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Environmental Disaster in Japan

Kathryn Karasek

Japan modernized more rapidly than any other country in the modern era. This rapid modernization dictated the government's responses to environmental issues throughout the twentieth century. In this essay, I examine the Minamata disaster and how it epitomized the ideology that grounded the government's response to environmental disaster. I argue that, although the climax occurred in the mid-twentieth century, the roots were planted in the beginning of the century, with the Ashio Copper Mine pollution incident. I further examine how the Minamata case affected the government's approach to the Fukushima Nuclear Crisis.

The Ashio Copper Mine

Intensive environmental destruction in Japan, coupled with a combative public response to that destruction, can be traced to just before the turn of the twentieth century, when the pollution from the Ashio Copper Mine wreaked havoc on the surrounding countryside and farmers rose up against their government to save their lands. The Ashio Copper Mine had been active since the seventeenth century, but was losing money by the Bakumatsu period (1853-1868). It took the mentality of the Meiji era, one focused on modernization and productivity, to bring the mine back to life. Little did Furukawa Ichibe, the new owner and operator of the mine who took control in 1877, know that he had awakened a monster.

Furukawa Ichibe was one of the great entrepreneurial minds of the Meiji era.¹ He set out to make the Ashio copper production competitive on the world stage.² Progress was slow when he first began production in 1877. But, ten years later, global forces pulled Ashio into the world market. In the late 1880s, the French Copper Syndicate sought to eliminate copper price fluctuation by creating a French-controlled monopoly on the world copper supply. The syndicate approached Furukawa to purchase his mine's output. However, because Furukawa acknowledged his ignorance of "the world beyond Yokohama," he refused to sign with the French Copper Syndicate itself, and instead signed with its representative firm, Jardine Matheson & Company.³ A British company, Jardine Matheson had a long and substantial history of mercantile activities in East Asia.⁴ The French Copper Syndicate failed to manipulate the global copper market successfully and went bankrupt by 1889. However, Furukawa held Jardine Matheson to the contract. As a result, Ashio owed the British company the incredibly large amount of copper it had promised: the contract called for "19,000 tons of copper to be delivered over 29 months starting in August 1888 at the fixed price of Y20.75 per 100 kin (pounds)."⁵

¹ F.G. Notehelfer, "Between Tradition and Modernity: Labor and the Ashio Copper Mine," *Monumenta Nipponica*, 39:1 (1984), 12

² Jun Ui, *Industrial Pollution in Japan*, (Tokyo: UN University Press, 1992) - Ch. 1, Sec. I

³ F.G. Notehelfer, "Japan's First Pollution Incident," *Journal of Japanese Studies*, 1:2 (1975), 358

⁴ Ui, *Industrial Pollution in Japan*, Ch. 1, Sec. I

⁵ Notehelfer, "Japan's First Pollution Incident," 358

This was the true turning point in the Ashio environmental history. In his attempt to join the global system, Furukawa “had contracted far in excess of his means;” in fact, he promised almost 1.5 times the current production at his three mine locations, two of which were already operating at maximum capacity. The Ashio mine had to make up the difference. Furukawa thus began a program of “crash modernization,” and initiated construction of a hydroelectric plant (Japan’s first), to provide electricity for the mine which greatly increased its production capacity.⁶ Electric motors and pumps increased production, while electric lights in the shafts allowed workers to work more efficiently. Through these changes, Furukawa was able to meet the demands of his Jardine Matheson contract, a success heralded as a “great victory for Japan” and perhaps an even greater victory for Furukawa himself, whose company by 1891 produced 47.8% of Japan’s copper (40% coming from Ashio itself).⁷

Although it cannot be denied that this rapid modernization was an important step in proving to the world that Japan was a competitor in the marketplace, at what cost were these victories achieved? The answer to this question may not have been obvious to Furukawa, but it was painfully so to both the laborers at Ashio and to the farmers and fishermen who lived downstream from the mine. The intense emphasis that Furukawa put in capital investment in the late 1800s and early 1900s pushed the original means of production, the miners, to a secondary position.

⁶ Ibid, 359

⁷ Ibid, 360-61

Furukawa thus turned his focus away from modernizing the labor force and towards modernizing the technology used in the mine. This allowed the perpetuation of a hierarchical social structure within the mine, a structure that would prevent effective labor organization or unionization until well into the twentieth century, exacerbating the frustration of the laborers.⁸

By the time of the Russo-Japanese War in 1905-1906, it became clear to the miners that Furukawa prioritized his new technology over the wellbeing of his workers. This dangerous combination of polarization and pauperization culminated in 1907 with “the greatest outbreak of violence in modern Japanese labor history.”⁹ The Ashio riot of 1907 resulted from neglect on the part of the mine officials, corruption within the management structure, and the lack of an established outlet for the frustrations of Ashio laborers. The riot set miners against their supervisors in a conflict that lasted until the labor disputes of 1919, when the management was restructured.¹⁰ On a smaller scale, the 1907 riot was representative of the societal tensions of the era, especially the pitting of big business and management against the laborers of whom dramatic sacrifices were demanded for the sake of national economic development. Eventually, the tensions built to a breaking point. This formed a parallel with the case of the farmers dealing with the destruction caused by the Ashio mine as well as those

⁸ Notehelfer, “Between Tradition and Modernity,” 23

⁹ *Ibid.*, 24

¹⁰ Kazuo Nimura, *The Ashio Riot of 1907: A Social History of Mining in Japan*, (Durham: Duke University Press, 1997), 153

who suffered from Minamata Disease in the mid-twentieth century.

The group that suffered even more than the mine laborers were the farmers who lived downstream from the mine. By the late 1880s, “almost all marine life in both rivers (the Watarase and the Tone) was dead,” eliminating the livelihoods of thousands of fishermen.¹¹ In addition, farmers who lived along the riverside suffered. Because of the deforestation undertaken by Ashio to get enough wood to keep the mine running at maximum capacity, the watershed at the head of the Watarase was destroyed. With the watershed gone, flooding became a serious issue. The water that overran the fields was not replenishing as “poisonous silt from the mine rendered once-rich agricultural lands a moonscape.”¹² Not only was almost all vegetation killed, but farmers who came in contact with the water developed sores upon contact. The river of their livelihoods had become the “River of Death.”¹³

When faced with the disaster and destruction caused by the mine runoff, the citizens appealed to their government. These appeals were indicative of the new political system in Japan around the turn of the century. Appealing to the Diet, the representative and legislative branch of government, a coalition of village leaders submitted a formal petition in 1891 asking for the “removal of the pollution and a temporary closure of the Ashio Copper Mine.”¹⁴ In line with a pattern that

¹¹ Notehelfer, “Japan’s First Pollution Incident,” 361-62

¹² Brett L. Walker, *Toxic Archipelago: A History of Industrial Disease in Japan*, (University of Washington: Weyerhaeuser Environmental Books, 2009), 71

¹³ Notehelfer, “Japan’s First Pollution Incident,” 363

¹⁴ *Ibid*, 363

would become painfully repetitive over the next century, their petition was dismissed, and the government denied that the mine had caused any harm. One of the most frustrating aspects of this dismissal was the fact that there was a specific law in place, the Japanese Mining Law of 1892, which was meant to protect the public interest against potential harm caused by mines such as Ashio. It appears that public interest was considered secondary to the more powerful interests of profit and economic development.

With their government ignoring their requests, the villagers were forced to deal with Furukawa and Ashio on a private level, undertaking a system of local settlements. These settlements were effectively indemnity payments to keep the villagers silent for four years, or until 1896. The agreement also included a clause that said Furukawa would, by June of 1893, install new equipment to prevent future pollution from Ashio. It became apparent, however, that conditions in the affected regions were deteriorating, not improving; "Furukawa's promised technological improvements were all a hoax, or, if not a hoax, then a dismal failure."¹⁵

One of the key variables in this conflict came to light in 1895, when Japanese soldiers returned home from the Sino-Japanese War. Having just fought for their country, these soldiers were horrified to learn that their families and communities had been treated so unjustly while they were away at war. They came home to increasingly high infant mortality rates and fertility problems due to poisoning from the mine. The livelihoods of their families had been destroyed, and

¹⁵ Ibid, 368

the government as a whole refused to acknowledge their pain. The return of these soldiers brought a “new militancy” and a renewed resolve to the region. After a devastating flood in 1896, villagers from four affected prefectures sent a new petition to the government calling for the closing of the mine, and for the reduction of taxes in the affected regions while they recovered.¹⁶

The government’s reaction to such activities set an important precedent for how they would deal with environmental issues in the future. While the public response grew, the majority of members of government continued to downplay the significance of the issue. The government issued an ambiguous order that called on the Furukawa Company to undertake preventative construction, but it did not give specific guidelines, nor did it establish a timeline for implementation.

The exception to this governmental refusal to accept responsibility for the health and safety of its citizens was the Diet representative from Tochigi Prefecture, Tanaka Shozo. Early on, he accused the government of avoiding the pollution question and of putting the mine and its profits ahead of the wellbeing of the citizens. The government was committed “to the type of industrialization that Ashio represented.”¹⁷ They were unable to find a balance between rapid modernization (the desire to catch up technologically to the major trading powers of the day), and the remedying of collateral damage from such activities.

When their appeals to the governmental failed, the citizens once again turned to private coercion, albeit

¹⁶ Ibid, 368-69

¹⁷ Ibid, 368

with a new target. They persuaded leading politicians to visit the affected region, and these men were “deeply disturbed” by what they saw. Their discoveries, coupled with the rising tide of militant activism from the villagers, led to a governmental decision to act. In 1897, after apologizing for their prior inaction, the government issued a new set of specific orders with actions required by the Furukawa Company.¹⁸ Just as Furukawa had undertaken crash modernization in the previous decade, he was now forced to undertake a crash program to implement the necessary changes, changes that should have been put into affect ten years earlier. The violence of the anti-pollution movement slowly died down, the farms downstream began to recover, and the problem was eclipsed by the Russo-Japanese War of 1904-05.

Within the context of Ashio, modernity served to both attack and then to mend the damage in the countryside. Although rapid technological modernization was responsible for the pollution, farmers were also able to use modern political institutions—petitions, extensive research and appeals, the court system—to remedy the situation. This demonstrates the powerful change in mentality at the time: not all modern institutions were out to attack the people. Instead, citizens figured out how to fight fire with fire. However, Ashio remains a scar on the landscape of Japan to this day, serving as a painful reminder of what happens when a powerful government prioritizes profit over people, and gives the state ultimate power over its citizens.

¹⁸ Ui, *Industrial Pollution in Japan*, Ch. 1, Sec. III

Minamata Mercury Poisoning

The second major pollution incident of the twentieth century, the case of Minamata mercury poisoning, occurred almost half a century after the Aisho mine tragedy. Many of the themes that defined the Ashio Copper Mine incident also pervaded the Minamata situation: government unresponsiveness, the prioritization of profit over popular wellbeing, and the ensuing protest on behalf of those harmed by such decisions.

Minamata was a small fishing and farming village in southern Kyushu which also produced salt. When that product, which was critical to Minamata's economic security, came under government monopoly, village leaders decided to pursue other forms of industrialization. In 1909, chemist Noguchi Jun was looking for a site to construct a "carbide production plant that would use surplus electricity from a hydroelectric power plant."¹⁹ Minamata leaders offered the use of the land that had previously been used for salt production, as well as use of the bay, and infrastructural support from the local officials. At first, working with Noguchi's enterprise seemed to be going well for the tiny village. It had done its part to usher in a new era of industrialization and modernization.

Unfortunately, the product did not sell well. Carbide was a specialized product, and "its main use was as a light source in night fishing." Adapting to the circumstances, Noguchi's Chisso Company began using carbide to make fertilizer. World War I gave the company a monopoly on the chemical fertilizer

¹⁹ Ibid, Ch. 4, Sec. I

industry and kept the company alive. However, it was evident that Chisso still needed to advance and adapt if it was to maintain this competitiveness. Noguchi traveled to Europe to explore new methods for ammonia synthesis for fertilizer production. He was impressed with the Haber-Bosch process, which was a new technology even in Europe, and “was for Japan the first experience of ammonia synthesis and the first introduction of high-pressure gas technology.”²⁰ The company introduced plants in Japan and Korea and continued to increase their competitive edge in the marketplace. Selecting only students from the top of their respective classes, both management and labor were held to the highest standards. As explained by Ui Jun, “the employment of high-quality low-paid workers was the basis upon which Japan's industrial strength was built.”²¹

With the rise of militarism in the 1930s, Chisso was in a prime position to capitalize on their governmental connections. By this time, Noguchi had established himself as a military sympathizer and imperialist.²² Chisso formed its own financial conglomerate by 1933, and remained successful by providing the military with acetaldehyde, a key material for the petroleum chemical industry.²³ Mercury was a byproduct of this production and was dumped, untreated, into

²⁰ Ibid, Ch. 4, Sec. I

²¹ Ibid, Ch. 4, Sec. II

²² Barbara Molony, *Technology and Investment: The Prewar Japanese Chemical Industry*, (Cambridge, Mass.: Harvard University Press, 1990), 156

²³ Ibid, 186

Minamata Bay.²⁴

As early as 1926, fishermen in Minamata Bay began to notice the side effects of the untreated waste products being dumped in the water. However, complaints were pushed aside, just as they had been at Ashio almost thirty years earlier. In a manner similar to the “local settlements” offered to affected farmers at Ashio, fishermen received compensation with the condition that they stop complaining.²⁵ Efforts to increase production were prioritized above the human environment, and the government supported company over citizen. Pollutants continued to be dumped in Minamata Bay for the next three decades.

Although its munitions division was shut down during the American Occupation of Japan (1945-1952), Minamata managed to avoid the most dire stagnation and depression following World War II by continuing to produce fertilizer, which helped to reestablish Japan’s agricultural production.²⁶ Through a strategic selection of the optimal goods to produce, and through creativity and innovation, Chisso “experienced a second golden era during the 1950s,” and quickly regained its position as a monopoly power.²⁷

The people of Minamata managed to avoid the post-war economic devastation that gripped most of Japan

²⁴ Paul Almeida and Linda Brewster Stearns, “Political Opportunities and Local Grassroots Environmental Movements: The Case of Minamata,” *Social Problems*, 45:1 (1998), 42

²⁵ Timothy S. George, *Minamata: Pollution and the Struggle for Democracy in Postwar Japan*, (Boston: Harvard University Press, 2001), 74

²⁶ George, *Minamata*, 40

²⁷ Ui, *Industrial Pollution in Japan*, Ch. 4, Sec. III

until the mid-1950s, and thus felt indebted to the Chisso plant. The majority of the village's tax revenue came from the company and directly related income sources.²⁸ The mayor of Minamata—which had grown to become a city in 1949—and the city council members also consisted primarily of former Chisso managers and union members. Chisso and Minamata had become so fully intertwined that they had effectively become a single system. But this system was not based on democracy, or even the wellbeing of all of its components. Rather, it was effectively a return to the feudal system of medieval Japan, where one party had complete financial and political control over the other. This internal “hierarchical social stratification,” coupled with the external support of Chisso by both the local and national governments, made it structurally very difficult for the people to assert themselves and their rights regarding their environment.²⁹ This pattern replicated that of the labor force at Ashio at the turn of the century. As at Ashio, this system led to civil unrest and a movement against those at the top of the hierarchy. By 1955, the situation became dire and those who ate the fish from Minamata Bay developed a sickness that was mysterious, debilitating, and fatal.

The Minamata anti-pollution movement can be broken down into distinct time periods which differed in public action and in government response. Paul Almeida and Linda Stearns break the struggle into four

²⁸ Almeida and Stearns, “The Case of Minamata,” 42

²⁹ Barbara Molony, review of *Minamata: Pollution and the Struggle for Democracy in Postwar Japan* by Timothy S. George, *Bulletin of the History of Medicine*, 77:2 (2003), 460

stages, beginning in the mid-1950s with “early efforts to understand what was happening in Minamata.”³⁰

Municipal health authorities Hosokawa Hajime and Ito Hasuo headed the initial investigation. Forming a Strange Disease Countermeasures Committee, they completed a house-to-house survey that revealed more and more victims of the mysterious disease. After a period of door-to-door surveying, the investigation retreated to the laboratory at Kumamoto University Medical School. When the local community realized that heavy metal poisoning was the source of the problem, and that this heavy metal waste likely came from the factory, they became uncooperative. As frightening as the disease may have been, it occurred infrequently enough that the people were more willing to risk a small chance of contracting the disease, than they were willing to compromise their city’s economic success. The company itself was even less willing to cooperate. From providing faulty and fabricated samples, to a disastrous human experiment in 1958 that involved “switching the discharge of the acetaldehyde plant’s wastewater from Hyakken Harbour to the mouth of the Minamata River,”³¹ it was evident that the company suspected it was at fault but refused to risk its profit. In fact, “testimony given in court at a later date proved that, at the time of the *mimaikin* (sympathy payment) signing, Chisso already knew, from its own research scientists, that it was responsible for the mercury poisoning.”³²

Social action heightened in 1959 when the

³⁰ Timothy S. George, *Minamata*, 47

³¹ George, *Minamata*, 54

³² Almeida and Stearns, “The Case of Minamata,” 43

Minamata Fishermen's Association, and the Fushimi Sea Fishermen's Association, demanded compensation from the company for damage perpetrated by the chemical complex.³³ The company decided to pay a small amount of sympathy money, a *mimaikin*, to the affected parties, but refused to admit culpability or change their waste disposal system.³⁴ In response to their inaction, fishermen held a rally demanding that the Diet act on their behalf. In fact, "on the way home from this rally, [the fishermen] broke into the grounds of the chemical complex and destroyed office equipment."³⁵ For their actions, many fishermen were arrested by the prefectural police, and were condemned by the government and the labor unions associated with the plant.³⁶ There was a distinct divide between the fishermen affected by the Minamata pollution and the laborers who depended upon it for their livelihood. This divide reflected the pervasive tension between profit and public interest. The fishermen, like the farmers from Ashio, were no match for a "powerful, cohesive elite" made up of wealthy factory and government officials.³⁷

The company was able to get away with superficial fixes, similar to those improvements promised early on at Ashio. For example, the company installed a device with the improbable name of "Cyclator," that would supposedly clean toxic waste before it was dumped into the bay. This was a powerful public relations tool more than it was a solution to the pollution problem,

³³ Ui, *Industrial Pollution in Japan*, Ch. 4, Sec. V

³⁴ Almeida and Stearns, "The Case of Minamata," 43

³⁵ Ui, *Industrial Pollution in Japan*, Ch. 4, Sec. V

³⁶ George, *Minamata*, 93

³⁷ Almeida and Stearns, "The Case of Minamata," 44

especially when the company president, Yoshioka Kiichi, pretended to drink “a glass of water from the Cyclator in front of... assembled dignitaries, including Governor Teramoto.”³⁸ However, just as Furukawa did not follow through on his promises to decrease the pollution from Ashio, the Minamata officials were obstinately unwilling to change their behavior. The company lawyer later admitted that the machine was never intended to remove organic mercury, which is why Yoshioka did not actually drink the real waste water from the plant. Again, it was evident that the company knew the danger of the waste products, they just did not care enough to clean them up.

The second period of Minamata action was one of “expanding political opportunities.”³⁹ Between 1964-68, external allies began to prove integral to the cause. A pollution case similar to that in Minamata developed in Niigata Prefecture. The main difference was that local officials in Niigata sided, not with the plant, but with the victims. Unlike the Minamata case, the Niigata plant was not integral to the local economy, and, therefore, there was little political risk to demanding that it cease its dangerous activities. The Niigata officials demanded this through a lawsuit, a tactic that Minamata victims would later adapt and utilize in the subsequent decade. In 1971, however, the action of the Niigata victims was radical and unprecedented within Japan.⁴⁰ It flew directly in the face of the traditional hierarchical structures of Japanese society. This was the last straw, and anti-

³⁸ George, *Minamata*, 115

³⁹ Almeida and Stearns, “The Case of Minamata,” 44

⁴⁰ George, *Minamata*, 174-76

pollution activity soon rapidly increased. Workers at Chisso noted this development and adapted, breaking into two factions within the company labor union. One faction, the “old” union, issued a “Shame Declaration,” apologizing for siding with the company, instead of with the victims of Minamata Disease.⁴¹

The third period of action continued the advancements made during the second period and encompassed both external and internal action. There were three levels of activity in this period. The first level were the popular movements by parties external to the Minamata destruction, such as the student movement. The years between 1969-74 were already a time of heightened political unrest, especially among young people. The Vietnam War protests and disillusionment with big government on a global level trickled down to the environmental movement. Students in Tokyo and students at Kumamoto University united with locals in protesting the actions of Chisso.

The second level was the action taken by the pollution victims themselves, most notably their court victory in 1973 in conjunction with the other Big Four pollution cases. “With the Big Four pollution cases occurring during a widespread national anti-pollution social movement, there was public pressure for favorable verdicts.” Chisso was forced to publicly acknowledge the destruction they had caused and to pay the largest court settlement paid to citizens in Japanese history, “a total of ¥930 million (\$3.6 million).”⁴²

⁴¹ Almeida and Stearns, “The Case of Minamata,” 45-46

⁴² Ibid, 50

The third and final level of action was the government response to the popular movement. After passing a Basic Law for Pollution Control in 1967, the government continued to grant limited concessions to Minamata victims, including the 1970 “Law Concerning Relief of Pollution-related Health Damage” and the “Compensation Law.”⁴³ This is akin to the stage at Ashio in which the government forced Furukawa to clean up or shut down. The difference, however, is that the government followed through on their enforcement of such demands at Ashio, and continued to support the farmers for the benefit of agricultural stability. Sadly, in Minamata, this was not the case.

In the fourth stage of the larger movement, the government diverted from its path of gradually granting more concessions to the disease victims, and returned to its hard-line policies of the 1950s and early 1960s. The national anti-pollution movement lost steam with the stagnation of the economy after 1974. Citizens no longer had the luxury of dedicating free time to social movements, and did not press the government to maintain their dedication to addressing the victims’ problems. In the same way that government officials put public wellbeing on hold to modernize the mining industry at Ashio in order to compete on the world market, the government responded to the financial crisis by allying with big business. Although the Japanese government took a few small steps forward in the late 1960s and early 1970s, it took a big step back in terms of civil rights

⁴³ “Minamata Disease: The History and Measures,” The Ministry of the Environment, (2002), Section 2

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following the oil crisis of 1973-74.

Settlements made following this economic and political stagnation were more akin to the *mimaikin* of the 1950s, as the state receded into a refusal to accept responsibility for its failure to regulate Chisso, and for its failure to recognize the rights of the victims of the Minamata mercury poisoning. Lawsuits became tied up in courts for decades, and fewer victim certifications were granted, preventing many victims from receiving their indemnity, and any sense of closure that may have come with it.

Conclusion

Overall, the legacy of Minamata was one of incomplete victories. “Minamata does not offer a simple answer to questions about the nature of postwar democracy,” and the government’s responsibility to both protect its people from public health hazards and to ensure economic growth.⁴⁴ The impacts of this legacy began with the Ashio Copper Mine, continued in Minamata, and extended into the twenty-first century with the Fukushima Nuclear Crisis.

It remains to be seen how the government will ultimately handle the Fukushima earthquake-crisis, but many parallels with Minamata emerged immediately following the disaster. In the same way that Minamata officials persuaded Noguchi to construct his plant in their village, many rural villages, prior to the Fukushima crisis, sought to “solve their

⁴⁴ George, *Minamata*, 284

problems by attracting nuclear power plants.”⁴⁵ The “local settlements” and *mimaikin* of Ashio and Minamata were also duplicated with the offering of payments, following the crisis, to residents and towns near the Fukushima power plant. In addition, just as farmers near Ashio, and fishermen near Minamata, were among those most harmed by the pollution, farmers in the affected area surrounding Fukushima have seen the carelessness of technological innovators put the health of the town at risk.⁴⁶ Finally, and perhaps most disturbingly, the governor of Tokyo, Ishihara Shintaro, repeated the Chisso president’s infamous publicity stunt of 1959 by drinking “a glass of tap water on national television to prove that it was safe from radioactive contamination.”⁴⁷

Despite these parallels, there is still time for the government’s reaction to Fukushima to turn in a more positive direction. There is still time to learn from both the mistakes and successes of the past. In the same way that victims of Ashio and Minamata used modern institutions to fight social and environmental injustice, with an active popular response, it may be that the pain of past disasters can be avoided with respect to Fukushima. In conclusion, the ultimate similarity of the Ashio, Minamata, and Fukushima cases goes beyond environmental issues, and breaches the problem of citizenship, democracy, social control and

⁴⁵ Timothy S. George, “Fukushima in Light of Minamata,” *The Asia Pacific Journal*, 10:11, 5 (2012), online: http://japanfocus.org/-Timothy_S_-George/3715

⁴⁶ Christine Marran, “Contamination: From Minamata to Fukushima,” *The Asia Pacific Journal*, 9:1 (2011), online: <http://japanfocus.org/-Christine-Marran/3526>

⁴⁷ George, “Fukushima in Light of Minamata,” online

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governmental power, and the value of humanity in a world that seemingly values technology and progress above all. It also demonstrates the continual tension between the government's quest and constant push for modernity, and the forced adaptation of the citizenry to use the government's own weapons against them.

Kathryn Karasek is a double major in History and Economics. Originally from Cary, North Carolina, she chose to branch out and study East Asian History at SCU. Her paper, "Environmental Destruction in Japan", was inspired by her participation in the Solar Decathlon project and won the 2013 Redwood Prize for the best essay on a historical subject.