Toms River Study Guide

Toms River by Dan Fagin

BOOKRAGS

Contents

Summary

This study guide is based on the following version of this book: Fagin, Dan. Toms River: A Story of Science and Salvation. Washington: Island Press, 2015.

This is a work of nonfiction that chronicles the historical aspects of environmental science, and how pollution leads to illness. While the grand story arc encompasses hundreds of years of history, the parts relating to Toms River focus on approximately the last 60 years.

Toms River started out as a large - but sparsely populated - agrarian town near the Atlantic Ocean, Barnegat Bay, and the Toms River, which gave the town its name. A Swiss industrial giant with more than 100 years of experience manufacturing dyes and other chemicals decided to build a factory there. The company had been chased out of Cincinnati for being one of many companies that polluted the Ohio River. The company, Ciba-Geigy, bought acres of land in the pine forest. No one knew what was going on back in that factory unless they worked there. The workers were threatened if they complained too much about unhealthy work conditions.

The unhealthy conditions spread further than the factory, though. The dye manufacturer created a lot of waste, and something had to be done with it all. The most economic way to dispose of it was to dump it. A pipeline led to the Toms River. When people complained about that, the company got permission to build a pipeline to the ocean. When people complained about the smoke coming from the smokestack, the company started utilizing it more at night so no one would see the smoke. There were also hundreds of drums of liquid chemicals buried and leaking all over the property. In some cases, the liquid waste was simply poured into the ground.

In another area of town, there was a closed chicken farm owned by an immigrant couple. It would become known as the Reich Farm. They had made a deal with a man named Nick Fernicola that he could store some drums on the back, unused acres of the farm. He had a contract with Union Carbide, a factory in northern New Jersey, to dispose of its drums of waste. Instead of paying fees to dispose of the waste in a legal way, Fernicola just dumped it all on the Reich property. The drums leaked, and the chemicals seeped into the ground.

Contamination from both of these sites would go on to poison wells in the area. Most of them were private wells. Entire neighborhoods were drinking the chemicals. They were urged to switch over to the township's water pipes, so they did. However, the township's wells were also contaminated by the same waste. The Toms River Water Company did not release that information. The local politicians did nothing. They had too many connections to the water company and to the Ciba-Geigy management. They did not rock the boat.

Eventually, the secrecy that surrounded the factory and its pollution came to light. In 1984, the pipeline Ciba-Geigy used to transfer waste to the ocean leaked right in the

middle of a residential area. Most residents did not know that Ciba-Geigy had an ocean pipeline. This angered a lot of people. That anger caused the local politicians to have to act. Many towns depended on the beaches for their tourism, and word of a factory dumping into the ocean would hurt the economy.

It was around this time that some local residents started organizing to demand better environmental protections. Chief among those was Linda Gillick. Doctors believed that her son, Michael, developed cancer while still in the womb. He had the disease his entire life. She organized a group of families of children with cancer called Ocean of Love, named after Ocean County, where Toms River is located. She had met a lot of other patients at cancer hospitals, and a very high number of them came from Toms River. A former teacher, she was able to help put a human face on what would be called by many a “cancer cluster.”

Ciba-Geigy was on the front line, but people did not seem to blame the Reich Farm for the contamination. Additionally, the author states that there were any number of other smaller polluters in the area, such as gas stations. However, Ciba-Geigy was the main opponent for most of the people.

A local news reporter, Don Bennett, wrote almost daily about Ciba-Geigy and the chemicals that were being used there. Eventually, his stories graduated up to state newspapers that were read by state politicians. The outcry was bigger than anything Ciba-Geigy or their friends in local politics could contain. Finally, an unlikely chain of connections from a cancer nurse in Philadelphia to the state government caused the state to finally investigate the issues.

Throughout the book, the author explains key moments in epidemiology, the study of illnesses and their causes. Specific physicians and other great thinkers are highlighted. Epidemiology has come a long way, but it falters when it comes to finding a direct cause for a particular illness. Some cases are very clear, such as when scrotal cancer was detected in high cases in chimney sweeps. But often, there was only a correlation, not a causation. There were elevated numbers of certain cancers among people who lived a certain way, but it did not necessarily prove anything. Although it takes a while for the author to get there, he shows the strengths and weaknesses of this scientific field to show why these cancer studies would ultimately come up empty-handed.

The first physician Fagin highlights is Paracelsus, a Swiss physician in the 1500s. While all of his peers believed that illnesses were caused by humors - an excess of blood that needed to be leeched, for example – Paracelsus was the first to study the environmental factors of a patient. How did they live? It was this question that laid the basis for research-based studies on illness.

A series of other physicians and scientists followed. Each one added something to the field, or took something away. The physicians learned that an outside force, like pollution, could cause disease. However, going even further, they learned that multiple things could cause disease. A researcher could no longer draw a line from water quality to cancer. Now, they had to contend with a number of factors, including genetic

predisposition, diet, and smoking. Therefore, while environmentalists were able to claim that pollution caused disease, the polluters were able to show that the cancer could have come from a number of sources. In court, when juries had to decide something without any shadow of doubt, it was easier for corporations with deep pockets to find experts to shoot holes in any theory that environmentalists could have. A correlation between pollution and illness was not enough. There was no causation.

The book ends with the conclusion of a legal settlement between the Ocean of Love families and Ciba-Geigy, Toms River Water, and Union Carbide. The families received an undisclosed financial package in exchange for allowing the companies to say that they did nothing wrong. The author had spent hundreds of pages explaining things the companies had done wrong, but ultimately it was not proven that those wrongdoings were the cause of cancer in Toms River.

Section 1: Chapters 1-7

Summary

The book begins with a prologue describing what Michael Gillick's life was like. Michael was diagnosed with neuroblastoma when he was three months old. Doctors suspected he had developed the cancer in utero. What followed was a life of chemotherapy and a large volume of regular medications. As a result of his disease, and the side effects of the medications, Gillick was in nearly constant pain, nauseous, and weak. As an adult, he stood at 4 foot, 6 inches tall, and weighed 100 pounds. Born in 1979, he was nevertheless mistaken for a child in public. He lost the ability of sight in one eye and hearing in one ear, and his face was constantly bloated. Because of how difficult it was for him to get out, he did not work and his attempt at college ended after one semester. He also did not have much of a social life. Most of the people he got to know were other cancer patients, and he outlived most of them.

Chapter One explains in quick order Toms Rivers' early history. There were pirates or privateers, depending on who was considered the good guys, during the Revolutionary War. For the most part, the town's history was unremarkable. As the 1900s came into being, there were just a few thousand people living there, and most of them lived off the land. There were a few rich landowners who controlled the politics and business interests in the area.

Fagin then jumps back in history and explains the origin of coal tar, which had been worked over by an 18-year-old chemistry student named William Henry Perkin. This English scientist accidentally figured out how to dye fabrics by adding base chemicals to coal tar residue. His discovery made him rich. Other companies, reproducing his experiments, made themselves even richer. Two of them were named Ciba and Geigy. These two companies merged in order to do business in America, building a factory in Toms River. In Europe, the chemical companies fouled rivers and land with toxic wastes before local officials finally called on them to make changes. They formed a partnership and opened up factories in Ohio. Since they continued with business as usual, the Ohio River was soon full of pollution as well. Once politicians started forcing them to pre-treat their own waste before dumping it, they decided to move. They selected a small town with few regulations: Toms River, New Jersey.

Chapter 2 explains Ciba-Geigy's plant in Toms River. The property was a forested area almost 2 square miles. It was 1,350 acres, with enough room for multiple factories. There was also enough room for a half mile of forest on all sides to buffer it from neighbors. No one knew what was going on there unless they worked there. When the plant opened in 1952, it could produce 35 colors and 4 million pounds of dyes every year. It amounted to 10 percent of the dye produced in America. This earned the company about $6 million that first year, equivalent to $50 million today. By the 1970s, there would be 22 buildings, five waste lagoons, and more than a dozen dumps on the property.

The problem with dye manufacture, the author explains, is that it created more waste than product. “The process was so inefficient that at Toms River, making brown vat dye, a typical example, required five and a half pounds of raw material to produce one pound of finished dye, with almost all of the remainder discarded as waste. (p. 25)”

The plant was welcomed with open arms in Toms River, injecting new jobs and growth into the community. It hosted tours for the press, which fawned over it. Local politicians were wooed. Every effort was made to have citizens have a good feeling about the plant. In the beginning, the plant workers dumped more than 1,000 55-gallon drums every year of toxic waste on the site. By the late 1970s, that number would be closer to 10,000 drums a year. It also included more than 2 million gallons a day of wastewater (toxic liquids diluted with river water), which increased to 5 million a day in the 1970s. They also started dumping directly into the groundwater. As one 1949 company memo stated: “At Toms River, all objectionable sewage can be disposed of by irrigation of the sandy soil with only a minimum treatement, without difficulty and at very moderate cost.” The state health department did not investigate the plant. Instead, it believed all of Ciba-Geigy's claims of being safe and creating very little waste.

In this chapter, the author also delves further back in time to discuss Paracelsus, a self-taught Swiss physician in the 1500s. He was hated by his peers for rejecting their ideas that illnesses were caused by an imbalance of humors. Instead, he thought that everything could be learned by observing the patient. His influence would be described further throughout the book.

Chapter 3 explains how the town of Toms River grew in the mid-1900s and Ciba did as well. As it grew, the company's upper echelon had become active in local politics and civic groups. It had been colloquially known as Ciba despite a series of partnerships and mergers, because Ciba had remained the dominant company. The factory itself was called Toms River Chemical. In 1958, Ciba closed its other American factories due to increased environmental scrutiny. It shifted all of its work to Toms River. The azo dyes now being created there used phosgene, which was used as a weapon in World War I, and benzidine, which proved carcinogenic in Ohio.

The author quotes Ray and Jackie Talty, who both worked at the factory. Jackie spoke about nylon stockings that would melt on women's legs if they went into certain buildings. If they complained, they were told to be thankful they had a job. Ray explained “Early on, we didn't really know much. In the 60s, if you said anything the supervisors could be pretty sarcastic. Some of them would say, 'What do you think this is, an ice cream factory?' “ (45) His brother, John Talty, was splashed with chemicals and was told by the company nurse to just go home and shower. The next day, he had open sores on his face. His way to combat this was to get involved with the plant's union. Even so, stories started to spread about employees developing cancer. Many of them had been transplants from Ohio. Some were new, like Jackie Talty, who developed breast cancer at age 26.

This first part of the book is called “The Ice Cream Factory.” Fagin names it after that quote from management which characterized their flippant disregard for safety.

Encapsulated in that quote is the knowledge that the management knew the conditions were unsafe but did not care.

The author briefly segues into a story about Percivall Pott, a British doctor in 1775 who studied how chimney sweeps were developing testicular cancer. It was one of the first clear lines of workplace conditions causing a disease.

In 1954, Morris Smith, who was in charge of wastewater at the factory, wrote to superiors about how the water being brought into the factory had been fouled. The waste dumped on the property had, in just two years, contaminated the water supply that the factory itself was using. Smith alerted his supervisors that the plume of contamination was spreading beyond the grounds of the factory, to nearby neighborhoods, and would soon hit the Toms River. The company responded by building a stronger dump site closer to the river, so that when the site eventually leaked, it would just leak into the river. The author is critical of the state department of health for missing this: “The State Department of Health could have insisted on a more effective treatment system, just as it could have back in 1952. But state officials did no such thing; instead, they rubber-stamped the company's plan, concluding that it was consistent with the prevailing industry standard, and issued a new permit. (51)”

In the early 1960s, the state Division of Fish and Wildlife started looking into the complaints that Toms River Chemical was causing fish kills. There are small pockets of resistence building up, like the Ocean County Fish and Game Protective Association, which was formed specifically to fight the factory. A developer, Philip Maimone, who sold land to the chemical factory, was now suing it for soiling the rest of his land, so that it could not be sold. Even the governor got involved, coaching the factory leadership on how to woo the town to try to stop all this resistenace. Toms River Chemical was now the second largest producer of epoxy resins and the fifth largest producer of dyes in the country. One employee, Jim Crane, who was tasked with figuring out how to get rid of the wastewater, even though he had no training to do so, suggested building a pipeline to the ocean instead. The oceanfront mayors fought back, even though the Department of Health approved the project.

In Chapter 4, the author explains how the people who worked at the chemical factory knew they were poisoning the environment. Quoting internal communication, Fagin shows how everything was covered up. They were not the only ones doing cover-ups, though.

The Toms River Water Company, which provided water to 7,000 customers through wells, were learning that the water was contaminated. However, the members of the water company had close ties with the members of the factory leadership, so they never alerted the public of the contamination. During a series of secret negotiations in 1965 and 1966, the water company paid for Toms River Chemical's new chlorination facility and signed a document that held the factory harmless for all the contamination of the wells.

Another background section in Chapter 5 spoke about historic figures who used Paracelsus' philosophy to study illnesses. As much as people tried to study the field of “numerical medicine,” calculating illnesses and deaths, it was hard to prove where illnesses came from. Cancer was especially difficult to nail down. It could take years between someone's exposure to harmful chemicals and a cancer diagnosis.

Fagin takes a few segues here. In one, he explains how 19th Century physicians Farr and Snow laid the groundwork for epidemiology by studying the deaths of people in London. In another, Fagin explains how industrialized cities dealt with their waste throughout history. There was never a good solution. However, there was always someone who learned how to capitalize on waste. Toms River Chemical was one, since it was now being paid by other companies to dump their waste through their pipeline that led to the ocean. Another was Nick Fernicola, who was being paid by companies to dump drums of waste wherever he could manage. One of them was Union Carbide, a factory in northern New Jersey. In the early 1970s, Fernicola was paid to dump their waste in appropriate places. He started out making it look legitimate, and once Union Carbide was satisfied that he was doing what he was supposed to, he found other methods, including a closed farm in Toms River. The town found out about what was happening, and reported it to the New Jersey Bureau of Solid Waste Management, which declined to investigate. The farm's owner eventually had Fernicola arrested and alerted Union Carbide to what he had been doing. The newly formed state Department of Environmental Protection said it had no jurisdiction because it was on private land. This waste threatened new wells dug by the town. Union Carbide removed most of the drums, but covered the rest with dirt. There was never any testing done in the public wells. Fernicola, in his defense, said that he was not the only hauler illegally dumping material at the township landfill and other places.

Chapter 6 explains some of the history of cancer, which has been found in dinosaur fossils and the bones of pre-human hominids. Fagin details ancient Greek and Egyptian methods of dealing with the disease. Cancer, as modern medicine had found, was not a singular disease characterized by rapid growth of cells; rather it is a family of 150 or more diseases, most of which have rapid cell growth as a symptom. One physician highlighted here was a German named Virchow, who, in the 1800s, used microscopes to study blood and cell division and wrote an 1,800-page, three-volume book about cancers.

The author also returns to the case of Michael Gillick, the young man who always had cancer. He was born in 1971. At three months old, doctors were unable to remove a softball-sized tumor. His neuroblastoma, first described by Virchow a century earlier, manifested anywhere that nerve cells can be. His family celebrated his first birthday when he was six months old, assuming he would not make it further.

Meanwhile, Toms River Chemical grew to 1,400 employees churning out 131 million pounds of products a year. Two of the company owners partnered into the Ciba-Geigy Corporation. The third company, Sandoz, would later join in 1996 to form the company Novartis.

Changes were going on nationally that were more important. The first Earth Day was held in 1970, the Environmental Protection Agency was formed, and President Richard Nixon was pressured to enforce environmental laws that had been ignored since 1899. Toms River Chemical was charged in 1972 with 206 violations of the 1899 Refuse Act, carrying a maximum total penalty of $515,000, the highest of its kind thus far. While Toms River Chemical had a lot of friends in local politics, they had none in the federal EPA. Instead of going to trial, the Refuse Act was superceded by the Clean Water Act, and the federal government began years-long negotiations with the company. Ultimately, Toms River Chemical made a few changes, and politicians and local residents defended it.

A section of Toms River, Pleasant Plains, was mostly on private well water. These were all being contaminated by the Fernicola dumping at Reich Farm. The town ordered everyone to hook up to the town's water supply, without telling them that it, too, had been contaminated.

The 1980s were a turning point. In 1980, President Jimmy Carter signed a law creating a Superfund that would pay for large scale environmental clean-ups. This fund would be able to bill the guilty parties responsible, to the tune of millions of dollars. As the Gillick family began to meet other families with children with cancer, they started to find that a lot of them came from Toms River. The author also delves into the first reported “cancer cluster,” a mine in Germany where radon gas was later discovered.

Analysis

The author opens with a day in the life of Michael Gillick to show readers the face of cancer victims. Michael had been struggling with his illness all his life. This prologue shows what cancer can do to one person, and how it can taint an entire family. The author, Dan Fagin, opens with this in order to give a human reaction, since much of the book meticulously describes historical and scientific events.

Scientific history is blended with more recent history in order for the reader to draw some similarities between them. While the beginnings of chemistry and epidemiology happened centuries ago, they had far reaching implications. Paracelsus' discoveries laid the groundwork for events to follow. Sometimes, the segues fit neatly into the chapter. For example, the origin of coal tar is described in between portions of Ciba-Geigy's history of using coal tar. Some of it does not fit as neatly. The author obviously did copious amounts of research, and wanted to make sure it all fit in.

The story of Toms River would not be complete without at least a little background explaining key moments in the history of epidemiology: the study of diseases, their cause, and potentially their control. This history stretches back to at least the 1500s. Modern times have created advances in technology that will allow people to study the diseases more closely. The study of cancer in Toms River, and the environmental issues therein, would form a core point that epidemiologists probably study and quote to each other.

Epidemiology goes back centuries, and specific studies about coal tar are even closer. Thus, one of the pervading themes throughout this book is this question: What did people know, and when did they know it?

Ciba, Geigy, and their contemporaries in Europe knew that they were poisoning waterways and the air in the 1800s. Fagin demonstrates how they were basically kicked out of town due to their practices. They were able to set up shop in Ohio only because people there did not know what they had done before. Once people protested the polluting of the Ohio River, politicians finally got involved and put a stop to their wasteful practices. Then, they jumped ship and settled in another unsuspecting town: Toms River. They repeated the same practices that caused widespread illness in Switzerland and in Ohio. Fagin shows every stop of the way to make his point that Ciba-Geigy must have known what had happened because the history of the company was riddled with complaints.

It is difficult to believe now, when there are 24-hour news cycles and environmental education throughout school, but half a century ago, people did not question environmental woes like they do now.

Workers in the 1960s started to figure out that the chemicals were not safe. The stories that the Taltys told, about nylons melting and sores on faces, illustrated that they knew they were working with dangerous stuff. However, it was just the cost of living. In order to have a decent job, you had to put up with a lot. Unsafe buildings were just part of it. Of all the information that Fagin could have put into the book, he made sure to include some commentary from the workers to show that they had their doubts, but had to keep working. He seems to blame management more than the workers. Certainly, he shows that the workers are implicit in the pollution, but were doing what they were told.

Fagin shows that popular opinion was that pollution was always someone else's problem. The interoffice memos that Fagin quotes described how the sandy soil was great for dumping liquids. They just drained right down and disappeared. Flushing the liquid into the Toms River or into the ocean also made their problems effectively disappear. Whether they would ever reappear was someone else's problem. No one, or at least no one Fagin interviewed, thought much about what would happen later. The people in Toms River associated more urban cities in northern New Jersey as being polluted. Those were cities with lots of factories, as opposed to a town with one factory. Being hidden away in the Pinelands, the factory was mostly out of sight, out of mind.

In building the history of Ciba, Geigy, and other chemical companies, as well as early medical students like Paracelsus, the author builds the case that the company leaders should have known better than to pollute the area. When the company was run out of Ohio for being one of many factories to poison the Ohio River, it knew then that it's waste was toxic. Back in its native Switzerland, when nearby residents starting getting sick, it knew its waste was toxic. That was more than 100 years ago. Even if they did not study the works of ancient medieval doctors, there were closer sources. Fagin demonstrates that these chemical companies had more than a century of company history to learn from. They should have learned that their activities were dangerous to

people around them. However, all they learned was how to hide their activities. He seems to say “Everyone knew, and yet no one did anything.”

Fagin shows how a perfect storm of ignorance allowed this problem to happen. The general public was not aware of what was really going on. The main management at the plant knew what was happening. The management at Toms River Water knew what was happening. They hid the pollution as much as they could. The average resident of Toms River, especially those who worked there, were not privy to the company's history. They were not aware of the legacy they left behind in Europe, or even in Ohio. They were told that what they were doing was safe. They never questioned it.

Ultimately, the book shows that those with money can cover up problems and make it so that no one asked any questions. Fagin explains how before the factory came to town, there were mostly chicken farms and very little income. The factory injected revenue into the area, and people seemed willing to forgive any bad for the good they brought. Even the Taltys, who saw first hand what the factory environment was doing, used the union as their defense. They did not spread word about how dangerous the chemicals were. There was money to be had. The company created a lot of jobs. No one wanted to bite the hand that fed them.

Another recurring theme is that the protections put in place for people were not followed. As the author explains: “The State Department of Health could have insisted on a more effective treatment system, just as it could have back in 1952. But state officials did no such thing; instead, they rubber-stamped the company's plan, concluding that it was consistent with the prevailing industry standard, and issued a new permit" (51). This is written in reference to a new dump site being constructed on the property. Throughout this book, the author is critical of a lack of adequate protections. He shows how the local politicians turned a blind eye; the state Department of Health was just a bureaucracy that could not or would not do its job; after the federal government found them guilty of the Refuse Act, the charges did not stick. There were many, many times that the pollution could have been stopped, or reduced. These times came and went without any real penalty or change. The reader can feel the author's disgust through the language he uses. For example, “rubber-stamped” is a term used to explain when an agency just approves a plan without really looking at it. It is one of the many times Fagin accuses a government agency with not doing its job.

Vocabulary

fungible, burghers, pinelands, aniline, colossi, abrogation, cartel, irascible, transmute, antipode, canard, effluent, somnolence, mellifluous, lavation, manifold, epidemiology, plume

Section 2: Chapters 8-13

Summary

Part II, entitled “Breach,” begins with Chapter 8. Toms River Chemical was now Ciba-Geigy Chemical Corporation. Its Rhode Island branch closed down because of polluting. This meant that the pharmaceuticals created in Rhode Island were now being created in Toms River.

The turning point for Ciba-Geigy and the community came when a sinkhole opened up in the middle of two busy residential roads, close to schools and a large mall, on April 12, 1984. The liquid waste the company had been pumping into the ocean (which came from their own factory and other companies that were paying Ciba to dispose of their waste) had finally chewed through the steel pipe and eroded the ground around it. Most people did not know that they had a pipeline running right by their homes. Local reporters, such as Don Bennett for the Ocean County Observer newspaper, started publicizing the company's long history of pollution. Residents were up in arms. Toms River politicians defended Ciba. Shore mayors, who were not connected to Ciba, fought against Ciba because of the ocean dumping.

The author again switches to the historic research into cancer. Several physicians had been successful in creating cancer in laboratories under controlled conditions. Recording these conditions proved that cancer could be created by outside sources. However, the outside source, whether it was x-rays, or coal tar painted on rabbits' ears for 250 straight days, had to be repetitive for an effect to take hold. In 1915, scientist Katsusaburo Yamagiwa, whose mentor was Kirchow, was lauded in Japan for his rabbit ear experiment. It eventually led to other researchers around the world experimenting to see what prolonged exposure to different chemicals would do to tissue.

Meanwhile, in the 1980s, a civilian group was created out of local science teachers called Ocean County Citizens for Clean Water. Enraged by the plant's statement that the effluent being pumped into the ocean was “99 percent water and a little salt” (145), they lawyered up and spoke to every lawyer and state and federal employee they could. The EPA tested the effluent and, even after diluting it, found it to be deadly and mutagenic.

The civilian groups continued to get involved in Chapter 9, when Greenpeace staged a demonstration and some sabotage aimed at Ciba-Geigy. They plugged the ocean outfall pipe and climbed the plant's smokestack, sitting up there for two and a half days with a banner that read “Reduce It, Don't Produce It.” For a few weeks, Greenpeace staged events and meetings and showed people what was coming out of the pipe. The publicity spread to New York and Pennsylvania news outlets, then through the Associated Press around the world, including Switzerland, where the parent company was located.

On the historic front, another war was about to start waging. The author describes how another researcher was able to finally determine that a chemical was a carcinogen. While lauded in the scientific community, his discovery was not well received elsewhere. His studies showed that the products of industrialization caused people to become sick and die. Therefore, science became a target when businesses did not want to change their practices.

Chapter 10 highlighted some of the issues with governmental groups going after polluters. They had to prove criminal intent, and they were vastly outnumbered by the polluters. This was the beginning of the movement of targeting polluters, so they did not know what they were doing. Still, the state and federal departments were bringing down charges. Ciba-Geigy was forced to stop taking industrial waste from other companies, and they had to move drums out of one leaking landfill and put them in another.

Corporations often hired their own experts to combat those who said there was dangerous environmental processes. Fagin explains that one such incident involved the du Pont company who had hired a scientist only to fire him when he said that the factory was causing bladder cancer in its workers.

As the state dragged its feet in investigating Ciba-Geigy, local prosecutors got anxious. They were afraid that the state would cave and let Ciba get away with the dumping. So two Ocean County prosecutors, Dick Chinery and Dane Wells, called the state and said they were going to raid Ciba-Geigy. If the county could do what the state did not, the state would look bad. Within hours, state prosecutors arrived at the county courthouse to work out a deal to raid them together. Jorge Winkler, the factory's director of production and environmental services, was fired along with several others. What did not help his case was that Winkler had a side business testing well water in the area.

Ciba-Geigy's negotiations with state and federal investigators made some headway. They were forced to clean up one of their landfills, and pay some fines. In exchange, they operated as usual. Then, four of their managers were indicted by the grand jury in a decade-long criminal conspiracy to circumvent environmental laws.

The workers were not immune to the stories of health and environmental concerns. They all had theories about cancer clusters in the plant, the author discusses in Chapter 11. The problem was, with dye manufacturing going overseas, they all feared for their jobs. George Woolley, who oversaw some of the health issues for the plant, and was active in the union, described how caught they were in the middle. On one hand, the plant was responsive to employees and did make things healthier for them when requested. On the other hand, the laws were very vague about how dangerous these chemicals were and the plant did not act unless the law told them to.

In Cincinatti, a fellow Ciba plant handling similar chemicals was found to be the cause of a cluster of bladder cancer, but the results of that investigation never reached Toms River.

On the scientific front, a shift was being made toward lifestyle choices being the cause of many ailments. Two researchers, Hill and Doll, proved that cigarette smoking contributes to lung cancer in 1950. The downside of this was that factories would now point to their workers lifestyles as the culprits for their diseases. Additionally, the studies were being created by biostatisticians who looked at case studies but never looked at patients the way a physician would.

The combating philosophies came to a head when George Woolley asked the plant for a cancer study of its employees. The plant obliged, and allowed an inspector to come in. However, plant management had convinced Woolley and the union that this particular study would be flawed, because most cancer came from lifestyle choices, not from chemicals in the environment. The union refused to submit to a urine test to determine if there were mutagenic compounds in the body. Therefore, the study was inconclusive.

In Chapter 12, a meeting of the Ocean County Board of Health was taped by a news station producing a documentary on cancer cases in Toms River and its possible link to Ciba-Geigy. It was 1986. A U.S. EPA representative, Maria Pavlova, was making the case that there were some acceptable risks in factory work. Until the data showed conclusively that a certain chemical was extremely deadly, it would not be banned. Her point was that if there was smoke, there needed to be a lot more smoke before firefighters would be sent. A lot of children needed to be sick, not just a few. One resident, Frank Livelli, had a poignant quote at the microphone: “I really think what you're trying to do, Dr. Pavlova, is to make the unacceptable acceptable. What you're trying to say to the people is: Don't worry about it. There will be one case of cancer in a million, and that person who gets it is someone you don't know. He's not a neighbor. He doesn't have a family. He doesn't have friends. He's just an isolated incident and that's the guy that's going to get poisoned and going to get cancer. But you don't look around at the audience and say it could happen to you or your child.”

In June of that year, Ciba-Geigy downsized, moving most of its operations to states and countries with lower pay rates and less environmental oversight. The pharmaceutical factory would be built in its place, but would require the ocean outfall pipe. The license for that pipe would expire in 1990. In 1986, it actually released less waste than the ocean outflow sewer pipes of the town.

In Chapter 13, both sides – the environmentalists and Ciba-Geigy – used their connections to get close to political power brokers in New Jersey. It was now 1987, and Ciba-Geigy's war of hearts and minds was being lost on the local front. “After a while, we figured out that it wouldn't have mattered if you had nothing but distilled water or milk in the pipe, the pipeline was going down” (234). The union vice president, John Talty, told the author this in relation to a summer of medical waste, dead dolphins, and other environmental issues that plagued the county's tourism. None of these issues had been caused by Ciba-Geigy, but an enraged populace wanted the area cleaned up and there was only one business in town that dumped in the ocean.

Meanwhile, the wells pumped by the Toms River Water Company were still polluted. Pollutants from plastic manufacturing and other toxic waste was being found. The public, again, was still never alerted. Eventually, the news slipped out on accident. The chemicals, which might have come from Fernicola dumping Union Carbide drums on the Reich Farm, but maybe from other sources, also turned up in the drinking fountains of two local schools.

At a public hearing, 1,200 people filled a school auditorium in 1988. Union members fought for their jobs. Environmentalist fought for clean water. It was the first time that Linda Gillick had publicly spoken about it. She had been gathering the names and streets of every childhood cancer victim she met while her son Michael was getting treatment. She came with a list to read, but her son, 9 years old at the time, spoke instead: “If you have a child, picture him with cancer because of this water. Think of what it could do to him. He could die at any second, any minute, so please stop! What Ciba-Geigy is doing is really wrong, but you guys keep going on and on doing your stupid job and making people sicker. Please Stop!” (243-3).

The DEP, in 1988, denied Ciba-Geigy's request to build a pharmaceutical plant on the property. The company stopped making dyes in Toms River in 1988. It stopped making resins in 1990. It was now in the business of cleaning up its four decades of pollution. Meanwhile, the Toms River Water Company built a water tower that used a filtration method to reduce the content of one of the most harmful pollutants from its contaminated wells. However, it did not install a carbon filter, which had been recommended 20 years earlier, which would have cleaned it much more thoroughly.

Analysis

The second part of this book is entitled “Breach” for two reasons. One is the physical reason: the pipeline had a breach and that caused people to question what was going on in their town. The other meaning of the word “breach” could refer to information getting out. Residents were finally starting to know what the factory was doing. After the pipe broke at a residential intersection, people could not ignore it. In fact, they could not stop talking about it. Newspaper reporting drilled it home, and the secrets started being uncovered.

Here, Fagin shows how public opinion started to shift. Throughout the 1960s, people did not really know what was going on at Ciba-Geigy. It was described as its own impenetrable castle in the woods. Only the workers knew. There were so many buildings that if you worked in one, you might not know what went on in others. So, while there were stories, most people just kind of got on with life and tried not to think about it.

The information getting out to the people is part of a recurring theme about the power of popular opinion. Fagin shows that for politicians to do anything, there had to be a public outcry. It would be business as usual unless that happened. For Toms River, business as usual was Ciba and the water company being aware of pollution, and the local

politicians not caring. After the pipe burst, the norm became people demanding information, accountability, and repercussions for the pollution. Then, politicians finally started getting involved.

The state did not move to raid the Ciba offices on its own. The county prosecutors forced their hand. It was another case of people only acting when other people were watching. Again, Fagin shows that public opinion was the only thing that mattered.

However, Fagin shows a number of times where public opinion was wrong. Everyone in Toms River was so worked up over Ciba's ocean pipeline that they had no idea that the county had been pumping its own sewer waste into the ocean for years. The county politicians did not inform them of this, though. Additionally, the people of Toms River were angry about medical waste and dolphin kills that were going on offshore. This galvanized them even further, even though these situations were certainly not Ciba's fault. It did not matter, because mob ruled. Ciba's castle in the woods became an easy target to march on with torches and pitchforks.

It was easy for that public opinion to get turned around and overwhelmed, Fagin shows. Ciba was the only game in town until the dumping at the Reich Farm became common knowledge. Then, people were very surprised to learn that they had not one, but two huge polluters in town. The anger that they felt toward Ciba and Union Carbide might have been projection. They were angry at themselves for allowing themselves to be duped for so long. They lashed out at an easy target, when really they should have been asking questions all along.

As the battle between environmentalists and Ciba continued, both sides reached out to politicians to hear their side of things. Politicians only responded to large numbers of people, so both sides were trying to show that they had the larger voting bloc because public opinion was the only thing that mattered.

When finding the root of the cancer cluster, most people were looking for pollution, but the author was looking at a different source: money. It was cost-effective for Ciba or Fernicola to dump chemicals wherever they could. Fagin is critical of commercialism and the idea that it is acceptable to do anything for money. Ciba-Geigy was not about to clean up their operations out of kindness, or the love of nature. The only way to hit them was in the pocketbook. The environmental groups just were not able to do so. Part of this was that not enough was known about the compounds Ciba was using, so it was unknown if they were a threat. Epidemiology was a growing science (another recurring theme), and industry was growing faster. There were more chemicals being found every year, and it was too costly, time-consuming, and difficult to determine which were dangerous. Ciba sometimes fixed problems when it could, but if the chemical was not known to be dangerous, they had no incentive to fix the problem.

Vocabulary

epithelial, mutagenic, epochal, biostatistics, attitudinal, existentialist, Sisyphean, imbroglio

Section 3: Chapters 14-19

Summary

Fagin takes time in Chapter 14 to highlight the work of Theodor Boveri, a German biologist, who studied chromosomes in the early 1900s. During the same year that Yamigiwa was learning that cancer can be caused by prolonged exposure to certain chemicals, Boveri theorized that some people are genetically predisposed to cancer, and needed only the environmental agent to trigger it.

The two-hit cancer theory, created by an American scientist named Alfred Knudson, paired two different theories. Genetics was a growing discipline, and industrial toxins had been studied for years. Knudson said that a cell needs two “hits” to mutate and become cancer. One hit could be a genetic predisposition. The other would be a chemical in the environment.

This chapter also shows brief vignettes of some of the childhood cancer cases throughout the late 1980s and early 1990s. As Linda Gillick started mapping them, officials from the state department were unable to officially call it a cancer cluster because their data was years out of date. Hospitals were supposed to report the cases to the state, but Gillick's numbers were more accurate.

A nurse at a children's cancer ward in Pennsylvania kept seeing “Toms River” on the addresses of patients. Doctors said it was probably just a coincidence. The nurse, Lisa Boornazian, happened to bring it up at a family function. Her sister-in-law, Laura Janson, worked at the EPA. Janson called Steve Jones at the Agency for Toxic Substances and Disease Registry.

The string of unlikely connections continued in Chapter 15. In 1995, Jones called the New Jersey Department of Health and formally requested an investigation of childhood cancer in Toms River. It would wind up being the third time that the state tried to build the case for a cancer cluster in the town. Michael Berry, whose job it was to investigate, saw that there were problems with defining a cluster. Much of it was, indeed, random. “People just didn't realize how much cancer there is all over” (273). Additionally, the state records were still hopelessly outdated. And the state itself never seemed inclined to pursue any investigation all the way through.

Cancer clusters were very difficult to prove. Mere diagnoses were not enough. Since cancers appear more in older people, a study of the ages of patients was needed. Since cancer is really a catch-all for a series of diseases, the cancer diagnoses must be split up into certain cancers. The biostatistics field was growing throughout the last 100 years, but in so doing was able to rule out a lot of what it was looking for: clusters. Additionally, the smaller the study group, the more difficult it was to find a clear answer. Even the top researchers in the field were calling most neighborhood cluster studies a

waste of time and money. They rarely, if ever, provided solid proof. Still, there were enough statistics for Berry to look into it.

In Chapter 16, the author catches up with what was going on in Toms River in 1992. Two Ciba-Geigy executives plead guilty to dumping. The plant paid $9 million in civil and criminal penalties, reimbursed the state for more than $2 million in expenses, and donated $2.5 million to local environmental projects, and $50 million toward clean-up. The ocean pipeline was closed. Ciba-Geigy was now discharging its liquid waste into the county sewer system which, unknown to the general public, was piped into the ocean anyway. As Richard Barth, chair of Ciba-Geigy's U.S. subsidiary was quoted: “In settling with the state, we take responsibility for mistakes that were made at Toms River many years ago. We apologize for them. Fortunately, no harm to health or the environment has resulted” (288).

Meanwhile, Berry was calculating childhood cancer rates in Toms River, and finding that his sources were right, the cases were higher than normal. Throughout most of his department's history, there were never any findings that were truly smoking guns. Most findings could be ruled out as bad luck. However, here was a town with a few red flags. There was more than just random chance at work. However, he wrote up a report that said that while there were higher incidences of cancer, it was probably just chance.

Ciba-Geigy was now called Ciba in 1995. Toms River Water changed its name to United Water Toms River. Meanwhile, Union Carbide's clean-up of the Reich Farm property revealed a plume of contaminated groundwater 400 feet wide, 150 feet deep, and more than a mile long. The EPA wanted them to dig some wells to drain the contaminated water out before it reached two of the town's wells. Union Carbide came up with a better plan of doing nothing and just letting Toms River's wells dredge up the contaminated water and filter it then. The EPA approved the plan.

In Chapter 17, Berry wrote a letter about his findings to three people. Steve Jones, at the Agency for Toxic Substances and Disease Registry, thought it was enough to mount an investigation. Herb Roeschke, at the Ocean County Board of Health, did not tell his bosses because he feared a huge public war. The Ocean of Love volunteers got a hold of it, which gave Linda Gillick all the ammunition she needed. As the author says “It was a transformative moment in the Toms River story: Alarming and scientifically credible information was now in the hands of someone who was dead set on forcing the authorities to act on that information” (309).

The Star Ledger, a larger newspaper, started covering the Ciba-Geigy story, but not the Reich Farm portion of it. This was a newspaper that state politicians read, whereas the local coverage usually did not reach them. This was then picked up by national television news. It made the politicians look bad and forced them to act. A public hearing went out of control, with residents shouting at health officials until they were quieted by Linda Gillick. A state-federal investigation was promised, with water testing, and local people on an advisory board. These water tests found acceptable levels of industrial compounds, but they also found the water to be radioactive. This was something people did not expect, on any side of the issue. As it turned out, radioactive groundwater was

all throughout New Jersey, naturally occurring in the soil. The radium-224 that was found had a half life of just 3.5 days. When water samples sat for weeks before being tested, like they usually were, the radiation levels were extremely low. Since Toms River residents wanted quick answers, the tests were done immediately, and the radium was found to be in dangerous levels. This discovery caused a change in how quickly water gets tested.

The tests also found a mystery chemical and no one knew what it was. DEP investigator Floyd Genicola was the state investigator tasked to the studies, and determined to find out what it was, even though his bosses thought it was a waste of time and money. Through several connections, the mystery chemical was identified as SAN trimer. Surprisingly, Union Carbide admitted to having used it in the past, so a link was drawn from Union Carbide to Nick Fernicola dumping waste at the Reich Farm, to United Water (then the Toms River Water Company) not testing the water, to environmental government groups not requiring more oversight.

In 1996, Ciba-Geigy was formalizing its merger with Sandoz to become Novartis, a pharmaceutical company. In dealing with an insurance lawsuit, their cover-up of the contamination of wells decades earlier was finally unearthed. It closed its manufacturing that year, leaving a skeleton crew behind to supervise the clean-up. Many groups, including the plant's union, was calling for increasing cancer studies.

Linda Gillick was starting to get a backlash. Her berating of public officials made her appear like a bulldog. The news reports painting her as a suffering mom made it look like she was attention-hungry. She received a note in her mailbox one day that read “The water is fine, cancer cluster is probably a freak. Meantime, Ocean County will suffer this summer because you have scared away tourists, home buyers, and others” (333).

In Chapter 19, the cancer study was starting to get underway, but it was difficult. They focused only on childhood leukemia and cancers of the brain and central nervous system between 1979 and 1996.

Workers cleaning up found a memo from the management that said it did not plan on rehiring any of the union members after the plant shut down. That led to employees like John Talty, who was a leader in the union, to speak to Ocean of Love and tell them everything that he had seen at the plant.

Linda Gillick and the Ocean of Love families retained attorneys Mark Cuker and Esther Berezofsky. Cuker had just won a recent pollution case in another nearby region. They teamed up with Jan Schlichtmann, who defended families in a similar situation in Woburn, Massachussetts. This story was made into the book A Civil Action. The movie version had just started being made. Schlichtmann, who was renowned for his aggressiveness in court, was bankrupted by the Woburn case and had become homeless. He quit law but returned after the book had made him in demand again. He had learned that the legal system was not there to help people, it was there to support

lawyers. He advised the plaintiffs to actively seek a settlement and to stay out of the courtroom.

Analysis

The third section of the book, entitled “Counting,” explains how it all came down to numbers: numbers of cancer cases; parts per million of chemicals in effluent; statistic-bending to try to make a case; financial payouts. Throughout the book, Fagin has been dutifully recording numbers when they appeared in his research. Here, it all starts to come together as both sides fight.

Fagin includes another egregious example of federal protections not working. In this case, it was the plume of contaminated groundwater created by the Reich Farm that was snaking its way toward the Toms River wells. Union Carbide's solution was to do nothing. Fagin is incredulous at his description of the EPA approving this plan.

Two themes merge in this section. The first is that epidemiology is a growing field. But that is not as important as the second one, that public opinion is more important than fact. Even though Berry's research turned up statistically interesting results, they were impossible to prove. The science was not able to draw a line between the pollution and the illnesses. His part of the investigation would have stopped there except that he wrote about his findings to Linda Gillick. Ocean of Love members were not convinced that the studies did not prove anything and used the studies as a weapon. Here, information was taken out of the political machine and handed to someone who was willing and able to act on that information. This, the author asserts, is the only way that change can ever take place. The stakeholders in any situation have to take it out of the hands of the politicians and do things their own way. Change can only come from the outside.

Newspaper reporting is considered by Fagin to be a strong ally to the people throughout the book. Part of this is probably because Fagin is a journalist himself. The notes, which take up more than 50 pages in the back of the book, are split between references to scientific research and New Jersey newspapers. The Ocean County Observer, the most local one, is used the most frequently. The Asbury Park Press, a larger, regional New Jersey publication, comes next. Finally there are the few Star Ledger articles that brought the issue to the statehouse and made state politicians look bad. The politicians were not going to change on their own. They were reactive, not proactive. It is another example the author uses to show how change must come from without.

As a result of all the coverage by newspapers and even television news, the politicians started making concessions. Fagin shows how the power was shifted to the people. The people had shown that the politicians did not have their best interests at heart, and that if anything positive was going to happen, it had to come from the people. After writing about government inaction for a few hundred pages, the only time something happened was when everyday people got involved.

Fagin is able to draw a link from Union Carbide to cancer through his research and interviews. Floyd Genicola, the DEP investigator, determined that a mystery compound found in the water supply was SAN trimer, which had been used by Union Carbide and dumped by Fernicola on the Reich Farm. Through all the research Fagin has done, he is able to draw a line from that factory, to the illegal dumping, and then through all the missed opportunities that the water company and politicians should have been protecting the people. It is a pretty solid line, and it serves as the basis for the argument that the residents use for years to come. This argument, that the residents based their opinions on, was based on correlation, not causality. Despite the line Fagin drew, and the families of cancer victims followed, it could not be proven in a court of law. It was one of those things that the people believed in their hearts. It did not have to be proven. The public opinion was more important than if it was able to be proven.

Only a few pages are given to the Toms River residents' feelings about Linda Gillick and Ocean of Love. They were a force to be reckoned with in town. Their press conferences spurred a lot of actions by higher level politicians. However, there are just a few paragraphs about the backlash that Gillick created. The New Jersey shore was losing tourism dollars because people had heard about the pollution. How much tourism dollars were lost, Fagin would be unable to find. This number would not be counted in this section. Another number that remained elusive was the number of people who were unaffected or ambivalent about the issue. Obviously, plant workers and the families of those with cancer have a lot to say about cancer clusters and pollution. But what about the average person who was not affected? Did they just go about their day and ignore it? Did they resent the publicity this town was receiving? Did they feel fearful, waiting for their own child to start showing symptoms of cancer? These are questions that Fagin would never be able to answer. People who did not feel that strongly about an issue generally stayed out of it. He interviewed plant workers and families of people with cancer, the people who felt strongly about the issue.

The courts were another segment of the system that had failed people. Fagin does not delve so deeply into this criticism as he does with, say, the DEP or the EPA. Instead, he lets Jan Schlictmann speak for him. As an attorney who lost everything, including faith in the legal system, in a similar case, Schlictmann is allowed to voice his opinion of the courts. Once he had been a proponent of strongarming the opposition and trying to get them to admit they had done wrong. His goal had been to serve the enemy with a very public and very expensive loss. He had since changed, and told the author how conducting a protracted court battle only made served lawyers' pockets and egos. It is important to let Schlictmann speak his peace here, to set up the future conflict and let the reader realize that there was not going to be a satisfying conclusion: The factory was not going to buckle. They were not going to admit wrongdoing. They were not going to be destroyed in court. This was foreshadowing to show that everything was going to be settled out of court and nothing was really going to change.

Vocabulary

buttress, gavotte, carcinogenesis, mutagenic, biostaticians, minutae, adversarial

Section 4: Chapters 20-24

Summary

Chapter 20 sees the continuation of the investigations into Toms River as they dragged on throughout the late 1990s. The Agency for Toxic Substances and Disease Registry finished two health studies showing that a public health hazard was created due to dumping at the Reich Farm, the Toms River landfill (where Fernicola had first started dumping Union Carbide drums), and Ciba-Geigy. Meanwhile, the entire water system from the 1960s had been mapped out, and weather records were used to determine the path of fumes from the Ciba-Geigy factory and the nearby nuclear plant on Oyster Creek, about 10-15 miles away.

However, setbacks show up in Chapter 21. The EPA never did its own tests. It required the companies it was investigating to arrange for its own tests. There was a study being performed that introduced toxins to rats. This study, by itself, had issues. The rodents one lab used did not have a similar enough composition to humans to be an accurate study. On top of that, it would take eight years to go through the generations of rats.

More cancer cases continued to be diagnosed through Chapter 22. Residents started to really turn on Linda Gillick and the Ocean of Love, accusing them of instigating a cancer scare to win a huge settlement.

In 1998, the Toms River Little League won the world series, which brought the town fame for something other than cancer and a highly publicized murder (The case of Robert and Maria Marshall, which had been turned into a book and movie called Blind Faith).

Genicola found 261 unknown compounds in the water. The state did not want these studied because they were in such small concentrations. Usually, 1 part per trillion would be the limit to a chemical being in the water. But, if one added up all of these 261 compounds, there was 1 part in a million. His bosses told him not to investigate them, so he decided to do it in his free time.

Carbon filters were finally put on the wells to protect the people. These had been suggested decades ago.

On Schlictman's urging, the lawyers from all parties convened and held a mini trial. Instead of a prolonged trial with juries and a judge, and all the motions that would drag out a case, both sides tried to convince the other who would win if it actually went to trial. A settlement was the end goal, but it was not really talked about. Eric Green was brought in to mediate, and basically served as a judge. After both sides did their best at trying to impress the other, the attorneys and experts for Union Carbide, Ciba-Geigy, and United Water started considering a settlement. It would be far less of a financial hit than a lawsuit. Whether or not the science backed the plaintiffs' cases was not as

important as whether the jury believed them. A jury would be able to feel the emotions of a parent with a child diagnosed with cancer. There was enough superficial evidence. If it had gone to trial, the polluters would lose.

In Chapter 23, Fagin analyzes the numerical results of one of the cancer studies. Researcher Jerry Fagliano determined from the results that women who drank tap water when pregnant were more likely to have children with childhood cancers. However, with such a small number of cases, it was hard to prove. There were a lot of dose-response cases. In other words, it could be asserted that living downwind from the chemical plant provided more chances of having a girl with childhood leukemia. However, since there were only a few cases, nothing was proven.

The problem with the studies was a matter of size. All of Toms River was affected, but not everyone got sick. Employees got sick, but they were not in the studies. The studies were kept to just children with cancer, and only the types of cancer that could be traced back to the chemical pollutants. This amounted to only a handful of cases. These handful were still well above what was considered the norm for childhood cancers. However, with such a small sample, the outcomes of the studies were easily debatable. The failure of the studies was not a failure of causation but a failure of statistics. There just was not enough information, and the study of epidemiology had just not progressed enough. Had the study taken place 50 years in the future, after 50 years of scientific advancement, and if during that time reliable records were taken about chemical exposure, then causation would be easy to prove.

As investigations and mediation continued into 2001, all parties started to move toward a settlement. It was difficult to determine how to put a price on a family's tragedy. There were offers and counteroffers for months, while Fagliano's study results hung overhead. He had not completed the study that would offer a huge part of the proof over whether the companies were responsible for the cancer cluster. The agreed-upon figure of the settlement was never disclosed. However, it hinged upon a guarantee that the families would never sue. In a note at the end of the book, the author states the settlement was probably about $35-40 million, split between the families after attorneys' fees and reimbursable charges. It was probably about $300,000 per family. The lawyers donated $150,000 of their pay to TEACH, a local charity that dealt with the cancer clusters. It was also never revealed which company paid how much. While the families got $300,000, as the author estimated, that was the average. Some cancers were more easily attributable to the pollution. Those that had more causality were rewarded more. Those with thinner lines connecting pollution and childhood illness got less. The highest compensated families received six times more than the lowest. This disparity did not sit well with the families. Some thought everyone should get an equal share. Some thought those who lost a child should get more.

The families never got that feeling of relief that comes with closure. The issue just ended. They never were able to prove the contamination hurt and killed their children, and they were never able to bring down the corporations. As the author wrote: “At last, the families had gotten an indirect acknowledgment from Ciba, Dow, and United Water

that their children had been harmed, but it did not come with an admission, an apology, or even an explanation – just a dollar sign, and an unequal one at that" (431).

Fagliano finally released the results of his study after the settlement. The study had cost millions of dollars and took several years. He was able to prove a correlation between girls born during a certain time period in connection to water poisoned by Union Carbide/Fernicola, and the air pollution from Ciba's smokestacks, but nothing else.

A different study of the DNA of the children turned up nothing as well. There was no DNA evidence that explained why the children of Toms River were more susceptible to cancer. Part of this, too, was small sample syndrome.

A multigenerational study of rats being fed SAN trimer finally concluded in 2011, nearly 15 years after Genicola found the mystery compound. It revealed a large portion of rats developing brain and spinal tumors from the chemical. The National Toxicology Program declared it a carcinogen. Two days later, this decision was repealed after cross testimony from experts hired by various organizations in the chemical, petroleum, and pharmaceutical industries.

The final chapter, Chapter 24, shows the effects this ordeal had on the town, the country, and science in general.

Many of the families drifted away from the group after they got their money.

No one wanted to do studies anymore, because they were too costly. No one wanted to find the causes for cancer, because it was more profitable to find a cure.

In the years since the cancer cluster was first studied, rates of cancer have dropped in town. The main cancer that researchers were looking for was leukemia, since that had been scientifically proven to be caused by pollution. The rate for leukemia dropped after clean-up efforts at Ciba-Geigy and Reich Farm.

Another company, BASF, purchased Ciba-Geigy's chemical division, and its clean-up of the Toms River factory. They refused to clean up one of the dumps on the property, and the DEP did not pursue it. Some of the clean-up was experimental, and included mulching it and then burying it again.

Analysis

The final section of the book is entitled "Causes." This is a bit of a misnomer, as no direct cause was ever found for the cancer cluster. Perhaps the author named it "Causes" because that was what people were looking for. Or, maybe it was because some people believed that the pollution was the cause even though it was never officially linked.

Two themes again come together in this final section: the growing nature of epidemiology and the importance of public knowledge. The studies in Toms River were

unprecedented. The reader is told that never before, and never since, have there been millions of dollars spent investigating a local cancer cluster and its causes. Neighborhood studies, which were the names for studies that only had a general location, were not as effective as workplace studies, where the source of contamination usually was more evident. Therefore, there is not a single other town in New Jersey that is mentioned as ever having a neighborhood study being performed on such a grand scale. Most professionals in the health community knew that they would not bear weight. Most politicians did not want to spend the money on something that did not have a significant result. However, the politicians were spurred on by the public. The public knew that the contamination was the source of their health problems even if they could not prove it. Thus, the juggernaut of public opinion was stopped in its tracks by the slow progress of science.

Fagin expresses a number of reasons why the epidemiology would never have worked in Toms River. Part of this is a theme he comes back to time and time again: there was a breakdown in the system that was meant to protect people. The EPA never required (and in fact still does not require) independent testing. Rather, the government relied on the wolf to watch the henhouse. There was no way to get an objective third party study performed.

Another recurring theme was the importance of public opinion. People have a pretty short attention span. The environmental issues had been going on for two decades at this point. In order to keep the politicians' feet to the fire, Fagin credited Linda Gillick and the Ocean of Love. However, people were getting sick of hearing from them. They were accused of crying wolf and being in it for the money. Public opinion changed yet again when boys in town won the Little League World Series, and the town had something else to be famous for.

Progress in these last few chapters came incrementally. Every chapter seems to have at least one action that could be seen as a victory. The wells finally being treated. A connection being made between a chemical and a cancer. And yet, the book does not end at any of these victories. It is a bit agonizing to yo-yo emotionally like this. Every time there was one of these victories, no real change would happen. Or, they would be followed by a setback, or some explanation that showed that the victory was not as great as it seemed. Fagin probably does this on purpose. He wants the reader to feel how the families in Toms River must have felt. This omnipresent issue continued to tick away in the background of their minds, and every once in a while, news would break that there would be a step forward or a step back. For families like the Gillicks, it must have felt like a roller coaster. Fagin stretches these victories out thinly, making the reader feel like they are limping along toward the finish line. It also shows some of his penchant for foreshadowing an unhappy ending.

Public opinion would come back to haunt Ciba-Geigy again as their lawyers sat down for a miniature trial with the lawyers from Union Carbide, United Water, and Ocean of Love. The miniature trial was held to determine who would be able to sway a jury if there was one. This was the final instance of worrying about public opinion, the theme that Fagin weaves through the book. Even if there was no direct proof that the pollution

caused sickness, the jury would still agree with the families. Public opinion is more important than fact.

Many of the Ocean of Love families drifted away from the group. Fagin does not interview them, but discusses a number of reasons why they left. Some might have just wanted the money from the settlement. Some might have been exhausted by the entire situation and wanted to move on with their lives. The fact that the studies did not turn up anything concrete meant there was nothing left to fight. There might have also been personality conflicts.

After the mock trial, there were some changes that validated the public opinion. The rate for leukemia dropped after clean-up efforts at Ciba-Geigy and Reich Farm. This did not prove anything, but it meant everything to the families.

However, the book ends with business as usual. Commercial interests were given more credence than health interests and protections were not in place. Even as a different company purchased the land and clean-up efforts from Ciba-Geigy, the DEP continued to drop the ball, Fagin says. The new owner had a plan to just cover up a lot of barrels on the property, and the DEP approved this plan.

Vocabulary

fractious, propitious, causation, melange, stridency, biomarker, correlated, adduct, covalent, odds ratio, brinkmanship, reciprocal, ebullient

Important People

Michael Gillick

Michael Gillick is one of the people living with cancer, a probable result of pollution in the area. Doctors suspect Michael's cancer started in utero. He has multiple medications he takes every day. He has constant issues with pain and fatigue. Between the cancer, and the side effects of the medication, he can do very little but simply survive. He speaks out against the polluters, and the governmental agencies who he feels lapsed in their duties to protect people.

Linda Gillick

Michael's mother, Linda Gillick, a former schoolteacher, became a vocal member of the community as her son grew up. For a while, she sat idly by, watching other people talk about cancer in the community. Eventually, she became a dogged opponent to local polluters and politicians. Although she did not consent to an interview for the book, she spoke off the record a few times with the author. It was her determination that keeps the politicians from abandoning the plight of the cancer-stricken children in Toms River, at least for a little while.

Kim Pascarella

As co-chair of Ocean of Love, a group of parents of children with cancer, attorney Kim Pascarella speaks on the record about a lot of the group's efforts when Linda Gillick does not. His daughter died of cancer at a very young age. He continues to volunteer with the group out of a sense of community and continuity.

William Perkin

William Perkin is a scientist who accidentally created uses for coal tar in 1856. He was able to dye fabrics with them, creating rich hues that other people would pay a lot of money for. It is his invention all those years ago, and the commercial demand for dyed fabric, that causes the problems in Toms River a century later.

Eric Green

Eric Green was brought into the case between Ocean of Love, Ciba-Geigy, United Water, and Union Carbide. He was a prized negotiator across the country, and it was hoped that he would moderate the issue for the groups and reach an amicable result for all involved.

Don Bennett

Don Bennett was the reporter at the Ocean County Observer, a newspaper that only covered the county that contains Toms River. Due to its local impact, residents read a lot about Ciba-Geigy, Reich Farm, and other environmental issues. During the 1980s, Bennett saturated the paper with coverage about what Ciba was doing, and what laws it was not following.

Floyd Genicola

Floyd Genicola was the investigator for the New Jersey Department of Environmental Protection who was tasked to determine what the mystery compound found in the water was. It ended up being SAN trimer. He eventually found 261 unknown chemicals. Because his bosses did not want him to waste his time on this mission, he worked on it in his personal time.

Nick Fernicola

Nick Fernicola started a trucking company when he heard Union Carbide was looking for someone to get rid of its waste. He hired a few truckers and made daily trips to the northern New Jersey factory. In the beginning, he brought the drums of waste to the Toms River municipal landfill. They were dumped there illegally but he bribed the workers. After his deal with them went sour, he found the Reich family. He rented some acres from them to “store” the drums. He instead just dumped them all over the ground, and the drums spilled their contents into the sandy soil, poisoning groundwater for generations to come.

Jan Schlictman

Jan Schlictman is an attorney who became famous from trying a case that was made famous in the book and movie A Civil Action. What most people do not know is that after the hard-hitting court case he handled, he lost a lot of money and even lost the will to be an attorney. He became homeless and decided that the legal system does not exist to serve people, it only serves itself. Thus, when he was retained by Toms River cancer families, he lacked the fire that they expected. He immediately wanted to settle, instead of going to court and possibly proving Ciba's fault. He still had his press-friendly attitude, though.

Paracelsus

Paracelsus practiced medicine in the 1500s in a way that no one else in recorded history did: he observed the patient. While others blame humors or spirits, he was

looking for causes that could be recorded in some way. In a very rudimentary way, and in spite of many mistakes, he laid the groundwork for environmental sciences.

Objects/Places

Toms River

Toms River is a community near the New Jersey shore. At the beginning of the book, it was sparsely populated, and many people lived off the land. It was in the middle of nowhere, as far as Ciba-Geigy was concerned. It was a perfect place to build a factory because there was no one around to complain about the pollution. As transportation improved, the town grew. The factory grew too. Soon, they were butting up against each other and their impact upon each other was unavoidable.

Chemical plant

The chemical plant goes by many names throughout the book, as a result of mergers. The most common names are Toms River Chemical and Ciba-Geigy. It is the source of a lot of pollution in the area, and remains so as of the 2015 Afterword by the author. The plant has employed thousands of people over its decades of activity.

Reich Farm

The Reich Farm is a former chicken farm owned by a family. When the farm went out of business, they needed money. They rented space to Nick Fernicola so that he could store drums on the property. Fernicola had no intention of storing them, however; instead, he dumped them. He also did not pay the farm the agreed-upon price. As the Reichs' neighbors all sold their farms to developers for big money, the Reichs remained tied to the land no one will buy because it is contaminated.

Coal tar

Coal tar, created in 1856, is an environmental bane. One of the scientific studies mentioned in the book is about London chimney sweeps. They had a very high rate of scrotal cancer, and it is because of the coal tar. It is the source of the dye industry, and so it is heavily sought after. It is a money-maker, even though the people who own the factories have heard reports of its danger.

Smokestack

The smokestack of the Toms River Chemical/Ciba-Geigy plant was one of the only times that people could actually see the pollution the factory creates. Almost symbolically, the factory management changed the schedule so that it was mostly used at night, when no one could see the colored smoke. It was another way that the management hid the pollution.

The Ohio River

The Ohio River had been dangerously polluted by Ciba-Geigy's dye plant in Cincinnatti prior to the events in Toms River. The pollution was so great that the city and state had to get involved. They imposed penalties against any polluters and made it more expensive to do business. Increasing the fees and forcing the company to be more responsible basically chased them out of town. This was why they came to Toms River.

Children's Hospital of Philadelphia

The Children's Hospital of Philadelphia, or CHOP, has a pediatric cancer ward. Here, a nurse named Lisa Boornazian noticed a lot of patients from Toms River. She inadvertently set a series of events in motion that lead to a government investigation into cancer clusters.

SAN trimer

SAN trimer was a mystery compound found in the water. No one knew what it was, but Floyd Genicola, working with the New Jersey Department of Environmental Protection, determined that it is a waste product that had come from the local pollution. Even though there is no proof that SAN trimer caused the cancers in town, the residents are convinced it did.

The ocean pipeline

An integral part of the Toms River Chemical operation was a pipeline that carried effluent out to the ocean. The factory had been pumping waste into the Toms River, but that caused the river to look and smell different. Locals did not like it. The company also dumped it in the ground. That took a little longer for residents to notice. Dumping it far out to sea seemed like a great solution because no one really knew that it was happening. The waste was able to dissipate into ocean currents and be nearly untraceable. This pipeline worked very well until a leak in the pipeline caused a cave-in of a road in 1984. Then, the residents realized what was going on under their feet, and started questioning what the plant was doing.

Cancer studies

There are several cancer studies performed during the latter half of this book. These studies were conducted in order to determine things such as: Is there a cancer cluster? What is the cause of the cancer? The problem is that the science was not advanced enough at that time to draw a causal link between certain compounds and illnesses. Also, records for a lot of the information is unknown, such as who drank water from certain wells at certain times. So, the studies, although they indicate a strong correlation

between the pollution from Ciba-Geigy and Reich Farm, were never able to prove that the pollution caused the cancers.

Themes

Polluting the environment leads to sickness

Fagin's, the author, underlying message throughout the book is simple: the information that polluting the environment leads to sickness is there - one only has to look for it. Fagin paints a detailed history of the study of epidemiology, environmental pollution, and industry going back hundreds of years, despite the fact that he could have simply told a series of events that happened in Toms River and that would have been enough.

Granted, information was not as easily available to the lay person as it is today. They did not have phones that could access the internet and look up information about Ciba-Geigy, leukemia, or any number of other pieces of important information. The only information the average person had was what they were told. And Fagin indicts the people who told them wrong information. The Toms River Water Company did not tell anyone that the wells had been contaminated. This one fact is repeated several times, every time it is relevant. The local politicians are blamed, although not by name, for not telling people what was going on. They covered up how much pollution was being done. The factory told the workers that everything was safe enough, so do not rock the boat. The local newspapers spoke well of the Toms River Chemical plant, and its impact on the economy. It is not until one reporter, Don Bennett at the Ocean County Observer, started delving into the chemicals that were being used at the plant that people finally started learning what chemicals were in their town.

It is easy for a reader to shake their head when reading this book, wondering how things were allowed to get as bad as they did. The reader must realize, though, that terms like “toxic waste” were made popular because of cases like this. Environmental protection was not a given. Today, corporations and government agencies have environmental plans. Even if those plans are flawed, they are still addressed. Half a century ago, these protections just did not exist.

Jorge Winkler, the factory's director of production and environmental services, told the author how polluting was just a natural thing to do. No one even gave it much thought. “Back in those days I don't think anybody ever really thought about landfills, period. You just put [waste] someplace that one thought was suitable, and suitable was basically any cheap land that was out of the way” (33). This shows that the upper level of management were aware, on some level, that the waste was a real problem but did not address it in a careful way.

Danger was the cost of living, Fagin seems to say. Employees were unknowingly subjected to dangerous chemicals. The group that had come over from the Ohio plant had many cases of cancer. They had been working with the chemicals for a long time. They knew it was dangerous work. It was probably believed that all factory work was dangerous. They just continued to do the work because it was a good-paying job close to home. They might have also been too macho or proud to complain about it.

The workers, who dumped chemicals every day, did not know the damage they were doing. It was all business as usual. No one really thought of the repercussions 100 years or even two years down the line (that is how long it took for Toms River Chemical's dumping to poison its own wells).

“You have to remember that except for the people at Ciba, no one in Ocean County had any knowledge that these kinds of chemicals moved through soils” (114). Chuck Kauffman told the author in an interview. He was the county's first health coordinator.

Protections set in place did not work

The pollution should never have gone as far as it did, Fagin argues, but the few protections that were supposed to be in place failed. Fagin explains many times how government officials dropped the ball, or simply did not even bother to do their jobs.

The first line of defense should be the factory itself. Fagin shows how this failed. At Toms River Chemical, when workers complained about dangerous conditions there they were told to be thankful they had a job. All of their complaints were minimized and anyone who tried to rock the boat was threatened. The union worked to keep workers safe, but the union failed as well. When a study of the employees began, the employees had to submit urine samples. The union refused, and so the study went nowhere. Union Carbide hired Nick Fernicola to dump its industrial waste. In the beginning, Union Carbide followed Fernicola to make sure he was doing what he promised. After that, they left him alone, and he started dumping at the Reich Farm.

The next line of defense is the local government. Fagin goes into detail explaining how the ruling political party was very friendly with the management at Toms River Chemical. Thus, nothing got done. At the municipal dump, nameless employees there had a deal with Fernicola to allow him to dump industrial waste even though that was not allowed.

Fagin makes it a point to say that the local leaders who failed people were Republican. Going further, when Nixon, also a Republican, helped with federal legislation, he was forced to. Meanwhile, the work of Carter, a Democrat, is viewed more favorably. There are a few New Jersey leaders who are also named, and the Democrats are described as more helpful than the Republicans.

The water company was also complicit in this problem, Fagin shows. The Toms River Water Company hid results that their wells were contaminated for years. They never bothered to clean anything like they were supposed to.

The next step up would be state and federal regulators. While Nixon had to act upon the Refuse Act of 1899, the real laws were just starting to be written. The Superfund one, in particular, came online during Carter's administration.

Fagin writes, “The State Department of Health could have insisted on a more effective treatment system, just as it could have back in 1952. But state officials did no such

thing; instead, they rubber-stamped the company's plan, concluding that it was consistent with the prevailing industry standard, and issued a new permit" (51).

The use of the term "rubber stamp" in the above quote is a telling sign. That term would only be used when a writer believes that the department did not perform its due diligence in vetting an application. Instead, it just approved the plan without looking at it because it was easier to do so.

The author does not go so far as to call for more oversight. As an environmental reporter, he instead just states facts. The facts, however, are stated in such a way that it is clear that the author does indeed want more oversight. When he writes about the state approving Union Carbide's plan for dealing with a plume of toxic waste moving through the soil, he is incredulous that the state was fine with Union Carbide doing nothing and allowing Toms River's drinking water wells to such up the water and treat it instead.

The author also states that there are far more polluters than people who can keep track of them. When Superfunds come into play, they take up a great deal of money, personnel and time that a department just does not have. And these are just the big pollution spots. These would not include sources of pollution like a gasoline station or a farm using chemicals, or people using fertilizers. There is almost no way for the government to monitor all of these sources of pollution. This is why, often, the DEP or EPA simply review plans and hope that the polluter follows through on them.

Epidemiology is a growing field - but not growing fast enough

Ultimately, epidemiology relies on two things, Fagin says: there must be accurate recording of environmental factors; and, there must be a large enough number of test subjects to rule out random chance. Toms River's study had neither. Throughout the book, he builds the case that an epidemiological study is nearly impossible, almost warning the reader that the outcome is not going to prove anything. This kind of foreshadowing lets the reader down easily.

Epidemiology is the study of what causes illnesses and how to prevent them. It is a branch of medicine that has gone back hundreds of years, and it is still growing. Unfortunately, it never seems to grow fast enough.

The author uses at least a third of this book detailing the history of epidemiology as it applies to the case in Toms River. There are several reasons for his doing so. One of them is to give readers a background on chemical dangers. Another is to show why the cancer studies in Toms River were doomed to fail.

In the 1530s, for example, London started compiling weekly bills of mortality, listing how people died. These were used as an early warning system to see if a plague was about to start. However, other people realized that the long lists of people's causes of deaths

could be abstracted to learn statistics about diseases. Fagin argues that if medical records in Toms River had been recorded better, people would have learned there was a problem earlier.

At a cancer ward in Philadelphia, nurses and doctors could tell that there were a lot of Toms River cases coming in. This was dismissed as coincidence. If the hospital had recorded the information, Fagin argues, a trend might have shown up earlier. Additionally, the author writes several times that the state's cancer registry is at least a year out of date. Residents like Linda Gillick knew about new cases before the state did. All this lack of information made causality between pollutants and illness hard to prove.

In 1837, London physician William Farr studied the environmental causes of diseases after tuberculosis claimed his wife. His reports to the government pleading with them to pass laws to create sanitation was groundbreaking at the time. The government listened, passed sanitation laws, and diseases were kept at bay as much as possible for the nineteenth century. It was a huge step forward in science. He was joined soon by a physician named John Snow. Snow interviewed the survivors of cholera victims with identical questions. He tracked the locations and onset symptoms of the disease. He was able to pinpoint the exact well that was contaminated because of this kind of research. These methods of study would be used by researchers for years to come. The exploits of Farr and Snow are included in the book because the author wants to show how government and doctors should act. The physicians made very informed decisions. They interviewed people. They studied environmental impacts. These were all steps that were taken more than a century later in Toms River. Unfortunately, the government in New Jersey did not respond as well as the one in 1800s London.

The author uses the term “numerical medicine” to explain how looking at a series of cases could yield results. Similarities start to line up. Too many similarities cannot be dismissed as a coincidence.

In the twenty-first century, the western world has reached fairly stringent standards about what can be done environmentally. Dumping is not as condoned, for example. However, while a certain chemical might be restricted to one part per trillion now, it might be interesting to see if this figure becomes more restrictive in the future. As the study of chemicals and their effects on the body improves, the impact of these chemicals might prove to be even worse than previously believed.

One thing that Fagid did not explain, and perhaps he could not, is just how is random chance measured? Occasionally, he will write that one additional case of cancer in a town can be attributed to chance. What about two? Or five? At what point does randomness stop being a cause? There might not be any objective way to measure this. Also, in the world of science, is anything truly random? Genetic traits are sometimes a surprise. Recessive genes pop up unexpectedly. That does not mean they are random. It just means that the observer of the trait can not determine why something happened.

Money and possessions are more valued than safety

While the focus of the book is on science, and the impacts of cancer in people's lives, there is subtle undertone that condemns commercialism. When Fagin explains the history of industrialization, and the demand for products produced with chemicals, he is explaining the history of greed. Supply and demand are a given in the world, but greed happens when businesses want to make more money at any cost.

From the very beginning, Fagin explains the history of the dye industry. Dyes brighten up dreary and boring clothing. They are a way for the rich to show off their wealth, or for the lower classes to pretend they have wealth. Dyed fabrics are heavily desired. But, they are not a necessity. They are not food, water, or shelter. Regardless, they are in high demand. It is that demand that causes companies to cut corners to make ever more money. As the book shows, many people cut corners to make more money. Meanwhile, that demand for products never slows.

Waste is the by-product of commercialism, industrialism, and the way people live. Fagin illustrates how there used to be an entire subset of people whose jobs it was to dispose of waste. They scrounged for castaway objects, mostly. They took waste and burned it or changed it in some way so they could sell it to someone else. These jobs are all gone now. (Not that they were desirable to begin with – the people who had these bottom feeding jobs led short and painful lives.) In their place are municipal landfills. Fagin says that while the industries of creating products for sale never changes, there really is not much of an industry for how to get rid of waste, byproducts, or garbage.

Profit margins dictate getting rid of unwanted material as quickly and as cheaply as possible. Fagin includes several quotes from internal documents at the chemical plant where managers were pleased with how hungrily the sandy soil devoured the effluent from the factory, or how outflow pipes did not have to be treated much, or any number of other cost-savings that were done to keep costs low.

There were several instances, Fagin shows, where decisions came down to either money or safety. Union Carbide decided not to drill wells to suck up a toxic plume because it would be expensive. The alternative was letting the drinking water wells pull up the plume and treat the water before giving it to people. That was far more cost effective. Nick Fernicola, in dumping Union Carbide's waste, was paid a certain amount of money per drum, which he pocketed and just dumped on the Reich Farm. At the Toms River Chemical plant, decision after decision was made to save money, all of it leading to the detriment of residents. Fagin includes all these examples, sometimes multiple ones per chapter, explaining how the dumping of waste is motivated by financial decisions more than anything else.

One of the reasons that in-depth investigations are seldom done is that they are so expensive. Fagin lists a lot of reasons why they are difficult and often inconclusive. However, it is their expense that taxpayers fight against. It is hard for politicians to validate a $10 million study that is inconclusive.

The author even ends this book with a trip to China. This country is now the seat of industry. There are many more factories there. In bringing the reader to China, the author shows the impact of commercialism, excess, and disposable products. He focuses on a couple who have a child with cancer. The mother was pregnant while working in a factory with chemicals.

Public opinion is more important than fact

One of the reasons that Fagin showed the history of the Ciba-Geigy corporation is to show where they had learned from their mistakes and how they learned to play the public better. They did not stop polluting - they just got better at controlling information. Starting in Basel, Switzerland, and leading to Ohio and a few other American spots, the company left a trail of pollution in its wake. They learned how to befriend the local power structure, and they got better at keeping information from getting out that could be damaging to them. What information they did get out, with some exception, was filtered better than the waste leaving the factory.

The only way that the residents of Toms River were able to get someone to advocate for them was to generate mass protest. Fagin shows a few times where public hearings and calls to action spurred politicians to finally get involved. For a few decades, Toms River Chemical's managers were the only ones with access to policy-makers in New Jersey. After mass protests got the attention of local and state newspapers, politicians had to get involved. Even though there might have been no correlation between some chemicals and cancer, the people in Toms River were frightened that there was. So, the politicians responded by testing and cleaning the water. After years of neglect, the politicians were not able to tell the residents “no.” They had to do everything they could to ensure safety. They spent millions of dollars on studies that they knew were probably not going to find anything.

Fagin shows that some people believe things so strongly that they become fact. The Ocean of Love parents did not need scientific proof to tell them that environmental pollution caused their childrens' cancers. They knew it deep down. Kim Pascarella, co-chair of Ocean of Love, said this about the SAN trimer found in the water: “Really, in our hearts, we all feel it's the cause” (448). Even after the tests came back as inconclusive, the families of kids with cancer said they were convinced that the disease came from the Toms River Chemical use of certain chemicals. Perhaps the use of the word “feel” in the quote is more accurate. If it was a fact, they would “know” it. Since it is not proven, they “feel” it.

The ocean pipeline was a huge wake-up call for people. Most people did not know the pipeline even existed until it leaked in 1984. Then, it became a galvanizing force. Environmentalists rallied to get that pipeline shut down. They did not realize that their own sewage was also being pumped into the ocean at greater volumes. Fagin capitalizes on this irony by showing how residents were still being kept in the dark. They were so focused on the factory waste that they never thought to ask what happened to their own. Fagin, being an environmental writer, explains at one point that the effluent

being released dissolved very quickly once it hit the ocean current. The water tested at the opening of the pipe had strong concentrations of the chemical waste. Water tested only a few feet away had significantly lower amounts. Certainly, Fagin believes that people should take care of the environment. However, he also does his due diligence to show that the impact of the ocean dumping might not have been as bad as the environmentalists claimed.

In the furor over Ciba-Geigy's contamination, people did not cast blame toward Union Carbide, Nick Fernicola, or the Reich Farm. The bulk of the hatred was on a local factory that was close enough for people to blame. Fagin mentions this in passing a few times how people were mistaken about the outcry. In the end, since no one really knew the exact cause, it could have been both of these properties, or neither.

Styles

Structure

The book begins with a prologue detailing the daily life of cancer survivor Michael Gillick. He serves as a human face for the disease. The book is then marked into four parts. The first part describes the early days of the Toms River Chemical factory. The second part shows when the relationship between the factory and the residents starts to decay. The third part describes the investigations into whether local polluters caused people to get sick. The fourth and final part explains the findings of the investigations, and what the entire experience causes for everyone involved.

Throughout this book, the Toms River coverage is interspersed with historical notation about the history of epidemiology and environmental science, as it pertains to Toms River and the studies going on there. The book ends with an Afterword written by the author two years after the book was originally published. It explains people's reactions to the book. There are then Acknowledgements by the author, and then 56 pages of notes showing where he researched his work, and expanding upon concepts introduced in the book.

Perspective

The book is written in third person. Although Fagin gets a lot of his information through in-person interviews, the reader never gets inside anyone's head. It is written like a long-form newspaper article or a magazine article in a scientific journal.

Tone

According to Dan Fagin's biography on his web site, he is an environmental reporter. This explains his relatively passive tone throughout the book. Most of the times, he lets the facts condemn those he deems are guilty. He has the reporter's habit of stating facts and allowing the reader to build the case in her head. He attempts neutrality, and he says in his afterward that his goal was to state the facts. However, he lets his personal opinion seep in frequently. After all, why write a long book about this case if he did not agree that the pollution caused the illnesses? He saves this ire for government officials and Ciba-Geigy management in general. People who are named in his book are rarely criticized. Employees at the plant who contributed to the problem are not held up to the same standard as the government officials who ignored the red flags of a dangerous factory. Nick Fernicola is mentioned as having a “woe is me” attitude about his role in polluting Toms River during an interview. He might be an exception, because Fagin writes about how Fernicola did not take any responsibility for his actions.

Quotes

The process was so inefficient that at Toms River, making brown vat dye, a typical example, required five and a half pounds of raw material to produce one pound of finished dye, with almost all of the remainder discarded as waste.
-- Dan Fagin (2)

Importance: The author explains how much waste was created by dye manufacturing. The waste had to go somewhere. It was a financial and physical burden on the company. They needed a place to put the waste that was cheap and out of sight.

After Paracelsus and Ramazzini, it was clear that many afflictions were a consequence of human action. Risk could be reduced by precaution, or it could be promoted by recklessness in pursuit of treasure.
-- Dan Fagin (2)

Importance: Previous to this quote, Fagin explains a change in the way medieval medicine was learned. Because of a few doctors who studied workplace environments and the effects on the workers, they were able to learn that similar ailments came from their dangerous workplaces. It was revolutionary at the time, because most medieval physicians attributed diseases to humors or angry supernatural entities.

Back in those days I don't think anybody ever really thought about landfills, period. You just put [waste] someplace that one thought was suitable, and suitable was basically any cheap land that was out of the way.
-- Jorge Winkler (chapter 2)

Importance: Jorge Winkler, a senior executive at the Ciba-Geigy plant in the 1970s and 1980s, explained how the factory dumped thousands of drums of toxic chemicals all around their wooded property. This quote shows how no one even considered the environment or future residents.

Early on, we didn't really know much. In the 60s, if you said anything the supervisors could be pretty sarcastic. Some of them would say, 'What do you think this is, an ice cream factory?'
-- Ray Talty (3)

Importance: An employee at the factory, Ray Talty explained to the author how people had a vague idea that things were dangerous. However, they were told to be quiet.

You have to remember that except for the people at Ciba, no one in Ocean County had any knowledge that these kinds of chemicals moved through soils.
-- Chuck Kauffman (6)

Importance: Chuck Kauffman, the county's first health coordinator, says this to the author. With this quote, he revealed that the politicians and health agencies were behind

the times, and certainly behind the factories they were supposed to be policing. They had no idea about the damage that was happening.

Ninety-nine percent water and a little salt.
-- Jorge Winkler (chapter 8)

Importance: Jorge Winkler, the former Ciba-Geigy executive and spokesperson made the mistake of claiming that the effluent the company was pumping into the ocean was mostly harmless. He said the company was just discharging saltwater into the saltwater ocean. This made a lot of people very unhappy because they realized the company was lying to them.

I really think what you're trying to do, Dr. Pavlova, is to make the unacceptable acceptable. What you're trying to say to the people is: Don't worry about it. There will be one case of cancer in a million, and that person who gets it is someone you don't know. He's not a neighbor. He doesn't have a family. He doesn't have friends. He's just an isolated incident and that's the guy that's going to get poisoned and going to get cancer. But you don't look around at the audience and say it could happen to you or your child.
-- Frank Livelli (12)

Importance: Toms River resident Frank Livelli spoke this to Maria Pavlova, who represented the United States Environmental Protection Agency at a meeting of the Ocean County Board of Health. The quote was picked up by a news station. She had just said that there were acceptable risks to creating and dumping hazardous waste. If one additional person got cancer, then it was an acceptable risk, as far as the EPA was concerned.

If you have a child, picture him with cancer because of this water. Think of what it could do to him. He could die at any second, any minute, so please stop! What Ciba-Geigy is doing is really wrong, but you guys keep going on and on doing your stupid job and making people sicker. Please stop!”
-- Michael Gillick (13)

Importance: Michael Gillick said this quote at a public hearing about the contamination. Michael was just nine at the time. After saying this, he ran out, crying. It put a face to the cancer crises and really brought it home for people. It was an emotional sound bite that the factory representatives could never fully recover from, and it shamed the governmental agencies conducting the meeting.

In settling with the state, we take responsibility for mistakes that were made at Toms River many years ago. We apologize for them. Fortunately, no harm to health or the environment has resulted.
-- Richard Barth (16)

Importance: Richard Barth, the chairman of Ciba-Geigy's United States subsidiary, released this public statement after a multi-million dollar settlement in which his

company had to pay out for a lot of pollution that was caused. It was typical of the company's continual point of view that it had done nothing wrong.

By that standard, the Toms River case-control study could never be fully legitimate scientifically because no one would ever know exactly which chemicals, at what concentrations, were in the air and water during the 1962 to 1996 study period.
-- Dan Fagin (21 paragraph 385)

Importance: This statement by the author sums up the trouble with the quest that the families of cancer victims had to determine the cause of the cancers. There is just not enough information available. Science is just not advanced enough to make a determination based on what information is available. Epidemiology is a growing field. The standards keep changing as researchers learn more. Since there are so many holes in the argument, the opposition is able to pull their argument apart.

At last, the families had gotten an indirect acknowledgment from Ciba, Dow, and United Water that their children had been harmed, but it did not come with an admission, an apology, or even an explanation – just a dollar sign, and an unequal one at that.
-- Dan Fagin (23)

Importance: This line came after the settlement between the Ocean of Love families and the chemical and water companies. The families all sought closure. The settlement was the closest they would ever get.

Really, in our hearts, we all feel it's the cause.
-- Kim Pascarella (24)

Importance: Kim Pascarella, an attorney and co-chair of Ocean of Love, said this about SAN trimer, a compound found in the soil and water. Although the tests point to a correlation between this compound and cancer, it was not proven to be a cause. Still, Pascarella spoke on behalf of the other families that they believe this to be the cause. It underscores the theme that public opinion is more important than fact, because the Ocean of Love families are convinced that SAN trimer was the cause of all their troubles despite the fact that it had not been proven.

Topics for Discussion

Unnamed politicians

Most politicians are not called by name throughout the book. Particularly, the local politicians that oversaw conditions in Toms River are anonymous. Why do you think Fagin skips naming them?

Author's use of foreshadowing

How does the author use foreshadowing to set up future events in the book? How is the reader able to guess that pollution probably caused the cancer, but there would be no proof?

Is Ciba-Geigy to blame?

Do you think the author presents a strong case that pollution from either Ciba-Geigy or the Reich Farm contributed to the cancers in town? Why or why not? What other factors could have been involved?

Alternating history

The author shuffles segments about physicians hundreds of years ago with segments about things happening in Toms River a few decades ago. What was Fagin's purpose in shifting between ancient history and recent history throughout the course of the book?

Interview choices

None of the doctors of the sick children are interviewed in this book. Why not? Are there any other people Fagin could have interviewed that would add another angle to this book?

This book's impact on Toms River

What do you think the impact of this book was on the residents of Toms River? Do you think they learned more? Do you think they doubt Fagin's findings? What kind of impact did this book have on the town in particular, and the state in general, in pertaining to environmental aspects.

Who is the antagonist?

If there was a movie based on this book, as there was with “A Civil Action,” who would be the heroes and who would be the villains? Considering the pollution theory was never proven, what would the ending be?

Methods used by Ocean of Love

Were the Ocean of Love parents and the environmentalists correct in the way they reacted to the pollution? Did they overreact or should they have done more? Should they have gone to court?

Author's purpose

What do you think the author's purpose was in writing this book? What kind of changes does he want to make in industry and in government?

Cancer clusters

What do you think of the theory of cancer clusters? Some do not believe they exist. Some believe that they are everywhere.