Minamata disease

Return us our healthy bodies

This excerpt recounts the harrowing tale of the methylmercury poisoning disease that struck Minamata in Japan nearly half a century ago

The next day in the library, I look for W. Eugene Smith's 1975 photo essay, *Minamata: Words and Photos*, which he coauthored with his Japanese wife. The picture that Jeff can recall so clearly is spread across two pages. The lines are stark and classical. In the manner of Mary cradling the crucified body of Christ, a naked mother holds the body of her half-grown daughter in a Japanese bath. The mother's upturned hand, which lifts the girl's legs, is balanced by the daughter's downturned hand, which just brushes the water's surface. The mother looks at her daughter with adoration. The daughter's eyes are rolled skyward—as if to God—but there is no light of awareness in them.

Suddenly, the viewer sees how the fingers touching the water are unnaturally bent, as are the rail-thin legs, and how in the centre of the girl's naked chest, which floats in the centre of the photograph itself, there is a deep hole that is not a wound but some kind of terrible malformation.

The daughter's name is Tomoko. She was born in 1956 and died two years after her portrait stunned the world, in 1977.

Minamata is an ancient city along the Shiranui Sea in southern Japan. Since feudal times it has been a fishing community, but now Minamata is mostly known as the birthplace of Minamata disease, which is not a disease at all but simply another name for methylmercury poisoning.

Mercury is an ancient element. Called quicksilver by Aristotle, it was named after the speedy planet by 6th Century alchemists who thought it possessed the power to turn base metals into gold. They were wrong. But mercury does have the power to speed up certain chemical reactions. Which is how the city Minamata and the element mercury came to have a common destiny.

In the 1930s and 1940s, a factory in Minamata called Chisso began manufacturing acetaldehyde and vinyl chloride—both ingredients in plastics. To do so, it used metallic mercury as a catalyst, which was then dumped into the wastewater that entered Minamata Bay. In the spring of 1956, a five-year-old girl was brought to the factory hospital because her speech was slurred and her gait unsteady.

Not long after, her younger sister began exhibiting the same symptoms. Then four of her neighbors became delirious and started to stagger drunkenly. The director of the hospital, Dr Hajime Hosokawa, was alarmed. He reported to the authorities that "an unclarified disease of the central nervous systems has broken out." Because of the clustering of affected families, Dr Hosokawa assumed he was dealing with a contagious illness—thus the label 'Minamata disease'. An investigation soon uncovered 50 more cases.

But three clues emerged that argued against an infectious cause. Cats living in the homes of stricken families had mysteriously died. The affected families almost always had ties to the fishing industry. And the homes of the additional 50 cases were scattered over a wide area and not confined to any one neighborhood. What united the victims was a strikingly similar progression of maladies.

Black curtain

First the hands and feet began to tingle. Then there was difficulty holding

chopsticks. Words became "entangled and knotted" in the mouth. Eventually, hearing was muffled, and a black curtain fell over part of the visual field. In some, there was restlessness and a tendency towards shouting. Finally, general paralysis set in, the hands became gnarled, swallowing became difficult, and death soon followed.

Once the investigation was under way, observations previously reported but subsequently dismissed suddenly took on new meaning. For six years or more, fishermen had complained about dead seaweed and empty clam and oyster shells. There had been other ominous sightings, too. Floating fish. Seabirds that dropped from the sky while in flight. Paralyzed octopus. Dogs, pigs, and cats that were seen to whirl about violently and then die.

Looking at all the evidence together—both medical and environmental—the study group issued a report in the fall of 1956 concluding, correctly, that Minamata disease was not an infectious illness after all but was a form of heavy-metal poisoning caused from eating fish and shellfish from the bay. Some kind of heavy metal was getting into the waters of the bay, and the evidence pointed to Chisso.

The release of this report revealing the cause of the mysterious disease should have marked the end of a terrible story. Instead, it was only the beginning. The local government opposed the study group's principal recommendation—a ban on fishing in the bay. At the same time, Chisso, the only possible culprit, refused to change its practices. Instead, it hired experts to refute the evidence and insist there was no proof to implicate the company's actions as the reason for the problem. Meanwhile, a university research team announced it would study the problem further.

At the end of almost four more years of study, this is what the research team found: That cats fed fish from Minamata Bay developed symptoms of Minamata disease. That the Bay was highly contaminated with methylmercury. That the livers and kidneys of human victims who died of Minamata disease contained high level of methylmercury. That the hair of living Minamata victims contained high levels of methylmercury. That workers exposed to methylmercury in a British factory had very similar symptoms to the people of Minamata.

Chisso responded that it used only metallic mercury, not methylmercury, and, therefore, its wastewater could not be source of the problem. What Chisso did not say was that its own hospital director, the same Dr Hosokawa who had first noticed the problem, had in 1959 induced Minamata disease in cats fed Chisso factory sludge. This information Chisso executives kept to themselves. Dr Hosakawa—unlike Dr Kelsey before him—kept quiet, too.

During those same four year that the research team toiled on and the company doctor held his tongue, the following events happened in Minamata: Chisso diverted some of its wastewater into a nearby river and spread the contamination further. Increasing number of babies began to be born in Minamata with what appeared to be cerebral palsy. And the local government began advising abortions for all pregnant women whose hair levels of methylmercury exceeded 50 parts per million.

The babies with cerebral palsy turned out to have congenital Minamata disease. Although they had never eaten fish from the bay, their mothers all had. Some of these babies were also blind or deaf. Some had unusually small heads and deformed teeth. Some had tremors and were prone to convulsions.

Autopsy reports showed that those born with Minamata disease had more extensive brain damage than those who contracted the disease after birth. Not counting these congenital cases, 29 per cent of the children born in the most contaminated areas between 1955 and 1959 showed signs of mental deficiencies.

Wastewater sludge

Then, in 1962, someone found a forgotten bottle of Chisso wastewater sludge sitting on a laboratory shelf, and researchers uncovered the critical missing link in their

painstakingly constructed chain of evidence.

The contents of the bottle tested positive for methylmercury. This finding proved beyond a doubt what many suspected all along: that the factory's waste disposal practices were somehow converting elemental mercury, a weaker poison, into organic mercury, a formidable one.

But if the research team supposed that demonstration of absolute proof would trigger action, the joke was on them. Chisso blithely went on dumping methylmercury for six more years, stopping only in 1968 when its method of making plastic materials became outmoded and new technology was introduced.

In the end, it was citizen activism and photography, and not the slow accumulation of scientific knowledge that awakened awareness about the ecology of methylemercury. In 1969, 29 families filed a lawsuit against Chisso on behalf of the dead, dying and critically ill. Other families appealed to the government for action.

Still others began direct negotiations with the company, staging sit-ins outside its Tokyo offices. Protesters there were arrested and beaten, including Smith himself, who was on hand to document their activities. His photographs went out anyway, including one that shows Tomoko being presented before a table of dark-suited officials from Chisso, while petitioners demanded that the men look at her and touch her body. Her face wears the same fixed expression it did in the bath.

In March 1973, the Kumamoto District Court ruled in favour of the families. It noted in its verdict that Chisso had failed both in it obligation to confirm safety "through researches and study" and in its obligation to provide preventive measures "if a case should arise where there be some doubt as to safety." In the final analysis, the court ruled, "no plant can be permitted to infringe on and run at the sacrifice of the lives and the health of the regional residents."

In 1998, I found a translated thesis in the library containing interviews with some of the original Minimata activists. Conducted many years after the trial's conclusion and the payment of indemnity, they express continuing desire for a more profound kind of resolution.

Money nuisance

One said, "[W]e most ardently long to have the sea and the mountains returned to us as they were before pollution. Money is a nuisance, a troublemaker in the family and in the village...The other world in which we

used to live should be brought back to us here and now. Our hope, a very slight hope, is to bring the sea back...and an even slighter hope is to return to us our healthy bodies of bygone days."

The most recent forecast is that mercury concentrations in the bay are expected to decline to background levels by the year 2011—more that a half century after Dr. Hosokawa first gave a name to Minamata disease and then fell silent. Fish and shellfish in Minamata Bay were declared safe for consumption in 1997.

This passage is excerpted from *Having Faith: An Ecologist Journey to Motherhood* by Sandra Steingraber, Perseus Publishing, Cambridge, Massachusetts, 2001