

# A Comic Book

by

Oluwadarasimi Atanda

Shri Vishalini Rajaram

Michelle Scherer

Kristy L Hartsgrove Mooers



# PCBs

## Here, There, and Everywhere

"The presence of Polychlorinated biphenyls (PCBs) in the environment is a reminder that our actions have consequences and that we must be responsible stewards of the planet." - Rachel Carson

COMMUNICATING DATA THROUGH STORIES



Hi, I am Darasimi, and I will be your narrator for this comic book. This is an excerpt from the book, "Biocidal: Confronting the Poisonous Legacy of PCBs" by Ted Dracos.



"There is no calamity greater than lavish desires. There is no greater guilt than discontentment, and no greater disaster than greed." Lao-tzu

At Swann's Corporation, Theodore Swann, a 33-year-old industrialist, had just returned home to Anniston, Alabama, and called for his young chemists for an emergency meeting.



Guys, this is going to be huge! Get ready to mint millions!



This is confirmed news from the executive team. They need the magic fluid to power the United States, and we will be the number one supplier of it.



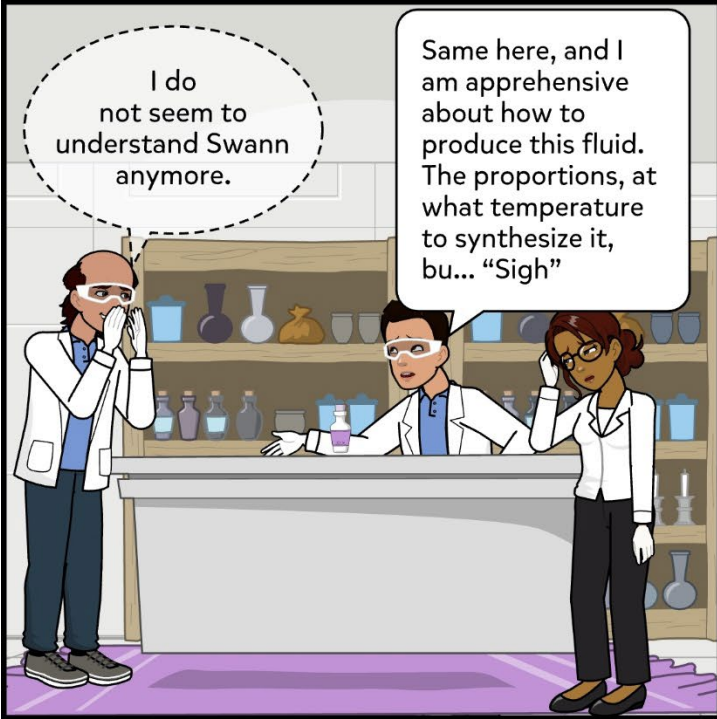
But... Swann, manufacturing this magic fluid will be risky and almost impossible. I don't think this is a good idea.

This is the same chemical that a roadside vendor called Eastman Kodak sells. You will all mass produce it, and we will sign huge deals with electric giants like General Electric.





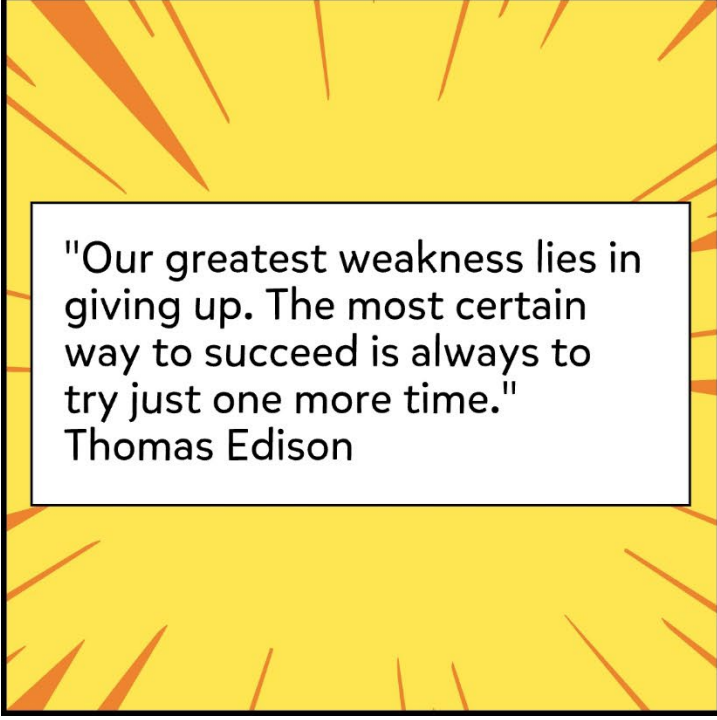
Did you say impossible? I don't care about the risks, and I give you sixty days for two tanks... Sixty days!! Now get back to work!!!



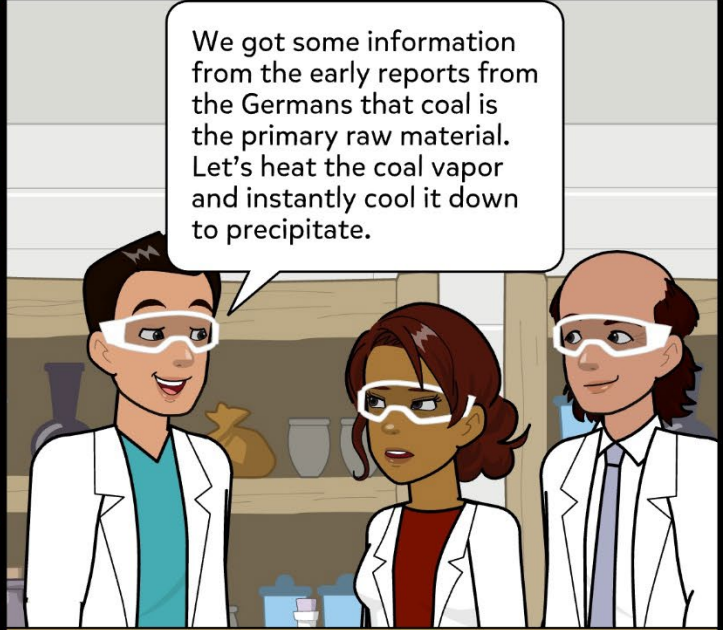
I do not seem to understand Swann anymore.

Same here, and I am apprehensive about how to produce this fluid. The proportions, at what temperature to synthesize it, bu... "Sigh"

The chemist did not know what was needed for this magic fluid. Days passed with sleepless nights as they crashed down on the lab couches and tried combinations of everything they knew about it. They weren't happy even when Swann gave them many pep talks and inflated their wages with company stock.



"Our greatest weakness lies in giving up. The most certain way to succeed is always to try just one more time."  
Thomas Edison



We got some information from the early reports from the Germans that coal is the primary raw material. Let's heat the coal vapor and instantly cool it down to precipitate.

Although they could get some pure products, the equipment's heating element became clogged.



Why don't we try benzene? We know for a fact that it can precipitate pretty well.

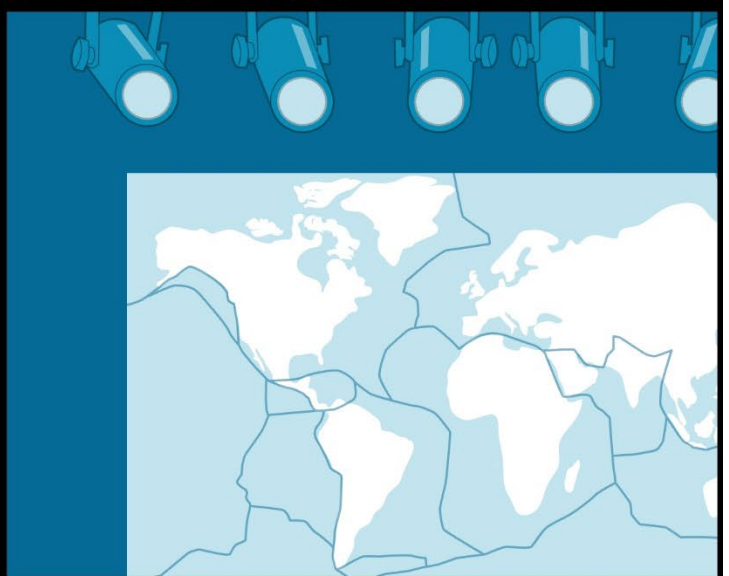
Are you out of your mind? If we heat and cool benzene at that extreme temperatures, it is not only the end of us; the explosion will ruin everything and everybody.



Silence filled the room until the head chemist agreed... They further synthesized the magic fluid by refining the methods, and Swann Corporation began mass production of the so-called magic fluid containing polychlorinated biphenyls (PCBs)! Swann began to sign huge contracts with his elixir.



I am now one of the wealthiest men in the United States, my plant is producing enormous amounts of phosphorus on one side, and my magic fluid, "PCBs," is creating revolutions in the electric and paint industries.



As PCBs became widely used worldwide, so did Swann's wealth. He traveled to exotic locations, threw lavish parties, and built extravagant homes filled with medieval English furnishings.

"Where wealth is health, bankruptcy is death."  
John Maiorana

Life is good when you're at the top! Money can buy you anything, even happiness. I have everything I could ever wish for and more.



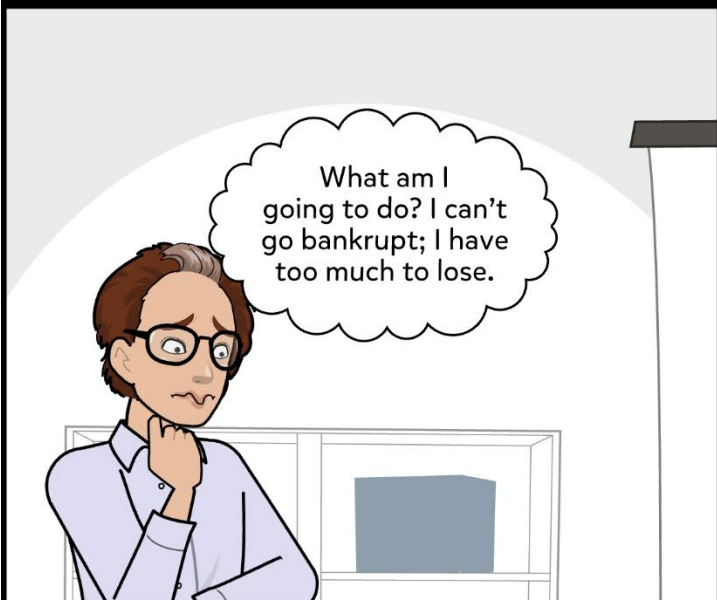




What economic meltdown? I have too much wealth to worry about something like that.

Swann did not realize that he was building himself into bankruptcy. He continued spending lavishly, even as the economy around him faltered.

The Great Depression hit the United States hard, and even Swann's wealth was not immune to its effects. His stock interests were decreasing, and his collateral loans were increasing, leaving him unable to pay the claim.



What am I going to do? I can't go bankrupt; I have too much to lose.

Swann was not ready to give up. He invited two white knights, Edgar Queen, and Edward Mallinckrodt, to help him salvage his fortune.



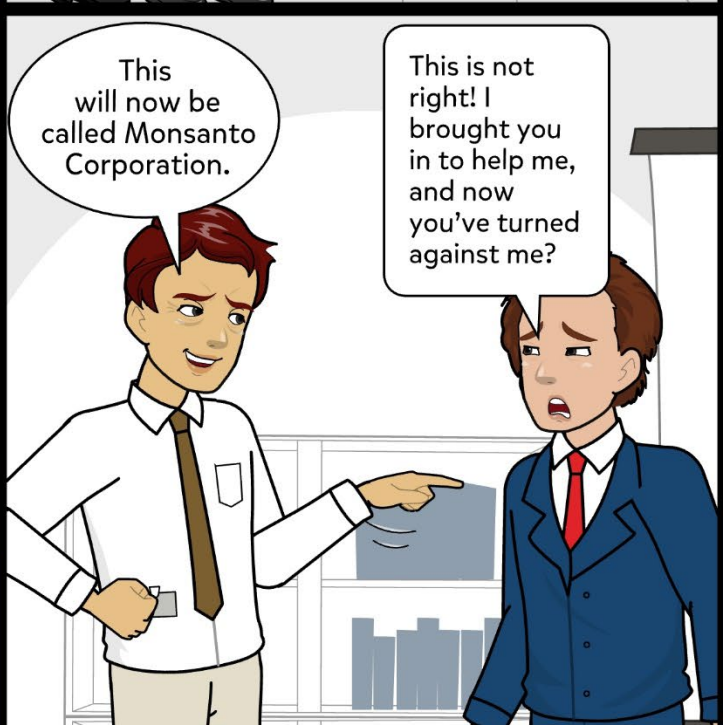
We will help you, Swann. We have experience in the chemical industry and can help you turn things around.

And we have financial resources to help you get back on your feet.



"Thank you, both of you. I couldn't have done it without your help."

...But then, these knights morphed into sharks. Edward reaped profits from short-term investments, while Edgar went a step ahead of him. He took over Swann's Corporation, pushing Swann out with a million-dollar buyout.



This will now be called Monsanto Corporation.

This is not right! I brought you in to help me, and now you've turned against me?





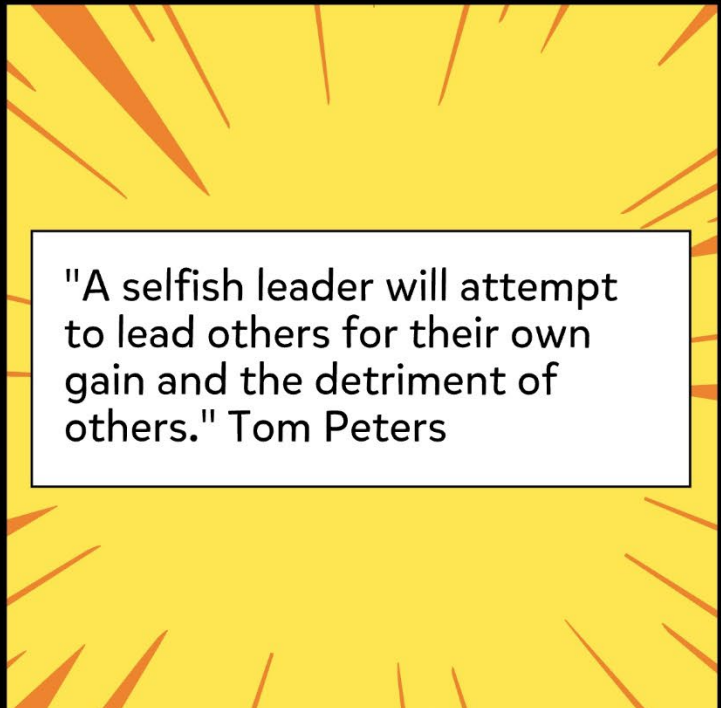
This is business, my friend, not a place for emotions. Haven't you heard? "Everything is fair in love and war."

My life's work, all for nothing. I hope my mistakes will serve as a warning to future generations.

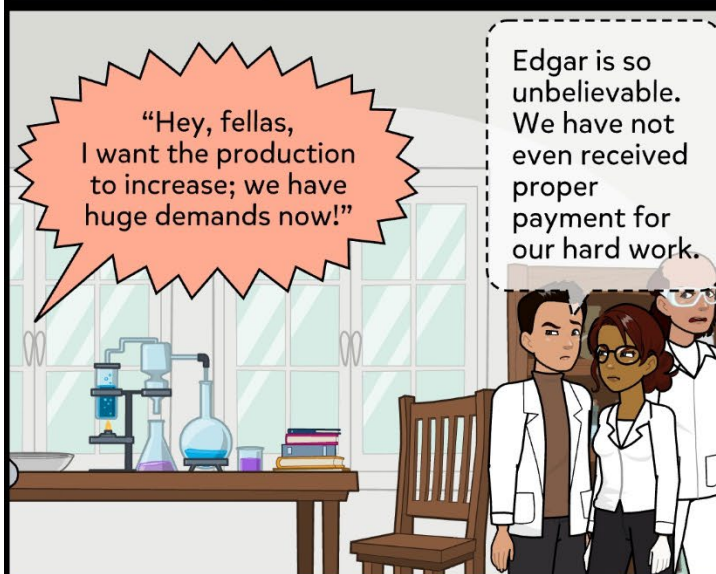


And I hope my success will inspire others to reach for greatness.

Theodore had nothing left to defend and continued to lose his legacy. He was forced to sell his castle and eventually passed away. On the other hand, Edgar was minting profits, making Monsanto Corporation one of the most successful agrochemical companies in the world.



"A selfish leader will attempt to lead others for their own gain and the detriment of others." Tom Peters



"Hey, fellas, I want the production to increase; we have huge demands now!"

Edgar is so unbelievable. We have not even received proper payment for our hard work.

From 1947 to 1977, two General Electric (GE) capacitor manufacturing plants in Hudson Falls and Fort Edward, New York, dumped approximately 1.3 million pounds of PCBs into the Hudson River. It wasn't a singular event but rather a gradual accumulation. Eventually, Edgar coined the name "Aroclor" to market PCBs.

Edgar had intelligent business acumen. Understanding the cue, he paid \$45 a share even during the Depression era to retain Swann's most loyal employees, making them wealthy.

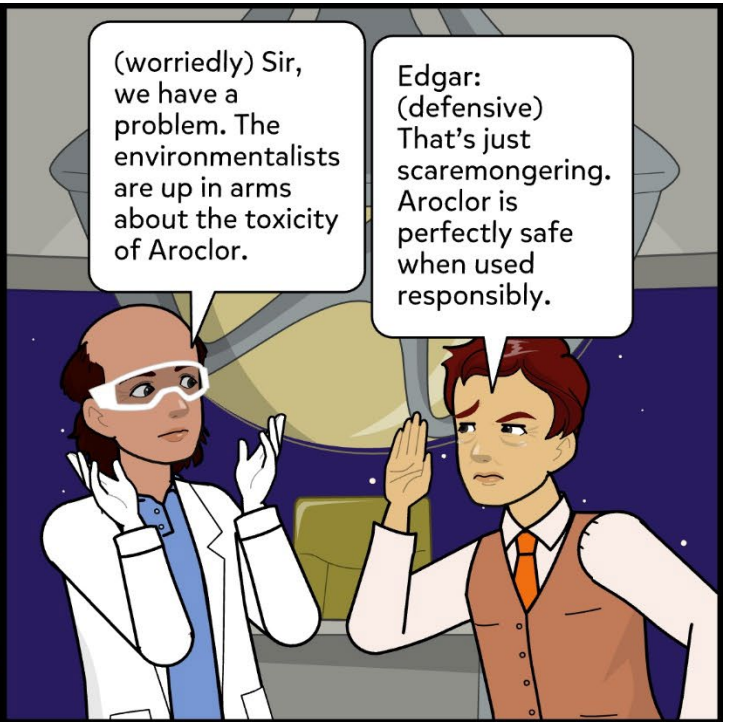
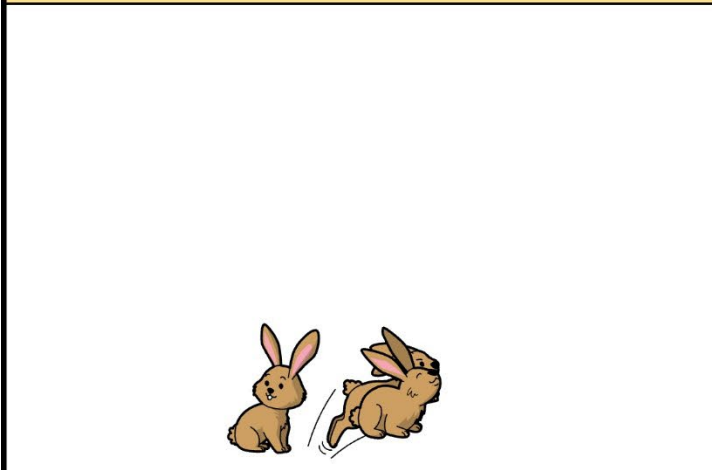




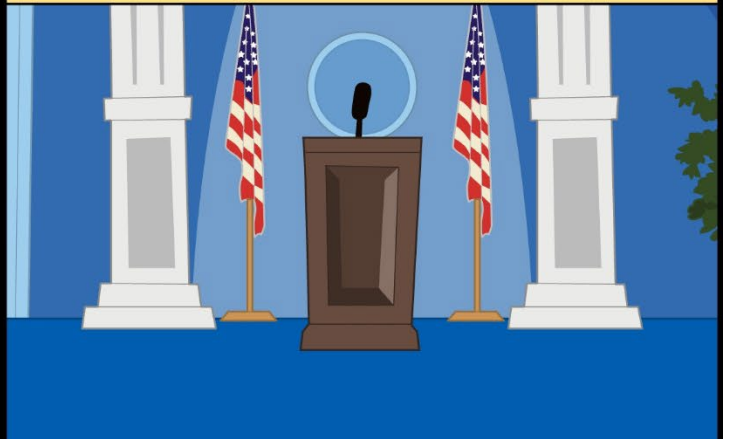
Monsanto started marketing Aroclor as a miracle chemical that could solve various industrial problems. They poured millions of dollars into advertising and promotion, and soon Aroclor became a household name.



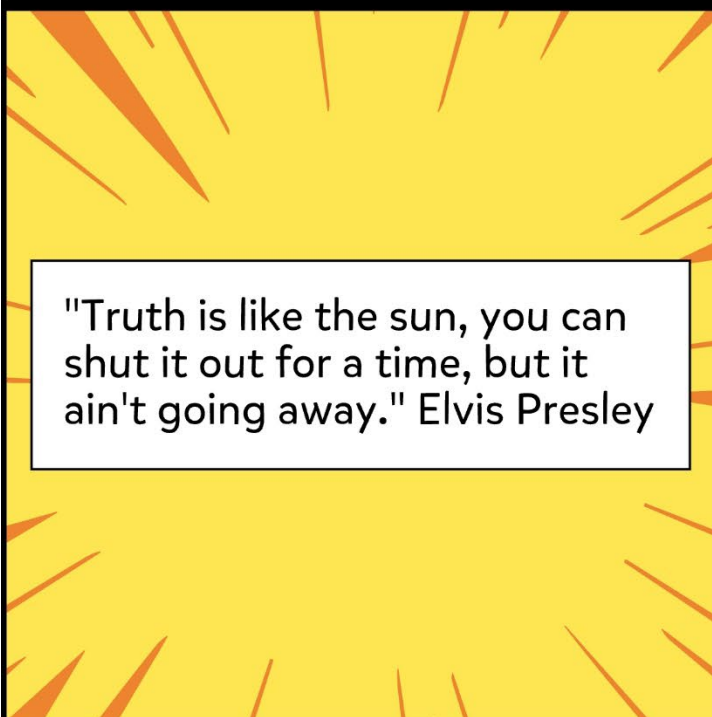
Edgar went on thinking about saving his business. He ran tests on rabbits and installed the necessary ventilation and baths, providing workers with separate clothing sets and cold cream daily. Edgar took every possible precautionary measure until employees fell sick with similar symptoms and died due to acute yellow atrophy of the liver.



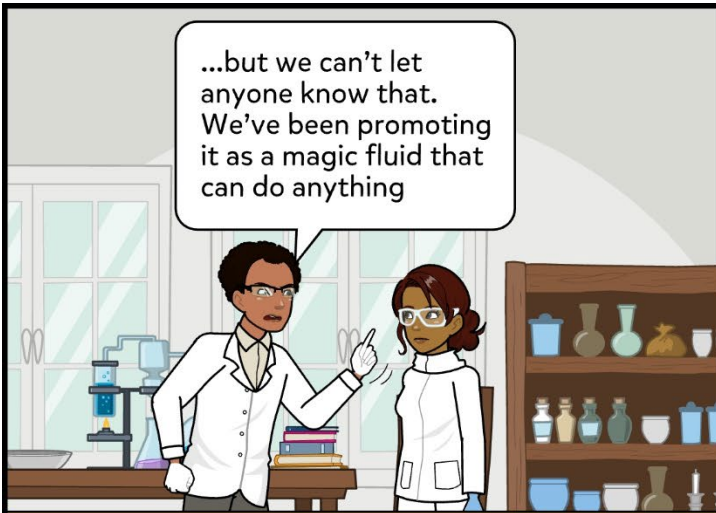
Edgar ignored the voices from the Massachusetts State Occupational Hygiene Department, asking him to label PCBs as toxic. Accusations were shut off by Edgar's favorite physician, Dr. Kelly. He claimed that neither his systemic reactions nor human experiments have proved that PCBs are toxic. Another irony was that the state was ethically unprepared to use its workers as guinea pigs.



In the 1944 Monsanto salesman's brochure, after five pages of descriptions of their product, Monsanto finally got around to the toxicity of PCBs.

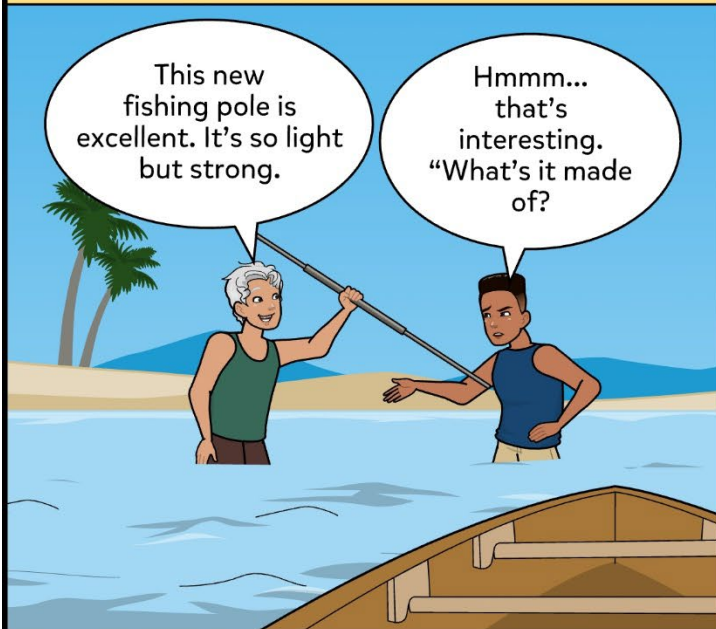




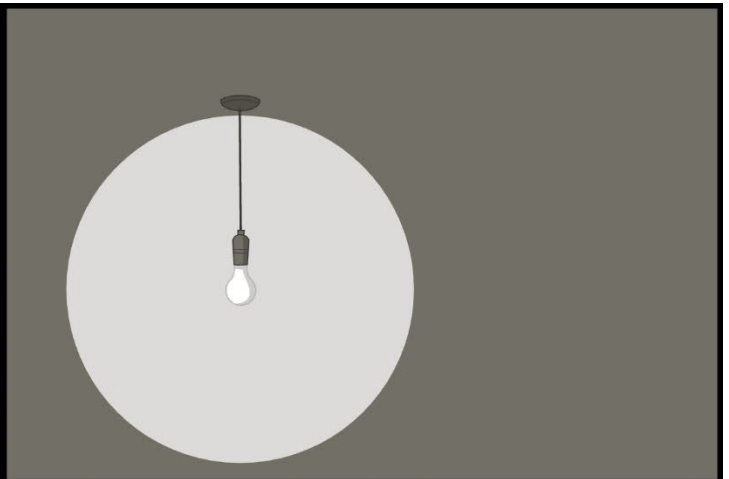
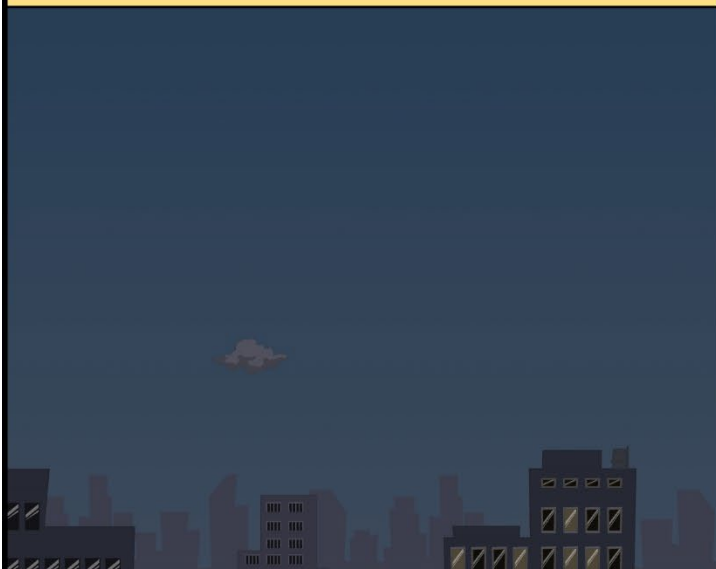


Kelly still couldn't allow himself to let anyone at Monsanto admit that PCBs were toxic to humans. This, even though he knew of more than a decade of incontrovertible evidence to the contrary—including the deaths of at least three workers and the poisoning of hundreds, perhaps many thousands, more

The most bizarre use of Aroclors was the application of the chemical directly on fishing pole handles



A few years later, queries about PCB toxicity came from a potentially huge customer. None other than competitor and fellow chemical industry giant Dow Chemical wanted more information about PCBs.



Aroclors were marketed for several uses, including as a hydraulic fluid for heavy equipment, coating for electrical cables, and wiring that could render them non-flammable and perfect for all types of paints and lacquers. Monsanto was aware of the dangers posed by PCBs but didn't warn unsuspecting buyers or consumers.



These fishermen didn't know that handling the fishing poles permeated with Aroclor for hours without gloves could expose them to PCBs enough to cause permanent systemic damage while waiting for that lunker bass to strike.

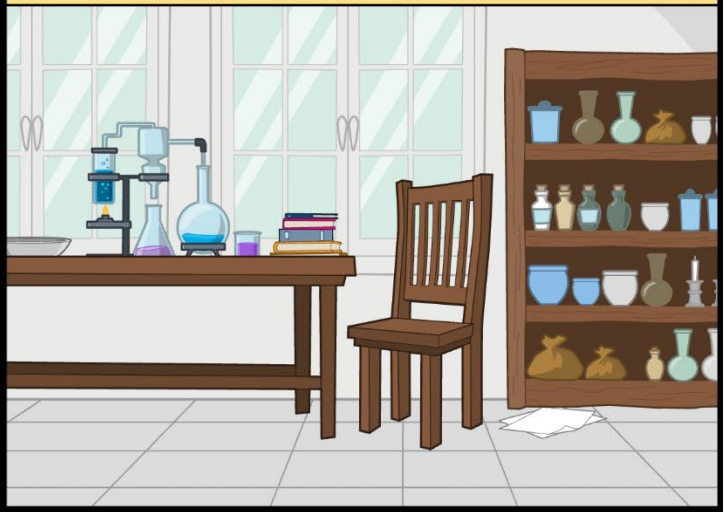




Of course, we stand behind the safety of our products. We'll run some tests and provide you with all the necessary information.



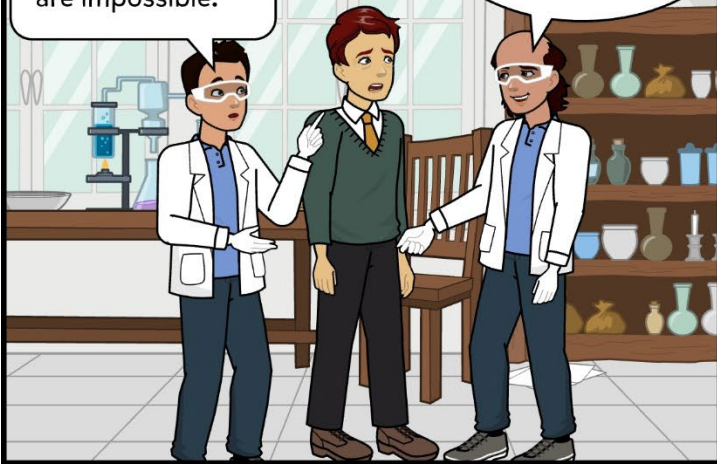
Monsanto triggered a "confidential" reinvestigation of PCBs to convince Dow that using Aroclor in their plant was safe. However, the tests that Monsanto ran were "air concentration" tests. They used PCB-impregnated paints in rooms of different sizes with different ventilation levels. The results were mixed.



The tests' conditions and the apparatus's limitations are such that absolute determinations... are impossible.

So what do we tell Dow?

That Aroclors are safe according to our label instructions.



The results made Rickover and Dow Chemical reject PCBs for their products, eventually leading to caution labels on all the products. Things became worse for the Monsanto Corporation and PCB production. Meanwhile, people were getting exposed to PCBs all over the world through various exposure pathways (air, soil, and water) and routes (Ingestion, inhalation, dermal)



"Science, my lad, has been built upon many errors; but they are errors that were good to fall into, for they led to the truth." Jules Verne

Another chemical called DDT (dichlorodiphenyltrichloroethane), an insecticide, was taunting most continents. The Swedish government ordered a scientist, Jensen, to test the countryside for DDT poisoning. However, he landed on a shocking discovery that would change the world forever.





Where could it be? The Swedish government wants me to find evidence of DDT poisoning, but something doesn't feel right.

He decided to take matters into his own hands by going to the countryside to investigate.

For years, Jensen had been studying the effects of pesticides and other chemicals on the environment, and he knew something was off about the assignment.

Jensen took some soil samples back to the lab and began testing them for DDT poisoning. However, what he found was even more alarming.

This can't be right. These samples are contaminated with PCBs, not DDT.

Jensen could not stop thinking about his findings. He was even more devastated when he heard about recent disease outbreaks in various parts of the world. Patients were reporting symptoms of large blackhead ruptures, acne, and boils on their faces but could not figure out the reason for the disease.

Jensen later met with the Swedish government, and the discovery of PCBs in the Swedish countryside set off a chain of events that would lead to a global awareness of the dangers of these chemicals. Scientists and environmentalists worldwide began to study the effects of PCBs, and many countries banned their use entirely.

Doctors saw victims in Japan, Taiwan, China, and other parts of Europe. The only typical food in all of them was cooking oil. All the usual chemical tests turned negative. But Jensen knew that it was contamination by PCBs.

