to address its potential liability should its products be proven dangerous in the aftermath of Maltoni's research discoveries. Their actions regarding aerosol propellants are an interesting example. Vinyl chloride monomer was used as an aerosol propellant in many different consumer products, not only in the creation of polyvinyl chloride plastics. Initially used in Japan as an aerosol propellant in 1958, by 1959 VCM was being considered by the Dow Chemical Company for use in spray paints, insecticides, hairsprays, and room deodorizers. Dow estimated its annual market for vinyl chloride monomer in aerosol at approximately 10 million pounds and did not see the current TLV of 500 ppm as a potential problem for them. It became clear ten years later, however, that 500 ppm could present a threat. B. F. Goodrich privately acknowledged that "the people in the cosmetics trade have been concerned about the possible toxicity" of vinyl chloride propellants. Levels of vinyl chloride measured in the air of hair salons indicated that the "average concentration of VCl monomer is 250 ppm by volume," but "in some cases where the duration of spraying is long (3 minutes) the concentration may be as high as 1400 ppm." The terrifying implication of this was that both beauticians and their customers may be "exposed to concentration of VCl monomer equal to or greater than the level in our [polyvinyl chloride plants]." [129]

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[128] MCA, Ad Hoc Planning Group for Vinyl Chloride Research, Minutes of Meeting (December 14, 1971), MCA Papers.
[129] L. B. Crider to W.E. McCormick, Goodrich, Memorandum, "Some New Informaton on the Relative Toxicity of Vinyl Chloride Monomer," (March 24, 1969,), MCA Papers.

Nevertheless, until 1974 vinyl chloride continued to be used as an aerosol propellant. Not until they learned of Maltoni's findings did MCA research coordinators suggest that "serious consideration should be given to withdrawal from this [aerosol] market since value of the product was limited and potential for liability great." [130] One meeting participant succinctly stated the situation: "If vinyl chloride proves to be hazardous to health, a producing company's liability to its employees is limited by various workmen's compensation laws. A company selling vinyl chloride as an aerosol propellant, however, has essentially unlimited liability to the entire U.S. population." [131]

The commitment of the chemical industry to public access to information, and objective science, was put to the test in January 1973 when NIOSH published a "Request for Information" on vinyl chloride's potential hazards in the *Federal Register*. NIOSH needed to obtain information on the potential health threats of vinyl chloride from all quarters, including corporations, scientists, and public health officials, in preparation of a document detailing safe and appropriate VCM exposure levels. [132] This information request put enormous pressure on members of the MCA as they tried to forge a cohesive stance on the health risks of vinyl chloride. NIOSH, as a government agency, was somewhat new, and its mandate to establish "criteria documents" intended to guarantee a safe work environment put safety and health standards previously under the private purview of individual companies and their trade associations into the public sphere.

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[130] W. A. Knapp, Allied Chemical, to W.S. Ferguson, Memorandum, "Vinyl Chloride Monomer," (March 1, 1973), MCA Papers.
[131] R. N. Wheeler, Jr. t Eisenhour et. al., "Confidential," (February 13, 1973) MCA Papers.
[132] Health Services and Mental Health Administration, Occupational Safety and Health, "Request for Iformation on Certain Chemical and Physical Agents, *Federal Register*, (January 30, 1973) 2782.

The industry now faced a sobering dilemma. In order to preserve its influence with the agencies under whose authority it operated, the industry would have to comply with NOISH's request for information, which would mean providing NIOSH with the data that would lead them to recommend standards that were anathema to the interests of the industry. This was the context within which George J. Williams, vice president of Dow, was convinced that the information should be turned over to the government because "it would be extremely damaging to the chemical industry reputation if someone should discover that we have this information and have not disclosed it to the Government."[133] Even the MCA acknowledged, in a detailed letter to all its management contacts, that it had a "moral obligation not to withhold from the Government significant information having occupational and environmental relevance," particularly Maltoni's new findings. The MCA also realized that by taking the initiative, and preemptively sharing information, they could insulate themselves, in part, from the scandal that would result from the data eventually becoming public.[134]

The MCA was also aware, though, that its recent confidentiality agreement with the Europeans prohibited the free exchange of scientific findings with the government, which posed a political and moral predicament. Would American industry be willing to honor what it saw as its moral imperative by revealing to the United States government Maltoni's troubling findings, even if it meant betraying the compact between the American chemical industry and its European cousin? [135] Or would it prevent public health authorities from accessing the information needed to pursue rational public policy by keeping vital information secret?

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[133] G. J. Williams to C. A. Gerstacker, Dow (March 5, 1973), MCA Papers.
[134] George Best, MCA, to John D. Bryan, Conico (March 26, 1973), MCA Papers.
[135] George Best, MCA, to John D. Bryan, Conico (March 26, 1973), MCA Papers.

MCA members settled on a plan in the spring of 1973 that would give the appearance of responding to NIOSH's request for information while maintaining their secrecy agreement with the Europeans. The MCA, rather than waiting for an invitation, planned a meeting with NIOSH administrator Dr. Marcus M. Key, who was tasked with providing state-of-the-art scientific information to OSHA to be used in establishing regulations that would ensure healthy, safe working conditions. [136]

The MCA began preparing for its July meeting with Key and the NIOSH staff in May of 1973. The MCA was under enormous pressure because at the same time, OSHA announced emergency standards for fourteen other possible carcinogens, and the industry had sued to delay their implementation.[137] From the outset, MCA's Task Group on Vinyl Chloride Research and the Vinyl Chloride Research Coordinators recognized that "a significant element for consideration ... was the development of an alternate presentation in the event that the release of European data cannot be negotiated with reasonable dispatch."[138]

MCA lawyers briefed its members "on their responsibilities and obligations under the confidentiality agreements." The "admonishments" from the lawyers were that the American companies "should not volunteer reference to the European project or substantive data derived therefrom," but that they should answer a direct question if asked. [139] Since NIOSH knew nothing of the European experiments, there was little risk that they would be able to form such a question. Furthermore, the MCA Research Group decided that companies should not disclose information about "potential hazards" involving consumer safety

[136] George Best, MCA, to John D. Bryan, Conico (March 26, 1973), MCA Papers.
[137] "Industries' Latest Cancer Scare," *Business Week*, (February, 23, 1974() 100.
[138] MCA, Vinyl Chrloiade Research Corrdinators, Minutes of Meeting (May 21, 1973), MCA Papers.
[139] MCA, Vinyl Chrloiade Research Corrdinators, Minutes of Meeting (May 21, 1973), MCA Papers.

because "at the insistence of UCC (Union Carbide) and Allied (Chemical)" NIOSH references to consumer safety issues, aerosol propellants in particular, had been removed because these were not "a worker-exposure problem except for beauticians and can-fillers."[140] As expressed by Robert Wheeler of Union Carbide, "Hazard to UCC's interests exists if vinyl chloride is declared to be a carcinogen or if vinyl chloride monomer is detected by FDA in foods exposed to vinyl chloride polymers as film, coatings, or gasketing."

MCA representatives were likely most troubled by the fact that legally, their letter "to Company Contacts" acknowledging "a moral obligation" to share Maltoni's findings with NIOSH was a powder keg. The fear was that the letter would be perceived as an indication that the industry intended to deceive the government. The memo, according to Wheeler, "could be construed as evidence of an illegal conspiracy by industry if the information were not made public or at least made available to the government." [141]

The industry's policy to keep Maltoni's studies hidden influenced public statements from the plastics companies and preparations in private for the meeting with NIOSH. Amidst these preparations, the industry magazine *Modern Plastics* published a piece on the looming problems the industry would face from NIOSH's program to establish new criteria for assessing the hazards that various chemicals pose to workers. The article, in a long review of anticipated problems for the industry, stated that vinyl chloride monomer had become the target of new scrutiny because of "recent animal studies conducted in Italy (at an elevated exposure level of 30,000 ppm)" that prompted MCA's study of the "potential

[140] R. N. Wheeler to Eisenhour et. al., (May 31, 1973), MCA Papers.
[141] R. N. Wheeler to Eisenhour et. al., (May 31, 1973), MCA Papers.

hazards" of VCM. The article never mentions Maltoni's discoveries of angiosarcomas in animals at 250 ppm.[142]

Through the spring of 1973, the Americans continued planning amongst themselves with their European counterparts for their presentation to NIOSH on July 17. On the 15th of June, the Europeans met, and "agreed that the MCA would be given permission to reveal to NIOSH data arising from the Bologna study." Italy's vinyl chloride manufacturer Montedison, however, let its fellow continental industrialists know three weeks later that this was unacceptable. The moral qualms of many American vinyl chloride producers went up in smoke when Dr. David P. Duffield of Imperial Chemical Industries came to the United States with the news that the Europeans had opted to keep the data secret.[143]

The Europeans and Americans arrived at a far more pragmatic plan for defending their industry. They would "comply" with NOISH's information request in a perfunctory way to divert attention from the true gravity of what they knew. If pushed by NIOSH, they would "acknowledge Maltoni's data" but note that "Maltoni had done his work only with rats, whereas [future research by] the MCA … calls for mice and hamsters as well." America's chemical industry intended to only provide information to NIOSH from the findings of their own epidemiological and animal studies "in very general terms without leaving any written information." [144] The purpose of the meeting was to ensure the agency would "take no precipitous action now." Moreover, "We should recommend no shift in priority," and "our people [should] get off the topic of animal work as quickly as possible."[145]

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[142] "What's Next from OSHA? Keep and Eye on NIOSH," *Modern Plastics*, (June, 1973),56.
[143] P. Duffield, "Vinyl Chloride Toxicity – Meetings Held at MCA Headquarters, Washington, D.C. and National Institute of Occupational Safety and Health, Rockville, Maryland on 16th and 17th July, 1973 (July 20, 1973), MCA Papers.
[144] Kusnets, Shell, to Files, "Private and Confidential," (July 17,1973), MCA Papers.
[145] Kusnets, Shell, to Files, "Private and Confidential," (July 17,1973), MCA Papers.

The meeting happened on July 17th at 1 pm in the Rockville, Maryland offices of NIOSH. Five government scientists sat across the table from five industry representatives. Dr. William E. Rinehart of Ethyl, Robert N. Wheeler of Union Carbide, Dr. Gerald K. Rowe of Dow, and George E. Best of the MCA represented the U.S. industry; Europe was represented by Dr. David P Duffield of ICI (Dr. Tiziano Garlanda of Montedison was not able to attend); NIOSH director Marcus M. Key and members of his staff Dr. Frank Mitchell, Dr. Keith Jacobson, Richard B. James and Dr. Donald Lassiter represented the U.S. government. This meeting was collegial, polite, and open, on its face. The European and American vinyl producers presented an ostensibly complete and candid description of their industry and any of its possible issues. Only the industry knew how distorted, skewed, and deceptive their presentation truly was.

Speaking from penciled notes, Rowe delivered the formal presentation, beginning with an emphasis on the scope and size of the vinyl chloride industry, and its efforts to address health concerns over cancer and acroosteolysis. Duffield presented the "exhaustive" studies of polyvinyl chloride and vinyl chloride workers at ICI plants in Europe that showed no "indication of hazard." He addressed Viola's published work that identified cancers in rats' zymbal gland, which does not exist in humans, as well as in the lung, and assured NIOSH that "none of the observed lung tumors were primary tumors." He also referenced contemporaneous research that confirmed Viola's findings while highlighting that "the program is still in progress and no firm conclusions [were] yet drawn."

No specific mention was made of Maltoni, nor of cancer of the liver or kidney. When Donald Lassiter of NIOSH inquired about the lowest concentration at which tumors had been observed, according to the MCA, Duffield responded that nothing had been found

below 250 ppm.[146] The notes taken by Richard James of NIOSH, however, despite the industry's admission of cancers at 30,000 ppm as documented by Viola, made no mention of tumors at 250 ppm.[147]

As per their plan, the companies delivered little that hadn't been previously reported or published: the single-sheet American Conference of Governmental Industrial Hygienists TLV report, the MCA's Chemical Safety Data Sheet for vinyl chloride (an eighteen-page booklet), a single-sheet summary of the vinyl industry, the condensed protocols for the MCA's epidemiological and animal studies, and the MCA's news releases on these studies. [148] NIOSH asked "to be kept fully appraised of the ongoing work both the U.S. and the European industries have in progress," convinced that they had been thoroughly briefed on the status of the industry's knowledge to date.[149]

All told, the MCA and its various companies were elated by the meeting and reported that "the chances of precipitous action by NIOSH on vinyl chloride were materially lessened." [150] Member companies not represented at the meeting received word that "*no* problems were encountered" and that the "presentation was well received and appreciated." [151] The industry had overcome its most difficult obstacle by leaving the government under the impression that research up to that point did not indicate any problem with cancer among workers, and that the companies were on top of the issue. They appeared responsible and

[146] "Notes on Meeting Between Representatives of MCA Technical Task Group on Vinyl Chloride Research and NIOSH,"(July 17, 1973), MCA Papers.
[147] Richard B. James, Untitled Notes of NIOSH-MCA Meeting (July 17, 1973), in possession of Peter Infante.
[148] "Notes on Meeting Between Representatives of MCA Technical Task Group on Vinyl Chloride Research and NIOSH,"(July 17, 1973), MCA Papers.
[149] Flynt Kennedy, Conoco, to R.W.G. et. al., "VCM" (July 19, 1973) MCA Papers.
[150] R.N. Wheeler to Carvajal, et. al., (July 19, 1973), MCA Papers.
[151] Flynt Kennedy, Conoco, to R.W.G. et. al., "VCM" (July 19, 1973) MCA Papers.

forthcoming to NIOSH officials without having to violate the secrecy agreement with their European counterparts regarding Maltoni's studies.

The deceit and denial that the MCA had engaged in might have been successful except for a tragedy that was revealed six months later in Louisville, Kentucky. In. January 1974, a company doctor, John Creech, in the B.F. Goodrich plant in Louisville revealed that he had found that four workers in the plant had died of an extremely rare tumor, angiosarcoma of the liver, the same cancer that the European industry had discovered in their rats. Reporters quickly picked up on Creech's report with one calling the Louisville plant a "plastic coffin."[152]

The Case of PCBs

The Monsanto Chemical Company, one of the largest in the nation, identified polychlorinated biphenyls (PCBs), chemicals originally synthesized in nineteenth-century Germany, to be extremely useful during America's Great Depression. Americans generally did not know about PCB's uses, including as medicinals, manicure resins, insecticides and insecticide extenders, and the possibility of their presence in food. Though Monsanto was the only producer of PCBs, it did not investigate, nor warn about, any possible long-term impacts of exposure to its nearly indestructible product. Throughout the 1940s and 1950s other chlorinated hydrocarbons, like DDT, Aldrin, Endrin, and Lindane in particular, increasingly came under scrutiny in congressional hearings and the press for the harm they could potentially cause to the environment and people alike, but Americans remained ignorant of any long-term danger from PCBs.

[152] Joe Klein, "The Plastic Coffin of Charlie Arthur," *Rolling Stone*, January 15, 1976.

Prominent industrial hygienists and physicians like Wilhelm Hueper and Alice Hamilton noted growing apprehensions about chlorinated hydrocarbons during World War II. Hueper noted in 1942 that chlorinated hydrocarbons could be a human carcinogen, and a year later Hamilton wrote "The Toxicity of the Chlorinated Hydrocarbons" in the *Yale Journal of Biology and Medicine*, pointing to their growing use as a solvent for rubber, a chemical agent in dry cleaning, a thinner and lacquers, and as a degreaser for metals, and warned of their possible danger to people's health.[153]

Concern over the broad dangers posed by these new chemicals accompanied increasing apprehension that some pesticides, most significantly the chlorinated hydrocarbon DDT (dichlorodiphenyltrichloroethane) were being extensively sprayed in neighborhoods to control a host of insects from mosquitoes to beetles, and on the fruits and vegetables people were consuming. First synthesized in 1874 and developed in 1939 as an insecticide by Paul Hermann Müller, a Swiss chemist who won the 1948 Nobel Prize in Physiology or Medicine, DDT started being extensively used to protect soldiers during World War II from disease-carrying insects in the tropics.[154]

Throughout the 1950s concern over chlorinated hydrocarbons grew, and more studies were conducted indicating that their effects on human beings were toxic.[155] DDT and other pesticides received the most public attention of all the chlorinated hydrocarbons during this

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[153] Alice Hamilton, "The Toxicity of the Chlorinated Hydrocarbons," *Yale Journal of Biology and Medicine* 15, no. 6 (July 1943): 787–801.

[154] "Paul Müller: Biographical," Nobelprize.org, Official Website of the Nobel Prize, http://www.nobelprize.org/nobel_prizes/medicine/laureates/1948/muller-bio.htmlS, accessed July 24, 2012.

[155] J. M. Barnes, "Toxic Hazards of Certain Pesticides to Man," *Bulletin of the World Health Organization* 8 (1953): 466. Monsanto had reason to worry that the link of DDT to other chlorinated hydrocarbons would easily be made. As early as 1948, Monsanto officials were suggesting the "possible use of liquid Aroclors as an auxiliary solvent for DDT and other insecticides in various formulations." See Benignus to E. W. Leake, U.S. Department of Agriculture, "Aroclors and MB-40," June 17, 1948, Available at: https://www.toxicdocs.org/d/qmajxOg5vmqr5j3Y3Ea5d0m05?lightbox=1 , Accessed: March 24, 2024.

period because of their widespread presence within the consumer food chain. [156] Sometimes PCBs were promoted along with DDT for use as a "pesticide extender" because of their adhesive qualities to extend the length of time pesticides could cling to plants, as well as to hard surfaces. Monsanto was aware of PCB use on crops with other pesticides that were destined for the dining room table, which troubled some inside the company.[157] In 1957, Monsanto scientist L. V. Sherwood sent a letter in an internal memo to P. G. Benignus from their development department regarding a Monsanto publication that promoted PCBs, marketed as Aroclors, to "increase the insecticidal life of lindane," cautioning that such use was reckless. He wrote, "It is most surprising to see that you are recommending without restriction a use for Aroclor which has not been approved" by the U.S. Department of Agriculture and the Food and Drug Administration. He pointed out that "since Aroclors are toxic," the government "would require . . . data to show whether or not residual Aroclor is present," and if so, whether "tolerances for the pesticide in question must be developed." He noted that "a tolerance cannot be established until after two-year chronic toxicity feeding tests have been completed for Aroclor." [158] But such tests did not even start for another twelve years.

In the 1960s evidence of environmental PCB contamination mounted, particularly when two Swedish researchers, Gunner Widmark and Soren Jensen, studying DDT in the environment in 1966 found PCBs in pine needles, salmon, the hairs of one of the scientists' young children,

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[156] H. Stilwell, "Farm Fallout Can Kill You!," *True* (March 1960). Quoted in A. P. Davies, American Meat Institute, to E. L. Peterson, Assistant Secretary, USDA, March 4, 1960, National Archives, Record Group 16, Records of the Office of the Secretary of Agriculture, General Correspondence, box 3455; Mrs. A. J. Jr. to E. L. Peterson, Assistant Secretary, USDA, March 4, 1960, National Archives, Record Group 16, Records of the Office of the Secretary of Agriculture, General Correspondence, box 3455.

[157] See Markowitz and Rosner, "Monsanto, PCBs," 463–540; and Rosner and Markowitz, "Persistent Pollutants," 126–133, for fuller accounts of these issues.

[158] P. G. Benignus, memo, "Aroclor Use to Increase the Insecticidal Life of Lindane," August 9, 1957, https://cdn.toxicdocs.org/jm/jmR3VMwvoxnVovaKqzLMMNmyQ/jmR3VMwvoxnVovaKqzLMMNmyQ.pdf; L. V. Sherwood to P. G. Benignus, "Re: 'Aroclor Use to Increase the Insecticidal Life of Lindane,' " August 30, 1957.

and essentially everything they looked at. Reports amassed of leaky storage tanks, leaks and spills in shipping vessels, including railway cars, trucks, and drums. It was revealed that waste PCBs were regularly disposed of in landfills and sewered into waterways. [159]

When widespread PCB contamination was discovered, it was a critical moment in environmental history. Rachel Carson's 1962 *Silent Spring* appeared only a few years prior to the Widmark and Jensen piece, and the positive feedback received by Carson's account drew a quick and aggressive reaction from Monsanto. *Monsanto Magazine* featured a counternarrative in its October 1962 issue entitled "The Desolate Year." "Does the world really need chemical pesticides? . . . Is the world being sold a monstrous bill of goods?" In language reminiscent of the sci-fi horror films of the late 1950s and early 1960s like *Invasion of the Body Snatchers* and *The Blob*, it imagined an apocalyptic future bereft of modern chemical products and pesticides. A vivid description was included of the Mediterranean fruit fly, which "turned her stiletto-like appendage into a grapefruit [and] sent an egg inside," propelling a vermin-infested hellscape: "Quietly, then, the desolate year began. . . . The bugs were everywhere. Unseen. Unheard. Unbelievably universal. On or under every square foot of land, every square yard, every acre, and county, and state and region in the entire sweep of the United States. In every home and barn and apartment house and chicken coop, and in their timbers and foundations and furnishings. Beneath the ground, beneath the waters, on and in limbs and twigs and stalks, under rocks, inside trees and animals and other insects—and, yes, inside man." [160]

Their frontal attack on Carson and environmental awareness itself did little, however, to slow the flow of information Americans were receiving about the toxicity of the new

[159] Markowitz and Rosner, "Monsanto, PCBs," 463–540.
[160] "The Desolate Year," *Monsanto Magazine*, October 1962, 4–9.

Monsanto chemicals pouring out of New Jersey, Illinois, Louisiana, and plants across the country. Nor had Monsanto's assault calmed apprehension over Lindane, DDT, or other chlorinated hydrocarbons that Carson's work brought into focus.

Monsanto took action to preserve its agribusiness markets through a campaign against the concerns raised by Rachel Carson and other scientists about pesticides, but the bigger threat they saw was from the increase in questions over its new chemical products.[161] First, Monsanto hoped that the impact of Widmark and Jenson's 1966 discovery of vast PCB contamination would not reach America's shores. But press reports filtered out of Europe over the next months and years, and angst over this new information about PCBs only grew. D. H. Hardy of Monsanto's British Division wrote to his St. Louis counterpart about new suspicions and findings articulated by representatives from Shell and other major Aroclor consumers.[162] Unlike DDT, PCBs were *only* manufactured by Monsanto in the U.S., and they alone would be held responsible if these were revealed to be a contaminant in this country. One of Monsanto's signature products was now at risk, as PCBs were not only sold in the agricultural sector but could now be found in as varied products as paints, catheters, carbonless carbon paper, adhesives, and many others.

PCBs became a major national issue when University of California oceanographer Robert Risebrough published a study that caught the eye of the West Coast press. The *San*

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[161] Soren Jensen and Gunner Widmark, "Presence of Polychlorinated Biphenyls at Residue of Biological Samples," September 1, 1966, Available at: https://www.toxicdocs.org/d/kmabGzY6J6KM576mZJNZbVjrO?lightbox=1, Accesssed: March 24,2024; D. V. N. Hardy to Benignus et al., "Aroclor—Sweden," January 12, 1967, Available at: https://www.toxicdocs.org/d/gb57aK1abE5mBEoVYw6wLGLYL?lightbox=1 , Accessed: March 24, 2024; Henry Strand, Rising and Strand, Sweden, to David Wood, Monsanto, Brussels, November 28, 1966, https://www.toxicdocs.org/d/aJR6mQe7gX3Yn5VLgrmgKdbYR?lightbox=1, accessed November 4, 2021.

[162] D. H. Hardy to Kelly, February 21, 1967, Available at: https://www.toxicdocs.org/d/4aKoE4K49Xaxb0vyBk5vYb5Vj?lightbox=1 Accessed: March 24, 2024; Strand to Wood, November 28, 1966, Available at: https://www.toxicdocs.org/d/bygGLLJDODkv1de4qVv4yyO06?lightbox=1 , Accessed: March 24, 2024.

Francisco Chronicle in February 1969, published a front-page piece on "bay scientist's pollutant warning," which presented a "newly-identified chemical pollutant" having "arisen on our planet" that already seriously threatened the existence of the peregrine falcon by weakening the animal's eggs. "The peregrine falcon, a bird of prey that once abounded all over America, is bearing a bitter warning to man," it warned. The chemical's "long-term hazards at low levels to the human species are wholly unknown—although in concentrated gaseous form the chemical is highly poisonous, and chemicals closely related to it are known to cause cancer." The article made clear that "newly-identified chemical pollutant" was PCB, closely related to DDT. This raised an alarm because Risebrough was presenting evidence that like DDT, PCBs are "carried widely across the oceans by winds and water currents" and "may affect human food supplies and human lives." "The one certainty now is that they can be found everywhere that they have invaded the food-producing levels of the oceans, and their presence is rising swiftly." [163]

While Monsanto initially declined comment, the public response was decisive, and letters flooded Monsanto headquarters and the office of the *Chronicle*. An enraged Oakland resident wrote to Monsanto president Charles Sommer demanding the company immediately halt production. "If you care nothing for birds or wildlife, at least consider your fellow man—yourself and your family."[164]

This ferocious attention garnered by the article forced a response from Monsanto. They sent a letter to its officials and executives across the nation one week after its publication describing the "sensational story," and questioning a "few facts." "These conclusions are puzzling in several aspects," they wrote in a disingenuous attempt to create a counternarrative to

[163] David Perlman, "A Menacing New Pollutant," *San Francisco Chronicle*, February 24, 1969, 1, 20.
[164] Joan H. Rivers to Charles Sommer Jr., February 26, 1969, https://www.toxicdocs.org/d/NK78DEvKKyQQZVyb8ZR25yD8?lightbox=1, accessed November 5, 2021.

the scandal, as PCBs "are not easily released to the natural environment." The letter suggested that perhaps "the substance identified by the scientists" was not a PCB but "a compound which only appears to be PCBs due to metabolism of other materials in the marine environment."[165]

Monsanto's executives knew, of course, how PCBs were getting into the environment by the time the Risebrough research article was published in 1969: they had been bombarded with reports and complaints about PCBs leaking into streams from their production plants, vapors emanating from tanks, from leaking equipment in frying machines, and from cracked casings in navy shipyards and cracked drums used in shipping. Monsanto officials realized they faced a decision by the fall of that year. The growing scrutiny PCBs were receiving in the three years following the report by the Swedish investigators meant that the company could either "go out of [the Aroclor] business," "sell the hell out of them as long as we can," or confine their sales to things they called "closed systems," transformers and capacitors that would not leach into the environment, or so they claimed.[166] The next year, Monsanto sent millions of pounds of PCBs into the environment, and into our bodies, by selling more of the toxic substance than at any time in its history.[167]

Monsanto and its fellow polluting chemical companies recognized by the late 1960s and early 1970s that their efforts to sufficiently allay public distress over the impact of their industry's products had fallen flat. It could no longer be taken for granted that the public would associate the chemical industry with limitless progress, and the press coverage of PCBs and other

[165] Memo, P. G. Benignus and N. T. Johnson to various employees, "Pollution Studies," March 3, 1969 Available at: https://www.toxicdocs.org/d/XMMNQBxx71QX7xxd9zOQEpqw?lightbox=1, Accessed: March 24, 2024 .

[166] PCB Committee, August 25, 1969, handwritten notes, https://www.toxicdocs.org/d/X7JKvq01ExZb77QZ857rM8y7d?lightbox=1, accessed November 13, 2021.
[167] "Production and Sales: Polychlorinated Biphenyls (PCB): Monsanto Industrial Chemicals Company (Short Tons)," table, https://www.toxicdocs.org/d/JDGjnmD3DzKD22vmBV5k8ZKO?lightbox=1, accessed November 13, 2021.

toxic chemicals in the environment was becoming dire.[168] They acknowledged the threat of civil service officials and scientists, armed with the megaphone and regulatory powers of the federal government through the offices of agencies like OSHA and the EPA, informing the American people about these industrial poisons. Downplaying the environmental movement as merely a fringe group of "tree huggers" was not going to quash the public's outrage. The environmental groups were too numerous to be dismissed with basic threats of lawsuits or public relations barrages; some voices would not be silenced. Lawyers willing to bring environmental cases to court, civil rights activists concerned with issues of environmental justice, local organizations worried about pollution of their waterways and toxic waste dumped in their communities, and national environmental advocacy groups would not be intimidated.

As the press detailed the crises faced by local communities, PCBs were Monsanto's most pressing concern, but they were also well aware that the situation was even more grim than the public knew. One Monsanto consultant estimated in 1969 that two hundred million pounds of PCBs had entered the environment because of the persistent presence of the two billion pounds of the chemical introduced since the 1930s. [169] The consequences of PCB pollution on the coast of Florida, in the Gulf of Mexico, in Lake Michigan, and along the California coast were amassing, and the probable toxic contamination of the nation's food supply, as evidenced by the casualties among populations of fish, shrimp, and birds nationwide, was becoming impossible to ignore.

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[168] "Possible Customers' Questions on PCBs' Publicity," Q and A for sales reps, https://www.toxicdocs.org/d/zbovDwKrZ1LgExZVr9e1j3oda?lightbox=1, accessed November 13, 2021.
[169] See Robert Metcalf, "Report and Comments on Meeting on Chlorinated Biphenyls in the Environment at Industrial Biotest Laboratories," Chicago, March 21, 1969, https://www.toxicdocs.org/d/2JqOqNKQJDM8xMogejnbDepeg?lightbox=1, accessed June 15, 2022.

Representative William Ryan (D-NY) introduced legislation at the federal level to ban PCBs as early as 1970, but upon his death in 1972 from throat cancer, the bill died in committee. Congress considered legislation in the following years to ban the production of PCBs, and to control the production of toxic substances generally. The EPA held a press conference in 1975 during which administrator Russell Train pushed for this legislation's passage, acknowledging that the "PCBs constitute a significant hazard to human health and the environment." Train told reporters that "there are hundreds of millions of pounds of PCBs out there in the environment—in landfills, soils, and the bottom sediments of rivers, lakes, and estuaries." Train lamented that PCBs would "be there for years, like a delayed action time bomb, . . . which we have no way to keep from moving into life systems, including humans." [170] The day he delivered this shattering critique of its products, Train wrote to Monsanto's president: "We must, as a society, accept and work toward a goal of totally eliminating the production, importation and use of PCBs as rapidly as possible."[171] The message was received. In an internal analysis of Train's conference, Monsanto described his view of PCBs as "a delayed action time bomb waiting to go off," concluding that "we may have to live with them for the rest of our lives." [172] The Toxic Substances Control Act (TSCA), passed in 1976, empowered the EPA to "require reporting, record-keeping and testing . . . and restrictions relating to chemical substances and/or mixtures," and specifically banned PCB production, effective 1979. [173] Monsanto responded by ceasing the

[170] "Background Statement by Environmental Protection Agency Administrator, Russell E. Train, at a Press Conference on PCBs," December 22, 1975, https://www.toxicdocs.org/d/pe8qv17NDZK7zqYnzBLwdB52E, accessed January 9, 2022.
[171] Train to Hanley, December 22, 1975, https://www.toxicdocs.org/d/rEJvvvmR8L09JZmyYVdnOdNr?lightbox=1, accessed January 9, 2022.
[172] D. R. Bishop, "EPA/PCB Press Conference," December 22, 1975, https://www.toxicdocs.org/d/85XxDg2beZbar4LmveLaKEzOa?lightbox=1, accessed January 9, 2022.
[173] Environmental Protection Agency, "Summary of the Toxic Substances Control Act," https://www.epa.gov/laws-regulations/summary-toxic-substances-control-act, accessed July 24, 2023.

sale of PCBs by the end of August 1977, though in anticipation of this cutoff, it encouraged some of its customers to stock up on their quantities of PCBs.

PCBs and other toxic chemicals were being illegally dumped along highways in various poor communities across the nation at the same time they were being legally banned because legal disposal was far more expensive than surreptitious dumping or burial. In 1978, for example, 30,000 gallons of PCB oils were dumped along two hundred ten miles of North Carolina roadway in what Robert Bullard named the "the largest PCB spill ever documented in the United States." [174] The state's governor decided four years later to bury the pollutant in Warren County, one of the poorest counties in the state, with a 63.7% African American population. Two important political movements, civil rights and environmental justice, united in this moment. Concerted protests by African American activists using civil disobedience tactics like road blockages and sit-ins inspired and established solidarity between racial and environmental justice efforts throughout the nation.[175] Local activists focused on the effects of pollutants in the air, water, and soil in community after community. Residents of Houston, Texas, the heart of the chemical and oil industry, organized and stopped a solid waste disposal site that had been zoned for the Hispanic and African American neighborhoods, as had all of the five previous solid waste dumps in the city.[176]

As communities across the country—both Black and white—began to see the effects of PCBs and other poisonous substances in, around, and under their homes, chemical pollution continued to compel public attention. It was discovered that PCBs polluted Times Beach, Missouri in 1982. Dioxin was a feared cancer cause, and a byproduct of PCB production, and

[174] Robert D. Bullard, *Dumping in Dixie: Race, Class, and Environmental Quality* (Boulder, CO: Westview, 1990), 30.
[175] Bullard, *Dumping in Dixie*, 32.
[176] Bullard, *Dumping in Dixie*, 40–45.

was found, among other oils, to have been used in road maintenance in the area. The entire town had to be abandoned, and its residents were forced to resettle in 1985 following national headlines and protests.[177] The three-by-one-hundred-mile stretch of land between the Mississippi River and Baton Rouge and New Orleans was renamed "Cancer Alley" because of the horrible health effects of ground, water, and air pollution emitting from the oil refineries and chemical plants that lined the river. In 1995, the average per-person exposure to toxic pollutants in Louisiana was twenty-one pounds according to the Toxic Release Inventory, a voluntary federal reporting system developed for tracking industrial pollutants. One community along "Cancer Alley," among the poorest African American communities in Louisiana, was the town of Convent, where the average exposure over a given year was 2,277 pounds per person, an incredibly disproportionate burden. Communities along the Mississippi responded to these threats to their health by mobilizing, suing polluting companies, pressuring legislators, and publicly protesting their demand for some modicum of justice.[178]

The integrity of industry-sponsored science became increasingly suspect as discovery court proceedings released studies and internal memos that detailed how asbestos, tobacco, lead as well as giant chemical and oil companies had withheld what they knew about the poisonous nature of their products.[179] The internal documents showed that companies actively tried to

[177] EPA, "Superfund: CERCLA Overview," January 24, 2023, https://www.epa.gov/superfund/superfund-cercla-overview, accessed February 10, 2023.
[178] See Markowitz and Rosner, *Deceit and Denial*, 260–286, for an extended discussion of the story of Cancer Alley and the chemical industry.
[179] For examples of the types of historical internal documents made available through various court proceedings, see Columbia University's and CUNY's Web site http://www.toxicdocs.org, which provides millions of pages of internal corporate memos, private research studies, corporate statements and public relations materials, and more.

manufacture doubt about the science exposing dangers, companies' hoarding of information, and federal authorities' suspicions of misrepresented data.[180]

The Case of the Industrial Bio-Test Laboratory

Among the most well-documented examples of scientific fraud and deceitful manipulation was the scandal over a private testing laboratory in Illinois, Industrial Bio-Test Laboratories (IBT), conducting long-term studies with rats on a range of chemicals for various corporations, one of which was Monsanto. The corruption uncovered in these studies led to the indictment, conviction, and imprisonment of Monsanto and IBT employees in the 1980s.[181]

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[180] Robert Proctor, The Golden Holocaust: Origins of Cigarette Catastrophe and the Case for Abolition (Berkeley, CA: University of California Press, 2012); Allan Brandt, The Cigarette Century: The Rise, Fall, and Deadly Persistence of the Product that Defined America (New York, NY: Basic Books, 2009); Gerald Markowitz and David Rosner, Deceit and Denial: the Deadly Politics of Industrial Pollution, with a new epilogue (Berkeley, CA: University of California Press, 2013); Elena Conis, How to Sell a Poison: The Rise, Fall, and Toxic Return of DDT (New York, NY: Bold Type Books, 2022); Gerald Markowitz and David Rosner, Lead Wars: The Politics of Science and the Fate of America's Children (Berkeley, CA: University of California Press, 2010); David Michaels, Doubt Is Their Product (New York, NY: Oxford University Press, 2008); David Michaels, The Triumph of Doubt: Dark Money and the Science of Deception (New York, NY: Oxford University Press, 2020); Naomi Oreskes and Erik Conway, Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues From Tobacco Smoke to Global Warming (New York, NY: Bloomsbury, 2010).

[181] Eliot Marshall, "The Murky World of Toxicity Testing," Science, new series, 220 (June 10, 1983): 1130–1132 (https://doi.org/10.1126/science. 6857237); Keith Schneider, "Faking It: The Case Against Industrial Bio-Test Laboratories," Natural Resources Defense Council, Amicus Journal, Spring 1983, republished in "Planet Waves," https://planetwaves.net/contents/faking_it.html; Edward Herman, "Corporate Sovereignty and (Junk) Science," Z Magazine, November 1998 (http://www.zcommunications.org/corporatesovereignty- and-junk-science-by-edward-herman), accessed July 14, 2022; Editorial, "The Scandal in Chemical Testing," New York Times, May 16, 1983, Section A, p. 18. (https://www.nytimes.com/1983/ 05/16/opinion/the-scandal-in-chemical-testing. html), accessed January 3, 2023. See Michael Evard, Plaintiff, v Monsanto Company, et al., Defendants, Circuit Court of Cook County, Illinois, Case No. 2019-L-011574; Neal Frank v Monsanto Company, et al., Defendants, First Judicial District Court, County of Santa Fe, State of New Mexico, No. D-101-cv-2021-00481. These cases involve polychlorinated biphenyls and Roundup, Monsanto's widely used pesticide. Keith Schneider, "Lab Fraud—or Government Harassment?", Boston Globe, April 3, 1983, p. A22; Keith Schneider, "Faking It, The Case Against Industrial Bio-Test Laboratories," in The Amicus Brief (Washington, DC: National Resources Defense Council, 1983). IBT, at the time the nation's largest private laboratory, was founded in 1953 by Joseph Calandra, a professor at Northwestern University, who organized three laboratories in the Chicago area to serve industry's need for testing new products. By the early 1970s it had conducted about 22 000 toxicology studies for scores of corporations, representing between 35% and 40% of all tests conducted in private labs in the country. "Nearly half of IBT's studies were used to support federal registrations of a mammoth array of products: insecticides, herbicides, food additives, chemicals for water treatment, cosmetics, pharmaceuticals, soaps and bleaches, even coloring for ice cream" (https://planetwaves.net/contents/faking_it.html), accessed January 4, 2023.

Monsanto approached IBT in the late 1960s to request that they conduct chronic toxicity tests on polychlorinated biphenyls (PCBs) in response to the increasing national concern over the consistent, pervasive persistence in the environment of PCBs. An insulating and plasticizing agent used widely in adhesives, paints, plastics, carbonless copy paper, electrical capacitors and transformers, among many other products, PCBs had been marketed for commercial use by Monsanto starting in the 1930s. By the 1960s PCBs had been identified in human and animal tissue, birds, fish, and waterways worldwide, leading to demands for information about its toxicity. Monsanto, which had neglected to test the life-long impact of PCBs on human health for almost three decades, now turned to IBT to conduct testing of chronic two-year toxicity in animals.[182]

From the outset, Monsanto saw these studies as part of a greater strategy to demonstrate to the government and the public, especially the newly established EPA and the Food and Drug Administration (FDA), that PCBs were not carcinogenic, and "do not constitute a serious threat to the public health."[183] In 1969 IBT contracted with Monsanto to perform two-year chronic toxicity and other studies, one of which failed to meet their expectations, and turned out, according to one internal Monsanto document, not to be "as favorable as we [Monsanto] had hoped or anticipated. Particularly alarming is evidence of effect on hatchability and production of thin eggshells." [184]

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[182] For a full discussion of the identification of PCBs as an environmental pollutant and Monsanto's response, see Gerald Markowitz and David Rosner, "Monsanto, PCBs, and the Creation of a 'World-Wide Ecological Problem,' " Journal of Public Health Policy 39 (2018): 463–540 (https://doi. org/10.1057/s41271-018-0146-8); for a detailed examination of Monsanto's history of PCB production and pollution, see Ellen Griffith Spears, Baptized in PCBs: Race, Pollution, and Justice in an All-American Town (Chapel Hill, NC: University of North Carolina Press, 2014).

[183] "Report of the Aroclor 'Ad Hoc' Committee (Second Draft)," October 15, 1969, "Company Confidential Attorney-Client Privilege" (https://www.toxicdocs. org/d/QXGD7Vm44Jx8qdpk742948pp7?lightbox=1), accessed January 3, 2023; Markowitz and Rosner, "Monsanto, PCBs, and the Creation of a "World- Wide Ecological Problem.' "

[184] "The PCB-Pollution Problem," January 21 and 22, 1970, meeting with General Electric Co. (https://cdn. toxicdocs.org/Ed/EdoyOJrmzBNJpQnGg36Oj3Y2j/ EdoyOJrmzBNJpQnGg36Oj3Y2j.pdf), accessed January

Monsanto thus arranged with IBT to conduct "some of the studies" again to "arrive at better conclusions." [185] They sent new PCB samples to IBT claiming they had been "clean[ed] up" and let IBT know they expected to "find a higher 'no effect' level," a potentially "safe" level below which signs of damage in the experimental animals would not show. [186] This effort to minimize the appearance of PCB hazards seems indeed to have worked. Monsanto claimed, by 1973, that "the most important data which has led the government agencies to permit the continued but constricted use of polychlorinated biphenyl are the extensive animal toxicity studies which we have completed in the last two years." [187]

The reliability of these studies, however, was belied by two truths. First, the existing conditions in IBT labs performing the tests on Monsanto's PCBs were found to be compromised shortly thereafter. Second, the data sent to the government as ostensible "proof" of the safety of their chemicals were soon found to have been fabricated. An assistant toxicologist in IBT laboratories conducting the studies of PCB chronic toxicology, Philip Smith, described how the deplorable conditions under which the animals were kept compromised the gathering of dependable data: "[L]oose and wild [rats] . . . were in the rooms . . . chewing the feet off of the [experimental] animals that were in the cages." He explained how it was "difficult to tell the difference between loose laboratory animals and loose [wild] animals that have been raised outside and gotten in," because interbreeding had occurred, and thus technicians were unable to distinguish between the animals. The subpar professional standards in the lab can be seen in

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3, 2023.
[185] "The PCB-Pollution Problem," January 21 and 22, 1970, meeting with General Electric Co. (https://cdn.toxicdocs.org/Ed/EdoyOJrmzBNJpQnGg36Oj3Y2j/ EdoyOJrmzBNJpQnGg36Oj3Y2j.pdf), accessed January 3, 2023.
[186] Wheeler to Otis Fancher, Director, IBT, May 25, 1970 (https://www.toxicdocs.org/d/YGBLJpeRa2jDEjL7MqLRzwZgn?lightbox=1), accessed January 3, 2023.
[187] Wheeler to Wilbur H. Speicher, Administrator, Industrial Hygiene, Westinghouse, February 23, 1973 (https://www.toxicdocs.org/d/3Q77xYrYKbK JaL9XdERMR6zwx?lightbox=1), accessed January 3, 2023.

Smith's depiction that "technicians . . . were caught burning rats' testicles with lit matches." Dead rats were often allowed to decompose to such an extent that their bodies "would ooze through the bottom of their cages, and all their tissues would be at a total los[s] for any pathology work." [188] One technician disclosed "that there were many dead animals that were stinking so bad that [the] caretaker did not want to go into the room to change the water bottles" and dead test animals were replaced with new, living animals without any acknowledgment.[189] Despite this obvious corruption of testing conditions, IBT submitted ostensibly rigorous scientific reports on three PCB Monsanto products (Aroclor 1254, 1260, and 1242), that claimed its tests had proven PBCs to be non-carcinogenic.[190]

The second issue was fraud: IBT employees simply faked data. One IBT toxicologist Otis Fancher, as early as 1972, wrote to his colleagues that so much of the work on one project was done so shoddily that he "was ashamed to publish the work done." He stated that "much of the data are either fudged or collected with carelessness or incompetence, particularly the data for the supplementary studies of [PCBs]."[191] Reported data were inaccurate at best, literally fabricated at worst, and the language in at least one report was manipulated by officials from Monsanto. IBT's Joseph C. Calandra sent a draft in 1975 of "AROCLOR 2-year Rat Feeding Studies" to George Levinskas, Manager of Environmental Assessment and Toxicology at Monsanto, which listed Aroclor 1254 as "slightly tumorigenic." Levinskas objected and

[188] Deposition of Philip S. Smith, July 9, 1987, Cecil Scott, et al., Plaintiffs, v Monsanto Company, Defendant, in the United States District Court, Eastern District of Texas, Beaumont Division, B-84-1103- CA, p. 244, 253 (https://www.toxicdocs.org/d/ 1gvgbp82nx6rwMn1V4jZKrZYK?lightbox=1), accessed January 12, 2023.
[189] Deposition of Philip S. Smith, July 9, 1987, Cecil Scott, et al., Plaintiffs, v Monsanto Company, Defendant, in the United States District Court, Eastern District of Texas, Beaumont Division, B-84-1103- CA, p. 254 (https://www.toxicdocs.org/d/ 1gvgbp82nx6rwMn1V4jZKrZYK?lightbox=1), accessed January 4, 2023.
[190] Industrial Bio-Test, Laboratories, Inc., "Report to Monsanto Company, Two-Year Chronic Oral Toxicity With Aroclor 1254 in Albino Rats," Nov. 12, 1971, IBT No. B7298 (https://www.toxicdocs.org/d/2NNN6GKONbd0ezNzbge4O0bn7?lightbox=1), accessed February 14, 2023.
[191] Otis Fancher to Don[avon] [Gordon], handwritten note, January 14, 1972, M 42627 (https://www.toxicdocs.org/d/ZJ55yDwBnqwJOq5QRqYx RoXdL?lightbox=1), accessed February 14, 2023.

requested that the wording be replaced with "does not appear to be carcinogenic," a small but significant revision that would avoid raising concerns within the government about cancer. Calandra acquiesced.[192]

Paul Wright was employed by Monsanto beginning in 1965, as a senior research chemist, and as a research group leader from 1968 to 1970. During its two-year chronic PCB testing for Monsanto, IBT hired Wright to direct the toxicology lab overseeing these studies. He returned to Monsanto as toxicology manager in 1972, staying until his 1984 conviction for conspiring to defraud the government by using the United States Postal Service was upheld, and he was incarcerated. The lab assistant during IBT's PCB studies, Philip Smith, gave troublingly vivid accounts of Wright falsifying data that were included in the reports they sent to government agencies. "The body weight data [were] non-existent," testified Smith in a deposition given years later. "For intervals it was not collected."[193] Smith knew that "because under Paul Wright's instruction, I plotted out the body weight data that we had in the department and all of the data that we could find in the storage area of the department. Then he [Wright] plotted out and gave me body weight numbers to put into the report for all the spaces that we had no records for." Smith literally "watched him" "make up numbers" "out of his head."[194] The FDA found conflicting data in an IBT study in 1976 leading to its scrutinization of IBT's research.

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[192] George J. Levinskas to Joseph Calandra, "Re: Aroclor 2-Year Rat Feeding Studies," July 18, 1975 (https://www.toxicdocs.org/d/NNkDddqyXv6gR9L R4wJqn7oM8?lightbox=1), accessed January 10, 2023. J. C. Calandra to George Levinskas, "Re: Aroclor 2-Year Rat Studies," August 4, 1975 (https://www.toxicdocs.org/d/dQM4xXnvnXpg7rYaY46O7Lq96?lightbox=1), accessed January10, 2023.

[193] Deposition of Philip S. Smith, July 9, 1987, "Cecil Scott et al., Plaintiffs, vs. Monsanto Company, In the United States District Court Eastern District of Texas, Beaumont Division, B-84-1103-CA, MONSPCB0019134-19135, p. 183.

[194] Deposition of Philip S. Smith, July 9, 1987, pp. 189–190. See also Trial Testimony of Philip Smith, October 28, 1991, WATER_PCB-00056547, pp. 1073–1074; see also ibid, pp. 1130–1137); United States District Court, Northern District of Illinois, Eastern Division, "United States v. Joseph Calandra, Moreno Keplinger, Paul Wright and James Plank," "Special October 1980 Grand Jury Charges," STLCOPCB80017757. See also Keith Schneider, "Faking It: The Case Against Industrial Bio-Test Laboratories," The Amicus Journal, Spring 1983, pp. 15–21 (https://www.toxicdocs.org/d/ eybVeZMgomD8N3KRv1k41GJq?lightbox=1), accessed February 14, 2023.

As questions mounted about its studies in 1977, IBT asked to meet with Monsanto to discuss the chronic toxicity tests they conducted on a variety of substances. That July Monsanto officials, including Paul Wright, who had returned to Monsanto and was soon to become director of its Environmental Health Laboratory, and the company group's Vice President for Environmental Policy and Board of Directors member M. C. Throdahl, met with IBT officials, including its president A. J. Frisque and its legal counsel F. R. Current. According to an internal Monsanto memo, the "reason for the meeting" was the "recent actions by the FDA and the EPA (pesticides) in questioning the validity of toxicology studies performed by IBT." Based on IBT reports, the FDA had approved trichlorocarbanilide (TCC), an antibacterial agent used in lotions and soaps, and specifically questioned the studies behind these reports. [195] Upon reviewing its operations, IBT "discovered . . . major problems . . . at IBT's Northbrook, Illinois, facility," where long-term PCB and other chemical research on rodents was conducted. [196] At this conference Monsanto's Vice President Throdahl "asked specifically whether 'fraud' was involved in the twelve" long-term rodent Monsanto studies. The president of IBT "replied that 'extrapolation' and 'faulty interpretations' were part of the problems . . . and that he guesses this constitutes 'fraud.'" Representatives for Monsanto referred to this as "a very damaging admission [that] was made in the presence of a [IBT] lawyer who took no exception to the question or answer."[197]

From the late 1970s to the early 1980s, the government of the United States investigated the toxicology work done at IBT. A federal grand jury handed down an indictment on May 4,

[195] W. Wayne Withers and G. Roush to M. C. Throdahl, July 13, 1977, PCB-ARCH075738 (https://www.toxicdocs.org/d/r3EnYLgeRGvQVrRwOQN7 ev2q?lightbox=1), accessed January 6, 2023.
[196] W. Wayne Withers and G. Roush to M. C. Throdahl, July 13, 1977, PCB-ARCH075738 (https://www.toxicdocs.org/d/r3EnYLgeRGvQVrRwOQN7 ev2q?lightbox=1), accessed January 6, 2023.
[197] W. Wayne Withers and G. Roush to M. C. Throdahl, July 13, 1977, PCB-ARCH075738 (https://www.toxicdocs.org/d/r3EnYLgeRGvQVrRwOQN7 ev2q?lightbox=1), accessed January 6, 2023.

1981, centered around TCC, one of Monsanto's twelve substances being tested at the time in rat toxicology laboratories. In the indictment, former IBT president Joseph C. Calandra, James B. Plank, Moreno L. Keplinger, and Paul L. Wright (now back at Monsanto), were charged with fraud. According to the indictment, between 1970 and 1977 Wright and the rest intentionally devised, and then implemented a scheme to defraud government agencies and clients by authoring and disseminating fraudulent study reports and false analyses of study reports; and by hiding the falsity of the study reports, and the explanations of research and study reports. [198] The focus of the accusations was that Calandra, Keplinger, Plank, and Wright represented their research as having lasted two years, while the defendants in fact "knew that the report included data from a substantial number of animals that had been on the study for significantly lesser periods of time." These defendants were additionally accused of falsifying the documents they submitted to the government, producing erroneous mortality tables "which the defendants then knew to be false in that it substantially under-reported . . . the number of animals that died during the study," and thereby "concealed . . . that the animal mortality . . . was substantially greater than reported in any version of the study report." [199]

The indictment detailed Paul Wright's "false, fictitious and fraudulent statements and representations . . . and concealed and covered up material facts" about the "Two Year Chronic Oral Toxicity with TCC, trichlorocarbanilide." Wright, who had returned to Monsanto by 1976 as "toxicology manager," predated the study by two years, falsely, to March 21, 1974, [200] which

[198] The United States of America v Joseph C. Calandra, Moreno L. Keplinger, Paul L. Wright and James B. Plank, Filed, May 4, 1981, United States District Court, Northern District of Illinois, Eastern Division, MONSPCB0021020-MONSPCB0021037 (https://www.toxicdocs.org/d/pp9be89q8qkoZEzzeR39R1V1d?lightbox=1), accessed February 14, 2023.
[199] The United States of America v. Joseph C. Calandra, Moreno L. Keplinger, Paul L. Wright and James B. Plank, Filed, May 4, 1981, United States District Court, Northern District of Illinois, Eastern Division, May 4, 1981,MONSPCB0021025 (https://www.toxicdocs.org/d/pp9be89q8qkoZEzzeR39R1V1d?lightbox=1), accessed January 4, 2023.
[200] The United States of America v. Joseph C. Calandra, Moreno L. Keplinger, Paul L. Wright and James B.

proved he knew about, and consistently engaged in fraudulent activity even upon returning to Monsanto.[201]

Early in 1978 the EPA and FDA investigated three more long-term studies conducted by IBT, including two for Monsanto, on an herbicide called Machete, and on monosodium cyanurate (ACL). In both studies, the FDA concluded ample evidence existed that Monsanto was aware of "significant problems" at IBT "prior to submitting their [Monsanto's] report to the US Government." There existed "strong evidence of client's being knowledgeable of inaccuracies in the final report," and in the IBT study of ACL, there was "strong indication of client's knowledge of the deficiencies before they issued their report to the US Government." The inspectors recounted that "anticipated toxicity problems known to both the client [Monsanto] and test facility [IBT] were deliberately overlooked."[202]

The four defendants' trial began in April of 1983 at the U.S. District Court in Chicago, and lasted several months. Local and national news outlets identified the significance of this case almost immediately, noting that it raised a ton of questions about the honesty and integrity of not only IBT but Monsanto itself. The press office at Monsanto denied Wright's guilt: "We think Mr. Wright is innocent and if his case goes to trial, the trial will vindicate him."[203] The statements from Monsanto were, at best, insincere. Four years before the indictment, as we have

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Plank, Filed, May 4, 1981, United States District Court, Northern District of Illinois, Eastern Division, May 4, 1981,MONSPCB0021025 (https://www.toxicdocs.org/d/pp9be89q8qkoZEzzeR39R1V1d?lightbox=1), accessed January 4, 2023.

[201] The United States of America v. Joseph C. Calandra, Moreno L. Keplinger, Paul L. Wright and James B. Plank, Filed, May 4, 1981, United States District Court, Northern District of Illinois, Eastern Division, May 4, 1981,MONSPCB0021025 (https://www.toxicdocs.org/d/pp9be89q8qkoZEzzeR39R1V1d?lightbox=1), accessed January 4, 2023.

[202] FDA, EPA, Compliance Inspection, "Summary of Findings," January 16–March 9, 1978, MONSPCB0000621.

[203] Keith Schneider, "Accused of Faking Data: Trial Set for Testing Firm, Monsanto Researcher," St. Louis Post-Dispatch, March 30, 1983, pp. 1, 10; see also Bill Richards, "Papers From Trial of Former IBT Officers Raise Many Questions on Product Safety," Wall Street Journal, May 13, 1983, pp. 31, 37; see also FDA, EPA, Compliance Inspection, "Summary of Findings," January 16–March 9, 1978, MONSPCB0000641.

discussed, Monsanto was informed by the president of IBT in no uncertain terms that the studies directed by Wright at IBT were a sham. Nonetheless, Wright was promoted by Monsanto in 1977 to Director of the Environmental Health Laboratory, and when he was indicted in 1981, Wright was assigned to "special projects," which included managing Material Safety Data Sheets, the documents that OSHA expected to be available on demand to alert workers as to the perils of the substances they handled. [204] Far from being fired, disciplined, or even reprimanded, Monsanto awarded Wright with merit raises in 1977, 1978, and 1980. One year after his indictment, [205] in 1982 Monsanto paid $1.4 million for Wright's legal defense. [206] The company doubled down on these studies, continuing to cite them as proof of PCBs' safety far into the future. For instance, a 1979 Monsanto publication cited the IBT research on PCBs as "the most comprehensive safety tests of the time." [207] Monsanto continued citing the fraudulent IBT studies in their Material Safety Data Sheets in 1983 and 1985. .[208] One of the defense consultants in PCB litigation still relied on these spurious studies as late as 2018. [209]

Moreno Keplinger, Paul Wright, and James B. Plank, Monsanto's former assistant toxicology manager, were sentenced to jail in August 1983 upon being found guilty of fraud.[210]

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[204] . January 1983 Performance Review and MONSPCB0013836-39; Monsanto, Paul Wright "Employment History," MONSPCB0013764 (https://www.toxic docs.org/d/2j2LykGJG84d0bJ4VkgGLanpL?light box=1), accessed July 14, 2022.

[205] . January 1983 Performance Review and MONSPCB 0013836-39; Monsanto, Paul Wright "Employment History," MONSPCB0013764 (https://www.toxic docs.org/d/2j2LykGJG84d0bJ4VkgGLanpL?lightbox=1), accessed July 14, 2022

[206] Deposition of Richard W. Duesenberg, Cecil Scott et al., Plaintiffs, v Monsanto Company, In the United States District Court Eastern District of Texas, Beaumont Division, B-84-1103-CA. pp. 19-33, 47, MONSPCB002951-2965, 29279.

[207] Monsanto Public Relations Department, Monsanto, Polychlorinated Biphenyls, PCBs, "A Report on Uses, Environmental and Health Effects and Disposal," Section 2, p. 4, [1979], WATER_PCBSD0000063098 (https://www.toxicdocs.org/d/g242x7ZeNEwm0k5wRE8maLQRe?lightbox=1), accessed January 3, 2023.

[208] Monsanto, Material Safety Data Sheet, "Polychlorinated Biphenyls," October 15, 1985, LEXOLDMON006373-63378; Monsanto Material Safety Data, September 15, 1980, MONS 000140; Monsanto Material Safety Data, October 15, 1985, MONS 003224 (https://www.toxicdocs.org/d/2qyQ8776EzvoG1d4R6Gz0EYpN?lightbox=1), accessed January 3, 2023.

[209] See Oral and Video Deposition of John Schell, PhD., City of Hartford and Hartford Board of Education v. Monsanto Company, Solutia and Pharmacia, United States District Court, District of Columbia, January 11, 2018, pp. 27–43.

[210] . "Tighter Controls on Toxics Testing," Chemical Week 145 (August 24, 1983): 32–39.

But even after his conviction, Monsanto provided Wright with a "golden parachute," giving him a month's severance, accrued vacation time, full retirement benefits, and the paid assistance of a recruitment specialist to help with further employment upon his release. [211]

In the period following the expansion of government regulation in the early 1970s, the government depended on the integrity of industries and their private laboratories to provide them with the information needed to establish new standards. Hence, the EPA, OSHA, and the Consumer Product Safety Commission, along with older agencies like the FDA—government agencies with neither the resources nor the inclination to test the myriad chemicals and synthetic products yearly produced by U.S. industry—depended on companies' integrity. Following the revelations discussed here, "Good Laboratory Practices Regulations" were intended to guarantee the quality of research upon which federal regulations depend.[212]

These and other ad hoc efforts to delay and defeat the government and consumer actions aimed at controlling what many saw as runaway industries that had betrayed the public trust were effective. It would take another fifty years for the silica standard to be revised downward to the levels first proposed in the early 1970s by NIOSH; the warning label for asbestos was not required to include cancer until 2016, over forty years after NIOSH first recommended this modest change. It was only in 2023 that Johnson & Johnson removed talc from its baby powder, following lawsuits in which juries found them liable for billions of dollars. Vinyl chloride has just recently been included in the EPA's evaluation of chemicals under the revised Toxic

[211] United States of America, Plaintiff-Appellee, v Moreno L. Keplinger, Paul Wright, and James B. Plank, Defendants-Appellants, No. 84-1639, argued, April 25, 1985, decided, October 29, 1985. Following the conviction, Wright and the others appealed, and on October 29, 1985, the United States Court of Appeals upheld the convictions and noted that Wright committed some of the fraudulent acts while he was employed at Monsanto.

[212] Good Laboratory Practice Regulations Management Briefings, Post Conference Report, August 1979, Guidance for Industry, August 1979 (https:// www.fda.gov/regulatory-information/search-fdaguidance- documents/good-laboratory-practiceregulations- management-briefings-post-conferencereport- aug-1979), accessed July 8, 2022.

Substances Control Act; of all the substances identified by the early 1970s as potential or actual carcinogens, only PCBs were finally banned from production in 1979. Even then the vast quantities of PCBs produced over the previous four decades have remained in light fixtures, machinery, and transformers as well as in the soil where it continues to present a hazard to school children and the public alike. These efforts to thwart government action depended upon several tactics. In the case of asbestos and silica, old-line industrial toxins, this meant challenging the science upon which regulations could be based and the creation of doubt about science's legitimacy. In the case of vinyl chloride, it depended on hiding scientific research the industry had conducted that showed the potential harm their product could cause. Finally, in the case of PCBs, the industry's tactic was to literally corrupt the science, as well as defraud the government and the public, to curb regulation.

But these efforts by industry, while successful, were also narrowly focused on the precise issues affecting specific products.

The Powell Memo

George Guenther, the first head of OSHA, and William Ruckelshaus, the EPA's first administrator, were both Republicans appointed by the Nixon administration. However, because these young agencies focused on the internal operations of factories and the external impacts of their industries' products on the nation's health and security, some conservatives saw them as part of a broad attack on American "free enterprise." From this perspective, the occupational health and environmental justice movements seemed indistinguishable from the politics of social protests over the war in Vietnam and the military draft, the turbulence of the late civil rights movement, student protests over the military-industrial complex, and the growing movement for women's equality. Some saw these movements as imminent dangers to American capitalism,

demanding concerted and organized action to suppress them. The efforts to counter the new threats from government agencies and consumer groups needed, according to some, more systematic coordination. It appeared to some that the consumer, environmental, and labor movements were developing a coherent and threatening attack on the "free enterprise" system itself.

Charles Reich, a professor at Yale University, was seen as the embodiment of the looming threat that awaited industry as well as America. Reich attacked "our system of justice" in a 1970 *New Yorker* article, later expanded to a book, titled *The Greening of America*. The 50-page piece began as follows: "There is a revolution under way. It is not like revolutions of the past. It has originated with the individual and with culture, and if it succeeds, it will change the political structure only as its final act. . . . [I]t is spreading with amazing rapidity, and already our laws, institutions, and social structure are changing in consequence." [213] Just as conservatives had feared, Reich's article, published right when the EPA, NIOSH, and OSHA were being established, put environmental movements in step with efforts to end racism and poverty, halt the war in Vietnam, regulate technology, oppose the war machine, and exert control over the power of corporations. [214] For Reich, business organizations were the driving force behind the modern corporate state threatening the destruction of democracy itself.[215] Corporations "need stability, freedom from outside interference, constantly increasing profits. . . . The medium through which these imperatives operate is the law. The legal system acts as an instrument of corporate-state domination, and it acts to prevent the intervention of human values or individual choice." [216]

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[213] Charles Reich, "Reflections: The Greening of America," *New Yorker*, September 26, 1970, 42; See also Charles Reich,*The Greening of America* (New York: Random House, 1970).
[214] Reich, "Reflections," 44.
[215] Reich, "Reflections," 44.
[216] Reich, "Reflections," 42.

The profit "imperative" placed workers, consumers, and the environment in unique jeopardy. Corporations engaged in behavior that harmed workers and the environment, but there existed no mandate that they pay what economists call "externalities," the associated costs of those harms. "A manufacturer would dump wastes into a stream but pay nothing to take care of the pollution," Reich explained, "leaving the public to share in the costs but not the profits. The manufacturer fought against having to pay for accidental injuries to workers, although they were statistically predictable, leaving the costs to be borne for, sometimes, an entire lifetime, by the unfortunate individual and his family." [217] Reich made the case that the current generation was seeing "a society that is unjust to its poor and its minorities, is run for the benefits of a privileged few, lack its proclaimed democracy and liberty, is ugly and artificial, destroys the environment and the self, and is, like the war it spawns, 'unhealthy for children and other living things.'" [218]

For industry, this characterization of itself would not stand. Lewis Powell, a partner in the Virginia law firm Williams, Gay, Powell, and Gibson, which represented the Tobacco Institute among other entities, saw this as no less than an immediate threat to the social and political order and to America's future. In August 1971, Powell wrote the blueprint for mainstream industry's response to what it saw as a sweeping assault against the capitalist system in a detailed memo to the Education Committee of the U.S. Chamber of Commerce; shortly thereafter, he was nominated to be a justice on the Supreme Court. Under the heading "CONFIDENTIAL MEMO: ATTACK ON AMERICAN FREE ENTERPRISE SYSTEM," the memo began by stating directly that "no thoughtful person can question that the American economic system is under broad attack. This varies in scope, intensity, in the techniques employed, and in the level of

[217] Reich, "Refletions," 79-80/.
[218] Reich, "Reflections," 42.

visibility." [219]

Powell continued:

> There always have been some who opposed the American system, and preferred socialism or some form of statism (communism or fascism). Also, there always have been critics of the system, whose criticism has been wholesome and constructive so long as the objective was to improve rather than to subvert or destroy.
>
> But what now concerns us is quite new in the history of America. We are not dealing with sporadic or isolated attacks from a relatively few extremists or even from the minority socialist cadre. Rather, the assault on the enterprise system is broadly based and consistently pursued. It is gaining momentum and converts. [220]

It was not "the Communists, New Leftists and other revolutionaries who would destroy the entire system, both political and economic," according to Powell. "The most disquieting voices joining the chorus of criticism come from perfectly respectable elements of society: from the college campus, the pulpit, the media, the intellectual and literary journals, the arts and sciences, and from politicians. . . . [T]hese often are the most articulate, the most vocal, the most prolific in their writing and speaking." Powell was baffled by the "paradoxes of our time," including "the extent to which the enterprise system tolerates, if not participates in, its own destruction." College students, the media, and even some in the business community willingly participated in this colossal endeavor to depose the prevailing status quo. He contended that the Weather Underground's attacks on banks were a ramification of the broader society's wide

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[219] Lewis Powell to Eugene Sydnor, "Confidential Memorandum—Attack on American Free Enterprise System," August 23, 1971, https://www.historyisaweapon.com/defcon1/powellmemo.html, accessed January 15, 2023.

[220] Powell to Sydnor, "Confidential Memorandum."

acceptance of revolutionary ideas, even by "respectable liberals and social reformers." "It is the sum total of their views and influence which could indeed fatally weaken or destroy the system." Ralph Nader, considered one of the founders of the modern consumer rights movement, and author of *Unsafe at Any Speed*, an exposé on the design failures of the Chevy Corvair, came under direct singular attack as "perhaps the single most effective antagonist of American business." He had "become a legend in his own time and an idol of millions of Americans." Nader was a distinct source of stress for business because his popularity implied public concurrence with his assertion that not only "fly-by-night hucksters" but "a great many corporate executives belong in prison—for defrauding the consumer with shoddy merchandise, poisoning the food supply with chemical additives, and willfully manufacturing unsafe products that will maim or kill the buyer."[221]

Powell presented his understanding of the issue and how to deal with it: "The painfully sad truth is that business, including the boards of directors and the top executives of corporations great and small and business organizations at all levels, often have responded—if at all—by appeasement, ineptitude and ignoring the problem." They have "not been trained or equipped to conduct guerrilla warfare with those who propagandize against the system, seeking insidiously and constantly to sabotage it."[222]

Powell detailed a plan to combat this "threat." Businesses and corporations must initiate forceful and consistent lobbying campaigns both in the public political arena and in the halls of Congress. But even more important for Powell was the urgent imperative to win the war of ideas, oppose leftist ideology, and reorient the nation's intellectual life to align with the values and interests of business. The Chamber of Commerce, he advised, should promote conservative

[221] Powell to Sydnor, "Confidential Memorandum."
[222] Powell to Sydnor, "Confidential Memorandum."

scholars in the social sciences "who believe in the system," like-minded speakers, a speakers bureau, and a methodology for assessing and censoring textbooks based on their faithfulness to the traditional American beliefs of business: "If the authors, publishers and users of textbooks know that they will be subjected—honestly, fairly and thoroughly—to review and critique by eminent scholars who believe in the American system a return to a more rational balance can be expected." Particularly vexing for Powell were the upwards of one hundred speeches by "avowed communists" (at least as per the FBI) given on college campuses with "no corresponding representation of American business, or indeed by individuals or organizations who appeared in support of the American system of government and business." [223] Any truth to the critique of industry as a danger to the health of Americans, or to the future of the environment, went unrecognized as Powell condemned "the stampedes by politicians to support almost any legislation related to 'consumerism' or to the 'environment.'" While altering the course of academic scholarship and restricting access to educational information through books, television, and lectures were long-view solutions to the conundrums facing the nation's business class, Powell insisted that "business must learn the lesson, long ago learned by labor and other self-interest groups. This is the lesson that political power is necessary; that such power must be assiduously cultivated; and that when necessary, it must be used aggressively and with determination—without embarrassment and without the reluctance which has been so characteristic of American business." [224]

Thus, a series of think tanks were promptly founded to repeal efforts toward progressive reform and to manufacture a political and intellectual corps to promote antigovernment

[223] Powell to Sydnor, "Confidential Memorandum."

[224] Powell to Sydnor, "Confidential Memorandum."

ideologies and libertarian ideas, and to "protect" free enterprise. [225] Many of these think tanks still hold influence to this day, including the Heritage Foundation (1973), the Cato Institute (1974), the Ethics and Public Policy Center (1976), the Free Congress Foundation (1977), and the Manhattan Institute (1977). As expounded in Sheldon Whitehouse's book, *The Scheme: How the Right Wing Used Dark Money to Capture the Supreme Court,* Powell's "blueprint" motivated the development of many such institutes, which were, and still are, financed by "dark money" right-wing industrial donors like the Koch brothers to seed doubt about the real human choices that yield environmental damage that destroys the world's natural habitats.[226]

The business community heeded Powell's call to arms. Over the next decade, efforts to realign the nation's attitudes and politics toward the conservative right became increasingly sophisticated, culminating in the presidential election of Ronald Reagan, and a collaborative endeavor by the emboldened Republican right wing to undo the regulatory and legislative progress of the 1960s and 1970s. In the business community, many saw the institutional

[225] Among them were the following: The *CATO Institute*, founded 1974, is a libertarian think tank dedicated to "the traditional American principles of limited government, individual liberty, free markets, and peace"; see https://www.cato.org/about. The *Alexander Hamilton Society* is dedicated "to identify, educate, and launch young men and women into foreign policy and national security careers" in part because "American universities are not providing our young people with an education that allows them to understand what they are defending and why"; its principles include that "America's greatness is the result of its commitment to individual liberty, limited government, economic freedom, the rule of law, human dignity, and democracy"; see Alexander Hamilton Society, "What We Believe," https://www.alexanderhamiltonsociety.org/what-we-believe, accessed February 13, 2023. The *Heritage Foundation*, founded in 1973, promotes "public policies based on the principles of free enterprise, limited government, individual freedom, traditional American values, and a strong national defense"; it prides itself on being a home to Friedrich Hayek and Milton Friedman; see https://www.heritage.org/about-heritage/mission. The *Manhattan Institute*, founded in 1977, considers itself "a leading free-market think tank" focusing on "Economic Growth, Education, Energy and Environment, Health Care, Legal Reform, Public Sector, Race, & Urban Policy." The *Free Congress Foundation*, founded in 1977, is a conservative think tank founded by Paul Weyrich, a "religious conservative political activist." The *Ethics and Public Policy Center*, founded in 1976, considers itself the "premier institute working to apply the riches of the Judeo-Christian tradition to contemporary questions of law, culture and politics"; see eppc.org, accessed February 13, 2023. The *Heartland Institute*'s mission is "to discover, develop, and promote free-market solutions to social and economic problems"; see Heartland.org, accessed February 13, 2023. The *American Enterprise Institute* is among the few conservative think tanks founded earlier, in 1938; see AEI, "Koch Brothers," https://www.aei.org/tag/koch-brothers/, accessed February 13, 2023.

[226] Sheldon Whitehouse, *The Scheme: How the Right Wing Used Dark Money to Capture the Supreme Court* (New York: New Press, 2022), 39–43, which places this memo in the context of the contemporary capture of SCOTUS today.

manifestation of the wider attack on "free enterprise" in the EPA and OSHA, as cautioned by Powell. Trade associations for the chemical, plastics, and asbestos industries, along with the petroleum and automotive industries, started to lobby Congress, attack critics, and publicly deride and ultimately destabilize agencies like OSHA and the EPA which, by enforcing protections for the environment and American workers, threatened their corporate interest: profits. Essential to this effort was the manipulation and corruption of science. As long-time Administrator of OSHA under President Obama David Michaels identifies in his book, *Doubt is Their Product.* From the lead industry in the '40s and '50s, and the tobacco industry, trade associations and chemical companies since then, the control and manipulation of science was critical in their overall political strategy to stymie regulation and public oversight.[227]

[227] David Michaels, *Doubt is Their Product: How Industry's Assault on Science Threatens Your Health*, (New York: Oxford University Press, 2008).