Chapter———1

The Ashio Copper Mine Pollution Case: The Origins of Environmental Destruction

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I. Technological Modernization and the Ashio Copper Mine

In 1868, the newly established Meiji government of Japan made the modernization of the country by increasing military strength and expanding industrial production its first national priority. The government established a Department of Industry in 1870 and came to control all industries other than the military. On the basis of land taxes, this new department took the initiative in starting new industries, and looking after private enterprise until the department was disbanded in 1885. The work that the department had done was to introduce new technologies and machines from the advanced capitalist countries and also to invite technicians to Japan to provide new industrial production models and technologies.

Related industrial laws were established and, by 1877, mining, financed by private capital, had grown rapidly. Copper was especially important for the new government, because its exports brought in much-needed foreign money. The demand for copper overseas supported the copper industry in Japan. As table 1.1 indicates, most of the copper produced in Japan was exported. Copper earned 9.5 per cent of Japan's export earnings in 1890 and through this Japan became established as a world-level copper producer. The earnings were used to purchase mining equipment, military weapons, and other industrial machinery. Copper played an important role in the development of Japan's capitalism, and the main domestic copper producer was the Ashio copper mine.

The Ashio copper mine had been the property of the Tokugawa shogunate, and as such had produced 1,500 tons annually, which was the maximum possible output in the 1600s. However, this high output level had been dropping gradually. The mine was temporarily closed in 1800, but in 1871 it became a private operation, and finally in 1877 it came to be owned by Ichibei Furukawa. In 1881 a new but small lode of ore was discovered, followed by a much larger one in 1884, and, as indicated in table 1.2, copper

Table 1.1. Copper Export as a Percentage of Production

Year	Export/production (%)
1882	49.4
1884	59.3
1886	100.4
1888	72.4
1890	107.6
1892	87.4
1894	76.9
1896	72.6
1898	79.3
1900	82.0

Source: Nihon Keieishi Kenkyuujo, *Furukawa Kogyo sogyo 100 nenshi* (Furukawa Kogyo, 1976), p. 73.

production rose very rapidly as a result of these discoveries. In 1884, the production stood at 2,286 tons per year. Thus Ashio became the mine with the highest output in Japan, producing 68 per cent of the total output of Furukawa mines and 26 per cent of Japan's production.

From 1876 to 1885, the demand for copper was rather low, because mining technology in Western countries was on the upswing and because the world's copper market had fallen into a depression. This also had an effect on Japan's copper production which, in like manner, faced marketing difficulties during that period. In spite of its primitive methods and the depression in the world's copper markets, the Ashio mine was prosperous because of the excellent quality of the ore discovered in the larger lode.

In 1885, Furukawa bought the Ani mine from the government, not only to add another productive mine to the company's holdings, but also to provide an opportunity to make use of the latest modern equipment that had been installed there, as well as its highly skilled technicians. This equipment from the Ani mine enabled the Ashio mine to modernize the system for pumping the water and ore slurry, which up until then had been done manually, because the newer ore-digging and crushing equipment incorporated a steam-operated pumping method. With the help of foreign technicians the mine was reorganized for more efficient output on the basis of new techniques and equipment, and the horizontal mining method was introduced. However, the mine's capital accumulation was as yet insufficient for the further introduction of advanced production technologies.

In September 1885 when the Ashio mine was flooded, the technical limitations were revealed. Although production had reached a record 4,090 tons that year, it took another two years before the former production levels were regained. The years 1886–1887 saw a depression in world copper markets. The Jardine Matheson Company, the largest of all British companies in South-East Asia at that time, requested exclusive purchasing rights for all

Table 1.2.

Year	Production (tons)			Percentage
	Ashio mine	Furukawa mine (a)	All Japan (b)	(a/b)
1874			2,111	
1875			2,399	
1876			3,181	
1877	46	149	3,943	3.8
1878	48	158	4,256	3.7
1879	90	263	4,630	5.7
1980	91	268	4,669	5.7
1881	172	370	4,669	7.9
1882	132	737	5,616	13.1
1883	647	1,671	6,775	24.7
1884	2,286	3,411	8,888	38.4
1885	4,090	5,250	10,541	49.8
1886	3,595	5,100	9,774	52.2
1887	2,987	4,455	11,064	40.3
1888	3,783	4,180	13,255	31.5
1889	4,839	5,999	16,254	36.9
1890	5,789	7,589	18,115	41.9
1891	7,547	7,681	19,003	40.4
1892	6,468	7,397	20,727	35.7
1893	5,165	6,928	18,015	38.5
1894	5,877	8,017	19,912	40.3
1895	4,898	6,587	19,114	34.5
1896	5,861	7,695	20,102	38.3
1897	5,298	7,964	20,389	39.1
1898	5,443	8,764	21,024	41.7
1899	5,763	9,191	24,276	37.9
1900	6,077	8,924	24,317	36.7
1901	6,320	9,089	27,392	33.2
1902	6,695	8,194	29,035	28.2
1903	6,855	9,290	33,187	28.0
1904	6,520	8,986	32,123	28.0
1905	6,577	8,949	35,495	25.2
1906	6,735	9,580	37,432	25.6
1907	6,349	9,298	38,714	24.0

Source: Nihon Keieishi Kenkyuujo, *Furukawa Kogyo sogyo 100 nenshi* (Furukawa Kogyo, 1976), pp. 76, 82.

Furukawa's copper output, with the aim of creating a monopoly in world markets and forcing an increase in the price of French-produced copper.

At first Furukawa was unwilling to conclude this contract because of the large amount of copper to be sold and the terms of the payment. But in 1888 a contract was signed; Furukawa was to sell 19,000 tons of copper at the Yokohama rate of 20.75 yen per 100 kin (1 kin = 0.6 kg) for 29 months. With

this contract in hand, Furukawa could make capital borrowings, but in order to realize these the output of the Ashio mine had to be greatly increased.

Under these conditions it was not only essential but inevitable that the technology used in the Ashio copper mine be updated and modernized. The problem of flooding, which had plagued the mine for three years, was solved within the year. Furukawa was the first to install a telephone system in the mine. Various kinds of mining equipment were imported for drainage and the transportation of ores, and the production was generally improved. Further, the company initiated innovations that were to increase production capacity, reduce the need for labour, and cut the cost of production.

However, no matter how much effort was given to increasing copper production, the refining method was still rather primitive. In 1887, of the 48 refining sites, eight were abolished and replaced by one modern hydrometallurgical separator and three pyrometallurgical smelters. In 1890, in order to meet the contract demands of the Jardine Matheson Company, another 12 hydrometallurgical separators were installed to replace the old smelters.

There were many problems like excessive energy consumption and product and ore transportation. In 1890, Furukawa requested the Siemens Company of Germany to install a 400-horsepower hydro-electric turbine that was to run an electric generator to power an 80-horsepower pump, a 25-horsepower ore lift, and a 6-horsepower electric-light system. The electric pump was of the plunger type which provided greater efficiency and energy conservation in water drainage and ore transportation. In 1891 an electric railway was built between the mine and the refining area.

Because the transportation of the finished products was dependent on the use of horses and cows, weather and temperature caused problems. In order to solve them, the company installed a 30-horsepower steam-engine-powered cable across the Hosoo Pass in 1890. Then, when the Japan National Railway opened the Nikko rail line, the company began to operate a horse-drawn train between the Hosoo Pass and Nikko, thereby greatly improving the product transportation system.

In 1893 Furukawa built a Bessemer smelter. With the help of this, the time needed for the refining of the ore was reduced from 32 to 2 days. The Ashio copper mine now became the leading copper producer as a result of its greatly increased productivity.

II. Protests against Mining Poisons and Governmental Measures

The predominantly capitalistic production system of the Ashio copper mine brought about serious mining-induced environmental destruction. As indicated in figure 1.1, the discovery of the large copper ore lode caused all the trees surrounding it to die by the end of 1884. In August 1885, the use of a rock-crushing machine and a steam-operated pump in the Ani mine greatly increased production but led to massive fish kills in the Watarase River. In

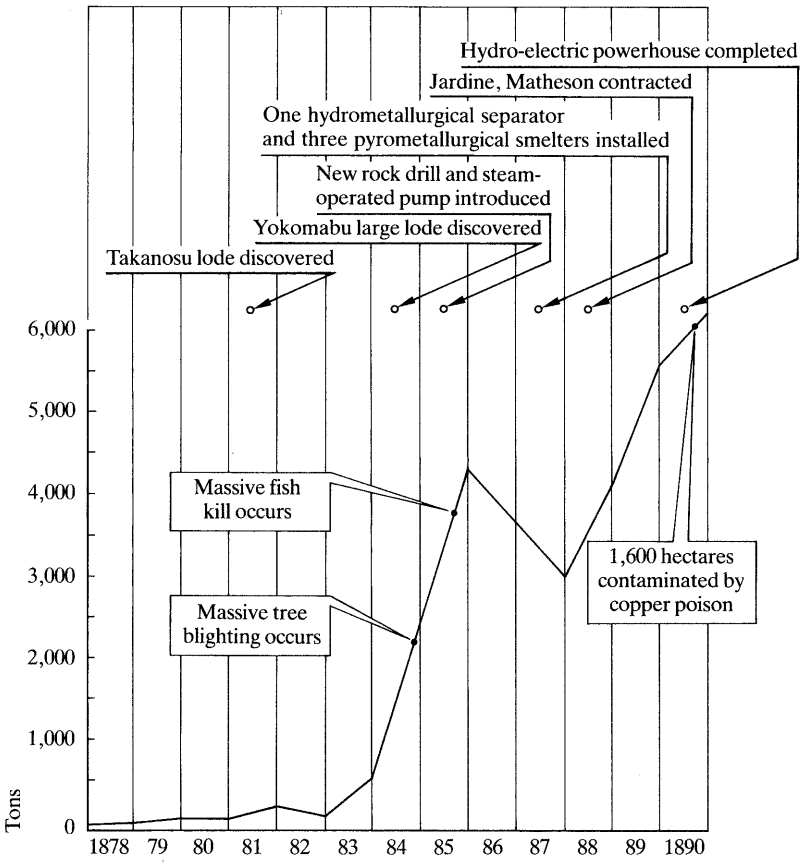


Fig. 1.1. Process of Environmental Destruction around Ashio Copper Mine (after K. Shoji, production figures from *Furukawa Kogyo sogyo 100 nenshi*, p. 82).

August 1890, when all modern technology systems had been installed, a flood occurred in the Watarase river basin, and 1,600 hectares of farmland and 28 towns and villages in Tochigi and Gunma prefectures were heavily damaged by the floodwater, which contained poisons from the Ashio mine.

In October 1890, Chugo Hayakawa led a movement against the mine and asked the prefectural hospital to do some tests for water-borne poisons. In December, the residents of Azuma Village, Tochigi Prefecture, appealed to the governor of the prefecture to call a halt to the mining operations at Ashio. This was the first of such appeals and of the movements against Ashio.

In December 1890, the Tochigi Prefectural Council resolved that the poison problems should be investigated. Gunma Prefecture followed their

lead in March 1891. In April 1891, the governor of Tochigi made a request to the Agricultural University to investigate the causes of the damage to agricultural systems, and asked for countermeasures. He was followed by the governor of Gunma, who did the same in June and July. During these periods the farmers began to organize their efforts to counteract the mining poisons. Sukeyuki Cho, Chugo Hayakawa, and Sahei Kameda from the Ashikaga and Yamada areas of Tochigi formed volunteer groups, and started to organize the provinces of Yamada, Nitta, and Oura in Gunma Prefecture in order to stop the mining. At the same time they published the results of soil analysis and other surveys related to the Ashio mine poisons, carried out by Professor Yoshinao Kozai of the Agricultural University, but the book was immediately confiscated by the authorities.

The destruction of agricultural ecosystems by the Ashio water-borne poisons provoked a response from the farmers, which at first was oriented towards stopping the operation of the mine altogether, but which was also concerned with gaining monetary compensation from the mine-owners for the extensive damage that had been done. In September 1891, the governor of Tochigi Prefecture proposed to lay the groundwork for negotiations between the farmers and the Furukawa management concerning possible compensation for damages on condition that the former agreed to mediation through the governor. The representatives of six villages in the Ashikaga area and three in the Yamada area, including Sahei Kameda of Azuma Village, agreed to accept the proposal. In this way the farmers' movement against the operations of the copper mines slowly changed into a movement to demand compensation for damage. Japanese governmental attitudes toward the Ashio copper mine problems and measures to resolve them were reflected in the Imperial Constitution of Japan, which was promulgated in February 1889.

Prima facie the Imperial Constitution was egalitarian, but in reality the rights of the people and the Imperial Diet were tightly circumscribed in deference to the authority of the Emperor, who, as the sovereign head of state and commander-in-chief of the armed forces, retained the power to declare war and negotiate peace. The National Diet was not able to interfere in military affairs, and its deliberation of budget bills was also limited. The power to form or disband governmental organizations belonged exclusively to the Emperor.

The concentration of power in the hands of the Emperor inevitably created advisory organs like Genro, which were exclusively manned by members of the Satsuma and Choshu clans, who had been instrumental in bringing about the Meiji Restoration and in establishing the bureaucratic system of Japan.

Elections were held only for members of the Lower House of the Imperial Diet, which was established in November 1890, while the Upper House was constituted through Imperial Orders and consisted of noblemen, bureaucrats, large landowners, and industrial capitalists. This system of government was established under the Emperor in collusion with large landowners and industrial capitalists who had accumulated their wealth by taking advantage

of the Matsukata Monetary Retrenchment Measures instituted in 1881. It was this same group that had established the Department of Industry within the government.

With this amount of power concentrated through governmental structures in the hands of a few individuals, policies were oriented toward strengthening military power and the creation of a technologically sophisticated industrial state. In this context and under the Imperial Constitution, the political and economic roles of the Ashio copper mine were strengthened, because copper was an important foreign money-earner, and foreign money was needed for the purchase and importation of weapons and industrial machinery. Against this background, Ichibei Furukawa succeeded in establishing solid relationships with those in governmental circles.

Furukawa continued his relationship with Eiichi Shibusawa, the leading capitalist of the times, and he was greatly supported by Kaoru Inoue, a political magnate who had served the Foreign Ministry and the Department of Industry. Junkichi, the second son of the future Foreign Minister Munemitsu Mutsu, was adopted as a son-in-law by Ichibei Furukawa and through this the ties between the two families were cemented, which did much to strengthen their economic and political power. In 1890, Mutsu was appointed to the Ministry of Agriculture and Business, and Mutsu's secretary, Takashi Hara, became vice-president of Furukawa Mining in 1905. In 1907, Hara became the Minister of Home Affairs, and ordered the destruction of Yanaka Village. Hara's talent had first been recognized by Kaoru Inoue, the then Minister of Foreign Affairs, and this led to his becoming a foreign affairs appointee to France. While Hara was in France, he had become acquainted with Tsugumitsu Saigo of the Japanese Navy, and Aritomo Yamagata of the Japanese Army—relationships that made it possible for him to move later on into the prime ministership. Taking advantage of these connections, Hara was able to strengthen the relationship between the political tycoons and Furukawa.

In December 1891, in the second Diet session, Shozo Tanaka, a member of the Lower House from Tochigi Prefecture, demanded that mining at Ashio be stopped, drawing on Article 27 of the Imperial Constitution which guaranteed the inalienable right of petition and pointing out the fact that Japan's Mining Laws stipulated a withdrawal of the right to mine if mining operations damaged public welfare. Along with this action Tanaka requested that Mutsu, who was then Minister of Agriculture and Business, take complete responsibility for the damage done to the agricultural sector by the mine-related poisoning. However, before any action could be taken in this regard, the second Diet session was dissolved over budgetary issue confrontations between the government and opposition parties. The government's answers to Tanaka's questions and demands appeared in *Kanpo*, the government newsletter, which said that the causes of the damage to the agricultural systems in the areas around the Ashio mine were unknown and were under investigation; the company would be reprimanded for the discharge of poisons from the mine and ordered to install pulverized ore-dust collection equipment so as to prevent the outflow of poisons.

These responses from the government clearly indicated that the officials were fully aware of the causes of the environmental destruction, because they at once denied the possibility of poisoning by mining and recognized the necessity for new mining control equipment to protect the agricultural environment. They claimed that the new equipment would be an effective means of environmental protection and at the same time used it as a way of trying to force the farmers to change their attitude from one of outright opposition to mining operations to one of accepting monetary reparations.

In February 1892, an arbitration meeting led by the governor of Tochigi Prefecture was set up in conjunction with a prefectural council members' mediation organization. In the Ashikaga area, however, a Mine Poisonings Examination Meeting was arranged. In both cases, negotiations for damage reparations were promoted. In Gunma Prefecture, the governor was not directly involved in the negotiations but the council chairman served as the mediator. However, there were still peasants strongly opposed to negotiations for compensation in both Gunma and Tochigi prefectures. The highest administrative official of Nitta Province led the Union of Water Consumers of Machiyaba Ryoseki in negotiations for compensation. These negotiations led to agreements on the following three points: (1) that money should be paid to the farmers in view of the moral obligations of the mining company; (2) that in order to appreciate fully the efficiency of the pollution-preventing ore-dust scrubbing equipment that was to be installed, the parties signing the compensation pact should wait until 30 June 1896 before bringing any further complaints against Furukawa; (3) that Ichibei Furukawa should make every effort to restore the water ecosystem to its original quality.

Before the signing of the compensation pact, the necessary preliminary damage surveys were completed by a group composed of village élites who had been selected by the prefectural, village, and town legislative offices. In other words, the arbitration leaders and the public administrators were constituted in such a manner as to assure the strengthening of the Furukawa position. The amount of money negotiated as compensation for the extensive environmental damage was minimal.

For example, the poisoned areas of Ueno and Sakai villages, and Inubushi Town in Aso Province, which represented about 1,160 hectares altogether, were given compensation of only 10,000 yen. The annual income from 10 ares of produced rice at the time was between 14.60 and 17.52 yen. Therefore the amount of damages from the mine represented about one-twentieth of the annual income from the land. Furukawa also agreed to pay the peasants money for remaining quiet until the effectiveness of the pollution prevention ore-dust scrubbing equipment had been evaluated. The ore-dust scrubber was next to useless as a pollution prevention device and the amount paid to the farmers between 1890 and 30 June 1896 was 0.143 yen per annum, which represented less than one day's wages for a tenant farmer.

The first arbitration meetings were continued until 1893. Then, in 1894 when the Sino-Japanese War broke out, second arbitration meetings started and continued until 1896. This time the Furukawa Company tried to press a

contract on the victimized farmers, intending this as a final solution to the problem. The original amount offered for compensation was 1.40 yen per 10 ares of the poisoned land, but through the machinations of biased third-party negotiators the damages were lowered to between 0.40 and 0.25 yen per 10 are area, with the proviso that the peasants relinquish permanently the right to bring damage claims against the Furukawa Mining Company.

In March 1895, Japan emerged victorious in the Sino-Japanese War. However, the Chantung Peninsula, which had been won by Japan after the war, had to be returned to China through the intervention of Russia, Germany, and France. As a result of this the Japanese government decided to turn even more strongly towards military expansion under the military leadership, determined to modernize their forces in order to spread their hegemony to Manchuria and to defeat the Russian Army. The Japanese Navy was intent on increasing its strength so as to be able to resist the combined power of Russia, Germany, and France. The supreme order propagated by the Japanese government was to increase the power of the army and navy by doubling their capacity.

The Sino-Japanese War furthered industrialization, ensured capital expansion, and provided a rationale for the development of a military education system. It also brought about further diplomatic co-operation with the Great Powers. After the Sino-Japanese War, it became clear that Japan's policy was to join the race with other advanced nations for imperialistic expansion. This was the very beginning of Japan's imperialism, which eventually led to Japan controlling Korea.

Essential to waging the Sino-Japanese War was an increase in iron and steel production. However, Japan's smelting techniques were still immature. From 1896 to 1900, Japan could meet only about 50 per cent of its demand for iron, and one-twentieth of that for steel. As a result, it was absolutely essential that Japan import iron and steel. In this context, the importation of refining equipment, weapons, and other steel-fabricating machinery was greatly increased, and the foreign money earned by the copper-mine output played an important role in paying for these foreign goods.

Copper production was of vital significance in that copper was equated with the nation itself. The Ashio copper mine, by meeting the increased demand for copper, which was needed both for foreign-exchange and military purposes, came to be the foundation upon which Japan's imperialism was built.

By the close of 1884, the entirety of the once-forested areas around the Ashio refinery had been biologically destroyed. As indicated in table 1.3, by 1893 sulphurous anhydride from the smoke produced by the mining and smelting machinery had killed all living things, so that natural recovery was rendered impossible and the once tree-covered mountain areas were turned into an absolute wasteland. The continuation of the smelting operations resulted in extensive erosion in the mountains and the material washed away from them filled the middle of the Watarase River to a height of five feet. The damage to the natural environment was increasing at an ever-accelerating pace.

Table 1.3. Condition of Ashio Area Mountains in 1893 (unit: cho = 2.45 acres)

Area designation	Deforested	No vegetation growth	Exposed base rock
National forest	10,000	588	118
Government-owned mountain area	1,000	245	82
Privately owned mountain area	1,800	273	100
Total	12,800	1,106	300

Source: Tochigi Prefecture Education Committee, *Tochigi kenshi kenkyuu*, no. 19 (1980), p. 98.

In 1892 the Tochigi Prefectural Governor, and in 1895 the Gunma Prefectural Governor, went to the Agriculture and Business Minister seeking a prohibition against further damage to the forests, as well as policies that would save the viability of the mountains. In 1895 the Tochigi Prefectural Council presented a similar petition to the Ministry of Home Affairs. In March 1896, in the ninth National Diet session, Shozo Tanaka posed questions to the government in relation to the natural destruction that had been wrought by the Ashio copper mine.

The thing which all had feared occurred with devastating force. In September 1896 a massive flood, larger than the one visited on the area in July of the same year, was caused by torrential rains, and the Watarase, the Tone, and the Edo overflowed their banks. One large city, five prefectures, twelve provinces, and 136 towns and villages over a total area of 46,723 hectares were damaged by the water-borne mine poisons. The loss sustained was about 23 million yen, which was eight times the annual income of the Ashio copper mine.

Because of the seriousness of the mine-related damage to the natural environment, Shozo Tanaka set up a mining damage office in the Unryu Temple of Watarase Village in Gunma Prefecture, and with other volunteers began to take action to end operations at the mine. He started by organizing people in the areas most heavily destroyed, suggesting to them that the farmlands in the flooded areas be exempted from national taxes.

This was the beginning of one of Japan's first mass-based citizens' movements.

In November, the Ministry of Agriculture and Business sent technicians to Tochigi and Gunma prefectures in order to compile data on the extent of the flood damage, and in December a five-member mining poisons survey commission was formed in the same ministry. This rapid response on the part of the ministry was brought about not only by an atmosphere of crisis that the officers of the agricultural section had created and by the rising tide of public opinion against the destruction of the agricultural environment, but also by certain personnel changes in which Munemitsu Mutsu became Minister of Foreign Affairs and Takeaki Enomoto Minister of Agriculture and Business.

The excessively serious nature of the mining poisons damage became a powerful challenge to traditional agricultural ideologies based upon Confucianism. A crisis mentality obtained among the people, as well as among certain members of the governing élite.

In February 1897, Shozo Tanaka put questions to the tenth National Diet session in relation to the government's responsibility for the mining disaster, and demanded that the mining operations be stopped. As soon as the newspapers reported this, over 2,000 farmers were organized to go to Tokyo for the first mass rally about the problem. Riot police and military units were used to stop them, but over 800 managed to complete the long journey and came to appeal at the appropriate government offices. Through this action they received much greater public exposure. On 18 March four prefectures opened a co-operative office in Tokyo for the prevention of mining hazards. On 24 March, Enomoto, the Minister of Agriculture and Business, visited Ashio. In a second event, more than 3,000 peasants broke through police barriers to get to Tokyo for a second mass rally against the mine.

Against the background of these events, the government instituted an Ashio Copper Mine Survey Committee of 18 members, headed by Tomotsune Kamimuchi, the Minister of Justice. Immediately after that, Enomoto, the Minister of Agriculture and Business, resigned, and Shigenobu Okuma, the Foreign Minister, was assigned to the post. This first Ashio Copper Mine Survey Committee, however, had a hidden agenda: its primary objectives were the suppression of the heightened pressure of public opinion against the operation of the mine and the undermining of the farmers' movements and demonstrations.

III. Mine Operations in the Post Sino-Japanese War Era and the Stance of the Government

Newspapers reported that the mining operation might be ordered to stop by the first survey committee. Shimpei Goto, a member of the survey committee and the chief of the Public Health Department in the Ministry of Home Affairs, told the press that he would bring the mining operations to a halt. On 31 March Hirohata, a Chamberlain, and on 9 April Kabayama, the Minister of Home Affairs, visited the mine-poisoned areas. When Kamimuchi, the chairman, prepared the survey committee draft, there were indications that either a partial or total closing of the mine would be suggested. However, Koi Furuichi, the civil engineering adviser to the Ministry of Home Affairs, Wataru Watanabe, a non-official technician of the Bureau of Imperial Estates, and Kunijiro Wada, of the Ministry of Agriculture and Business, moved to suppress the mine-closing orientations proposed by Muneyoshi Nagaoka, an associate professor at the Agricultural University, and Hatsujiro Sakano, a technician engaged in agricultural research.

Although the press reported that Goto intended to stop operations at the mine, he did not mention this in the deliberations of the survey committee.

The victims' compensation plan proposed by some of the committee members was not taken up in cabinet deliberations in any shape or form. In this regard, the work of the committee was circumscribed by the duplicity of the government.

The government, for which military expansion was of the first order of importance, was unable to alter its basic demand for copper and as a result the mine continued operating with government support even after the great mine poisoning incident. At the same time great efforts were expended in nurturing public support for expanded militarism. The damage done by the poisons now affected 100,453 hectares of land and it was the government's task to stop the damage and improve the situation. The first survey committee managed to minimize the government's involvement as much as possible by offering tax exemption to heavily poisoned areas while issuing orders to the effect that further environmental damage should be prevented by more stringent measures than had been applied on two earlier occasions. This was as much as the government really wanted to do. That was why the government continued to make light of the situation, at the same time supressing the victims on the basis of national security.

In May 1897, the government sent 37 environmental protection articles in relation to the mine to Ichibei Furukawa. The main requirements were to build a condensation tower to cut down on sulphur emissions, as in the condensation of arsenious acid, the precipitation of smoke particles, the elimination of sulphurous anhydride caused by sulphuric acid production, the sedimentation of sludges, the precipitation of particulate matter, the provision of adequate sludge-pile catchments, and the construction of tall chimneys. The period allowed for the completion of these projects was specified, with the proviso that if the company did not meet these requirements, mine operations would be halted. Responsible for these agreements was Teizo Minami, who later became a director of the Ashio copper mine after the environmental protection construction projects had been completed. As things turned out, the tower designed to reduce sulphurous acid gas emissions was completely useless. The smoke damage worsened on the upper reaches of the Watarase River in the area of the old Matsuki Village, which was, as a result of the total damage involved, completely demolished in 1901. The construction costs for the pollution prevention tower totalled 1,040,000 yen for the entire project and the loans were partly covered by Eiichi Shibusawa of the Daiichi Bank.

It took another year before the first legislation to provide tax exemption for poison-damaged areas was enacted in May 1898. According to the circumstances there were six different tax-exemption periods. This tax-exemption legislation covered only 25,500 hectares. However, in September 1898, just after the initial legislation had been enacted, another big flood hit the area. Because this natural phenomenon caused further damage from mine poisons, in July 1899 a second round of tax-exemption legislation was enacted for the same area.

The tax-exemption legislation, however, did not deliver the farmers from

their plight, nor did it foster in them a true sense of independence. With tax-exempt status they were forced to give up voting rights which were accorded only to taxpayers. Furthermore, the local governments were unable to collect taxes. In other words, the copper-mining poisons not only ravaged the farmers' land, but also threatened their lives as well; the farmers were deprived of human rights and the local governments were brought to a state of dysfunction through the tax exemption. Kuno Village in Ashikaga, Tochigi Prefecture, and Oshima Village in Gunma Prefecture became tax-free zones. The local legislative offices were brought to a complete state of paralysis because they could not collect taxes, so the village secretaries had to take on the responsibilities of the village administrators in those areas.

The flood of 1898 did even worse damage to the surrounding areas because massive amounts of slag had been released from the sedimentation pond built by the mining company. In extreme anger and frustration, over 11,000 farmers started out for Tokyo 26 September for the third mass demonstration, with demands for reinforcement of the river banks, for the sparing of the poisoned areas from further insult and for a policy of support for the bankrupt local governments. They were confronted on the way by the police and military forces. However, some 2,500 succeeded in getting to Hogima Village, Minami Adachi Province, Tokyo.

Although Shozo Tanaka had been sick at the time, he went to meet the farmers and advised them to leave 50 representatives with him and go back to their villages. Tanaka pledged that if their demands were not met, he would fight to the death for their cause. In this manner Tanaka became the leader of the struggle against the copper mine and began to organize the farmers. In March 1899, during the thirteenth National Diet session, Tanaka again expressed his determination. In April, at the Unryu Temple meeting, he asked the farmers to direct their demands at prefectural governments rather than the National Diet and gave guidance as to election orientations that should be taken in relation to village- and town-elected officials. The point of this planning was to train the movement leaders so as to provide a firm foundation for ensuing struggles. This organization became the basis for the next explosion of farmers' energies against the government in Tokyo. At a meeting held at the Unryu Temple on 30 August 1899, the farmers decided to go to Tokyo for the fourth time in order to meet the Ministers of Home Affairs and of Agriculture and Business during the fourteenth National Diet session which sat from November 1899 to February 1900. Information about this plan was passed to the police within the day.

The farmers' decision led Tanaka to request them to conduct a survey of the death-rate in the poisoned areas, especially in relation to the increased death-rate of newborn babies. He said that the copper mine was responsible for murder, and in order to get at the facts, he made his rounds of the various villages in which the death-rate was increasing. At the 12 September meeting in the Unryu Temple, a fourth mass demonstration in Tokyo was decided on. Table 1.4 gives the statistics submitted by Tanaka at that time.

On 18 January 1900 at the Unryu Temple, village committee members and

Table 1.4a. Census Results for 12 Villages[a] in the Areas Affected by Copper Poisons in Tochigi and Ibaragi Prefectures (five years ending in November 1899)[b]

Years	Prefectures/ villages	Total population[c]	Births and deaths (total)		Average population per village	Average births/ deaths per village		Average population/ 5 years	Average births/deaths per 100 population in 5 years	
			Births	Deaths		Births	Deaths		Births	Deaths
5 years	2 prefectures/ 12 villages	6,182	865	939	515.17	72.08	78.25	1236.4	173.0	187.8

a. The 12 villages include 11 in Tochigi-ken and 1 in Ibaragi-ken.
b. No statistics were available for years before 1894.
c. Total population figure represents the figure for 1898.

Table 1.4b. Comparison of Birth/Death Rates for National Average,[a] Non-affected Areas,[b] and Affected Areas[c]

Per 100 population	Births	Deaths
National average	3.21	2.60
Non-affected areas	3.44	1.92
Affected areas	2.80	4.12

a. National average figures were taken from 1895 census figures.
b. Non-affected area figures are from Uyeno-mura, Aso-gun, Tochigi-ken in 1898.
c. Affected area figures represent the figures for 1898.

Table 1.4c. Comparison of Birth/Death Figures for Five Years Prior to and Succeeding the Incident in Kai-mura, Aso-gun, Tochigi-ken[a]

5 years	Average number of households	Average population	Average number of births	Average number of births per 100 population	Average number of deaths	Average number of deaths per 100 population
1883–1887	127.4	741.0	21.4	2.89	15.40	2.07
1894–1898	126	726.6	29.4	4.04	31.20	3.87

a. The startling difference between the average death figures for before and after the Incident should be noted.
Source: "Ashio Dohzon kohdoku shobun seigan Tokyo jimusho," *Ashio Dohzan kohdoku shobun seigan* (University of Tokyo Faculty of Economics library).

18 temple priests gathered for a meeting that was to call for revenge for the excessive number of deaths caused by the poisoning and to provide impetus for the continuing struggle against the government. A task force was created among young people, with the aim of strengthening the organization in areas where the movement had not yet taken off. All this was in preparation for the fourth demonstration being planned for Tokyo.

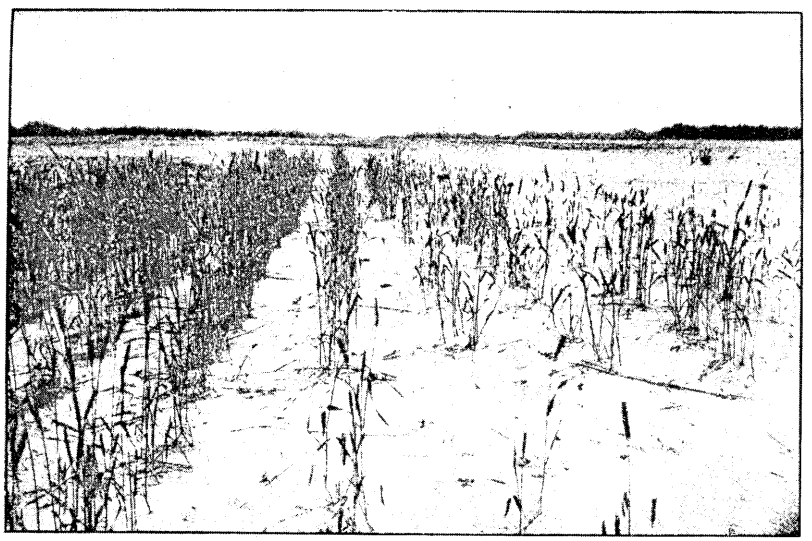
Against this background of movement unification, the military police continued their investigations and the restrictions on activist involvement increased. In response to communications from the Gunma Police Headquarters, the Tochigi police chief sent to all police forces details of the farmers' plans for a mass demonstration in Tokyo. The police saw through the farmers' attempt to cover up their plan by acting as if their movements were part of a sightseeing trip to Tokyo or a visit to the Narita Temple, and in this way they were able to keep a watch on the farmers' true intentions.

On 6 February 1900, discussions pertaining to the matter of the farmers' demonstrations took place between the Tochigi Prefectural Public Peace Department and the police chief. On the 7th, a Tochigi Prefectural Police section chief met with an Ibaragi Prefectural Police section chief in order to

determine the allotment of responsibilities for the demonstration-related investigation. On 8 February, the Tochigi Prefectural Police ordered the allocation of 10 police inspectors, 11 police section chiefs, and 162 policemen to the investigations. The Gunma Prefectural Police Department sent three police inspectors and 50 policemen to the Unryu Temple, and a total of 185 police were assigned to overpower and stop the demonstrations, while military forces were stationed not far away at Sano.

On 9 February, under these highly restrictive conditions, the Unryu Temple gong was sounded as a signal, followed by the Ueno, Azuma, and Watarase village gongs. In response to the sounds, 300 young men came *en masse*, singing songs and shouting slogans against the operation of the copper mine. Until about four o'clock the next morning, this large group went around to the various homes inviting people to join in the demonstrations. At the same time the village administrators, who were under the leadership of Shozo Tanaka in Tokyo, waited for the demonstrators to arrive so as to be able to lobby while the National Diet was in session. In this situation the village administrators also came to side with the farmers' movement against the operation of the mine.

On 11 February, the government's 140-member Copper Mining Poisons Committee met to discuss the final details of their investigations. On the 12th the military received information that the demonstrators would start on the 13th. At 7 p.m. the 12th, in the grounds of the Unryu Temple, a campfire was



Farmland damaged by copper-poison contamination in a village in Aso-gun, Tochigi-ken, taken by Sen Tsuda (from T. Matsumoto, ed., *Ashio koudoku sanjou gaho*, Seinen Doushi Koudoku Chousakai, 1901).

started and groups of farmers gathered to sing songs, beat drums, and chant prayers around it. On the 13th at about 8 p.m., about 2,500 farmers started to walk to Tokyo, their numbers growing as other farmers joined in the procession.

When demonstrators got to Tatebayashi they were confronted by the police, and then at Kawamata, in Sanuki Village, they met with police violence. At this time more than 100 farmers were arrested, and this came to be known as the Kawamata Incident. In the fourteenth National Diet session, Shozo Tanaka resumed grilling the government daily about the injustice of the police violence against the farmers and also about the Ashio copper-mine poisonings.

The fourteenth Diet session saw the enactment of major bills that would enable Japan to become highly industrialized. In addition, the national policies that provided the basis for Japanese imperialism after the Sino-Japanese War were greatly expanded. However, 1900 was a year in which the movement leaders were arrested and the movements were fiercely repressed and forced to go into reverse.

IV. Tanaka's Attempt to Appeal Directly to the Emperor and the Poisoned Water-collection Pond Plan

Of those arrested in the Kawamata Incident, 68 persons were held for preliminary examination on the charge of collective rioting, and of these 51 were brought for prosecution to the Maebashi District Court. At this, Shozo Tanaka fought hard to reorganize the farmers and rekindle their fighting spirit, engaging lawyers for the defendants and trying to have an appropriately meaningful court struggle. He was also determined to make an appeal directly to the Emperor, since, because of government oppression, there was no other means left.

In resorting to such extreme measures, Tanaka had expected that the news media would be shocked and would report the facts surrounding the copper mine, directing public opinion against it; he also hoped that they would reveal the oppressive tactics of the police and thereby bring the public around to the side of the farmers. But these efforts of his were not very fruitful, for he found little co-operation among the news organizations.

In June 1901, Yasujiro Ishikawa, the chief editor of the *Mainichi shimbun*, offered his co-operation and certain ideas of his own to help win the struggle. Two days later, Tanaka landed the co-operation of Shusui Kotoku, a journalist for *Yorozuchoho*, who was to write an appeal to be presented to the Emperor.

In December 1900, the court passed judgement in relation to the Kawamata Incident, finding 29 guilty of rioting and 22 not guilty. An appeal was made to a higher court; in September 1901, it was to be tried in the Tokyo Court. The farmers continued their court battle to stop the copper-mine poisonings and to receive fair treatment. The proceedings were reported in Tokyo news-

papers and once again public interest was aroused in the copper-mining problem.

Between 6 and 12 October 1901, the poison-damaged areas were investigated by the presiding judge of the Tokyo Court, the associate judges, the public prosecution lawyers, expert witness Tohitaka Yokoi, and the defendants. All of this was reported by journalists from eight newspapers. The newspapers did not cover just the event, but informed the readers of the background. They carried articles on the poison-damaged areas and on the poverty of the farmers, referring to the situation as hell on earth and expressing their sympathy for the farmers and their antipathy to the government that refused to take responsibility for the situation. More news articles appeared and Ishikawa of the *Mainichi shimbun* took on a leading role in the formation of public opinion by reporting the direct appeal that Tanaka was going to make to the Emperor. By so doing, Ishikawa hoped to get more and more people to join in the mass struggle against the destruction of the environment. On 23 October, Tanaka resigned as a member of the Lower House in order to prepare for his direct appeal.

The *Mainichi shimbun* published a series of articles, written by women journalists, on the miseries brought about by the copper-mine poisonings. Related news articles on the struggles of the people were also printed, and the editorials took up the cause. On 30 November, Tameko Furukawa, the wife of Ichibei Furukawa, took her own life by drowning under the Kanda Bridge.

On the morning of 10 December 1901, when, after presiding at the opening of the sixteenth National Diet Upper House session, Emperor Meiji was going to his carriage, Tanaka came up to him, a written appeal in hand, shouting to him. By this action Tanaka had planned to bring the scandal of the mine poisonings into public view, hoping that one of the imperial guards would either kill or injure him. But in fact, the sergeant-at-arms fell from his horse, which had reared up in surprise, and Tanaka also stumbled and fell on his face, so he was neither killed nor injured. He was arrested on the spot and taken into custody by the police.

Tanaka's attempted appeal to the Emperor came as a great shock to the government. The Minister of Home Affairs, Utsumi, was sent to the Emperor to explain the situation, and the chiefs of the Ooura and Kojimachi Police Departments were, likewise, sent to the Prime Minister to explain matters. Tanaka was examined by Public Prosecutor Kawabuchi and by the chief of the Kojimachi Police Department. He told them that his actions had been an attempt to reach the Emperor with his appeal, and kept secret his connections with the newspaper publisher Ishikawa. Dr Okunuki gave Tanaka a psychiatric examination, and declared that he was indeed perfectly sane. Tanaka was released at 7.30 the same evening.

Tanaka's appeal did not work as planned, but it astounded the public at large. Many people from different walks of life began to involve themselves in attempts to improve the terrible situation caused by the mine poisonings. On 27 December 1901, a trip to the poisoned areas was planned and about

800 students from 40 colleges, universities, and high schools joined it. They were deeply moved by the damage done to the environment, and so they organized movements designed to spread the news about the grim reality of the destruction and the need to help the farmers. This was the first of the numerous student movements that were to come.

With this escalation of the anti-mine movement, the National Diet was moved to discuss the situation. In January 1902, the government decided to form another Mine Poisons Survey Committee in order to manipulate public opinion, and on 15 March, along with the announcement of the Kawamata Incident Tokyo court decision, made the membership of the second survey committee known. The court had decided that none of the farmers were guilty of mass rioting, but that three persons had violated the policy security law and that the remaining 47, one of whom was dead, were innocent of any crime. The case was then appealed to the Tokyo High Court.

Although the membership of the Second Mine Poisonings Survey Committee included Hatsuziro Sakano, who had argued for a halt to mining operations in the first committee, and Yoshinao Kozai, who once surveyed the agricultural systems damage at the request of the farmers, the core was composed of such dignitaries as Yoshito Okuda of the Ministry of Justice, who acted as chairperson, and Ryuzo Tanaka, the Chief of the Mine Bureau, along with new bureaucrats from the Ministries of Home Affairs and Finance, all of whom were prone to side with Furukawa. Nor did the other members of the committee, such as Professor Wataru Watanabe, of the engineering department of Tokyo University, and Professor Kawakita, one of Watanabe's colleagues, represent the farmers.

On orders from the committee, a survey was carried out by 21 university assistants and many engineers from different industries. The results of the survey were reported to the committee in October and in March 1903 the final results were submitted to Prime Minister Katsura. In May of the same year the report on Ashio copper-mine poisonings was presented to the eighteenth Diet session. However, besides this, another report was handed to the Prime Minister, containing committee members' subjective views and supporting the government's intentions in relation to the mine. This report was entitled "Opinions Related to the Living and Working Conditions of the Victims by Poisoning," and reflected the false presumption that slag-related poisons found in the Watarase River were residual products left over from before the initiation of the environmental protection measures taken at the mine, and that the extent of poisoning was minimal. It did not lay the blame at the feet of the mining enterprise; in fact, it supported the continuation of the mining operations.

The allegation was that the damage to the agricultural infrastructure had been caused by what remained in the environment from past floods, while the poisons contained in the smelting-related smoke and the related random loss of forested areas were ignored. The committee successfully ended by skirting the issue, recommending that flood-control systems be constructed.

There were six items in the reports that were concerned with protecting the farmers from the mine poisons. The following three are the main ones.

First, poisons were to be eliminated from the production processes at the Ashio copper mine. This meant that the company had to take measures to supplement and improve the preventive ones started in 1897. However, nothing was said about the smoke damage, because effective means of preventing it were yet to be discovered. In July 1903, the committee ordered the company for the fifth time to carry out a 15-item construction project designed to eliminate the mining-related poisons.

Second, land values were to be depreciated in the areas surrounding the Watarase River. This was the government's response to the farmers' requests for the poisoned land to be partially exempted from taxes. In October 1903, the government decided on a plan for land-tax reductions and passed a bill relative to the plan in the twentieth Diet session; this was announced in March 1904. The land that had been seriously affected by the poisons was divided into ten different groups, with tax-relief ranges from 80 to 15 per cent. This legislation became effective at the beginning of 1904. This was the second set of measures taken by the government to provide relief to the farmers. But the total amount allowed by the legislation for deductions came to only about 23,000 yen.

The poisoning of the farmland was a clear violation of the farmers' rights. However, the government only took measures that resulted in the lowering of land taxes through land devaluation, but there was no compensation for the farmers from the Furukawa Company that operated the mine. This meant that the articles in the Imperial Constitution relating to property rights were reserved only for industrial capitalists.

Furthermore, the policies related to land devaluations and reductions in tax rates favoured only landowners and provided no help to tenant farmers. But for both tenants and landowners, the suffering increased as time went on, and even fairly wealthy farmers gradually became impoverished, since the land was unable to recover from the poisoning and had become permanently unproductive. In this situation the local government again faced financial difficulties and were unable to solve the problem of poverty, especially in relation to farmers who were forced to leave the land.

The third item stipulated that flood prevention works be done. The Tone and Watarase rivers and their tributaries were to be repaired and a large poisons catchment constructed at the point where both rivers meet. The flow slope of the Watarase is gentler than that of the Tone, so the water from the Tone reverses into the Watarase, causing poisons to accumulate in the lower reaches of the Watarase. Therefore, the government's plan was to provide for the disposal of these poisons where they are at their highest concentration. At the time of the announcement of this project there was no indication as to where this plan was to be carried out, but only a hint of a 2,800- to 3,800-hectare area to be set aside for such purposes. However, the plan to construct a poisons catchment basin was kept secret because farmers in the

area of the proposed basin would have to be transported as emigrants to Hokkaido.

The Watarase River flows into the Tone, from which the Edo River divides itself. The flood in 1896 brought great damage to Tokyo and the government was concerned with possible public outrage. In 1898 the estuary bottom of the Edo River was covered with concrete and the mouth of the river was narrowed to one-third its original width at Sekiyado. Then the point where the Watarase joins the Tone was widened so that the Tone water could run back into the Watarase. The poison problems in the lower reaches of the Watarase originated with the destruction of the natural environment where the river rises, and, as the poisons increased in the river, the construction in the lower reaches of the river systems only served to complicate and worsen the problems. All the construction work in and around the rivers was done for the purpose of creating a large poisons catchment basin.

In fact, before the second survey committee was called into being, the Ministry of Home Affairs, in consultation with Tochigi and Saitama prefectures, was promoting the idea of concentrating the poisoned waters of the Watarase River in the areas of Yanaka Village in Tochigi Prefecture and Toshima and Kawabe villages in Saitama Prefecture. In January 1902, members of the survey committee representing Toshima and Kawabe heard about the plan, and immediately voiced their opposition to the idea of destroying these villages for the sake of a poisons catchment. Under the leadership of Shozo Tanaka the two villages circulated resolutions in which they refused any longer to pay national taxes or to serve in the army. This struggle halted the plan to destroy the villages; in December 1902, at a special session of the Saitama Prefectural Assembly, governor Kinoshita did not touch on the matter of the struggle against the plan, but did point out several unfavourable aspects of a poisons catchment basin in the area in question. In January 1903, the Tochigi Prefectural Assembly proposed the use of Yanaka Village as a poisoned water catchment basin in exchange for money which was to be paid to the villagers, but this plan was also rejected.

In May 1902, the Tokyo High Court totally supported the Public Prosecutor's position in the Kawamata Incident and rejected the Tokyo Court decision. Then the case was transferred to the Miyaga Court of Appeals, but in December that court ruled that the government's appeal lacked due process of law. Therefore, the defendants were all released. In order to unify public opinion in support of the national policy of militarization, the government demanded that its policies relating to the poison-damaged areas be carried out through the construction of a poisons catchment basin.

In 1903, the plans which had been rejected by Tochigi and Saitama prefectures before were once again recommended by the Second Mine Poisons Survey Committee. This plan also included the forced emigration to Hokkaido of all farmers who would be displaced by the poisons catchment basin. The government's aim was to deal with only the areas where poisons had accumulated rather than solve the mine problem at source.

In December 1903, at a cabinet meeting, it was decided that the govern-

ment would start plans for a war with Russia, that it would maintain a position of neutrality with China, and that Korea should be placed under Japan's control. Moreover, the government gave instructions to the Japanese ambassador to Great Britain to seek economic aid from the British government before the start of the Russo-Japanese War. The government's policy relative to copper poisons was in reality a prelude to Japan's period of imperialism, which was only just beginning.

The government's enterprise was being brought to fruition, just as it had hoped: the burden of poisons in the upper reaches of the Watarase River would be somewhat lightened by the construction of a catchment basin, and this had caused the farmers' and people's movement to be split and weakened. Those living along the lower reaches of the river were prepared to acquiesce in the demolition of Yanaka Village for the sake of the catchment basin if this meant that their land would thereby be protected from the poisons. The village leaders were divided over the question of whether to allow their land to be submerged, and the situation was such as to allow the government to make specific water- and land-use plans. There were many people who deserted the cause, supporting the government's imperialistic designs on foreign lands.

V. Shozo Tanaka Takes Up Residence in Yanaka Village

In January 1903, when the purchase of Yanaka Village was proposed in Tochigi Prefectural Council, Shozo Tanaka declared his intention to make a haven of the village if the government would give up its plans to make the ravaged area a catchment basin. He made it clear that he intended to live in the village. His idea of "haven" meant a place where all would be guaranteed freedom and security; he also laid emphasis on the fact that all must be equal, hoping that everyone would have his own way of expressing himself, because this would lead to creativity. In these circumstances autonomy would be possible. These ideas had come to him out of the struggle surrounding the Kawamata Incident. Tanaka attempted to achieve these ideals through his fight to save Yanaka Village from demolition.

In February 1903, opposing the government's preparation for the Russo-Japanese War, Shozo Tanaka published his views on violence, and made appeals for worldwide military disarmament. He had a clear understanding of the role of the Okura, Furukawa, Mitsu, Mitsubishi, and Asano *zaibatsu* in Japan's land-acquisition policies in Manchuria, and understood the means by which they encouraged the government in its pursuit of imperial power. He took militarism to be the personification of capitalistic imperialism. For this reason his non-violence meant the elimination of all armed forces from the world.

He placed emphasis on the solidarity of the people, and the evening before the declaration of the Russo-Japanese War he stated that Russia was not the enemy of Japan; he went on to contend that the future of Yanaka Village was

an issue of much greater importance than the coming war with Russia. He was concerned for the enhancement of socialism and justice, which he felt was a very important need for that particular period in Japan's history. He declared that he retained the right to remain a pacifist when the declaration of war was made on Russia. In July 1904, Tanaka made good his promise to live in Yanaka Village and took up residence there just as the state authorities were getting ready to demolish the village. His intention was to resist state power and in doing so defend the rights of village autonomy against the state. He personally led the fight for survival in Yanaka Village, along with those still remaining there.

VI. The Historical Implications of the Ashio Copper-mine Poisoning Incidents

1. Copper-mining-related Environmental Destruction

Before launching into the historical implications of the Ashio copper-mine poisonings, a brief explanation of the environmental problems involved is in order. Since this problem is not something to be relegated to the distant past but is also the inheritance of the present generation, it can be found in almost all countries of the world.

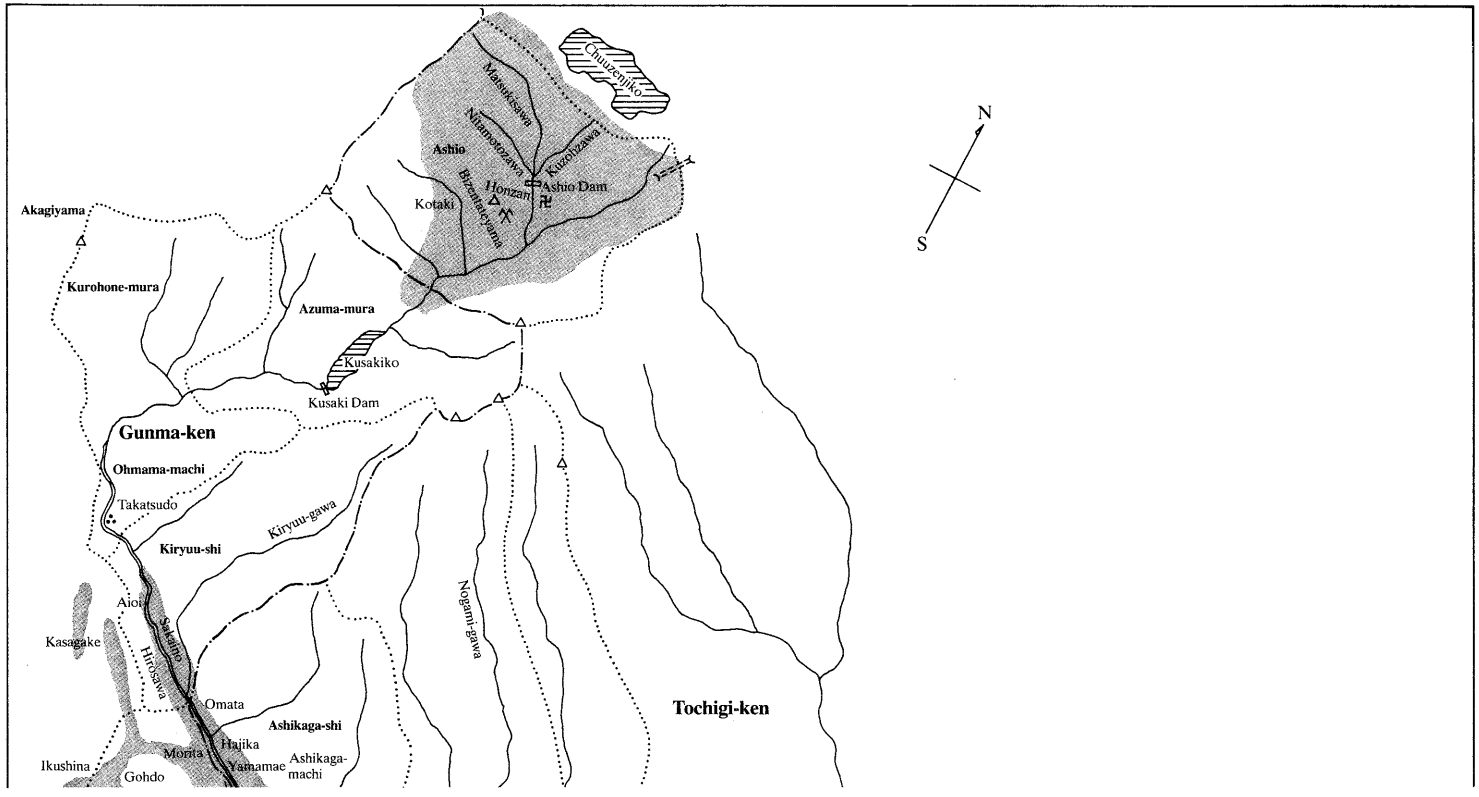
Non-ferrous mining as represented by copper extraction results inevitably in environmental destruction. Two kinds of destruction are involved: one derived from the sulphurous acid resulting from the refining processes and the metal-containing dusts from the refinery smoke, and the other from acid water discharged in the mining and ore-selection refining processes, which pollutes the rivers, leading to the destruction of topsoils by water-borne poisons. There are differences in ore quality, but most of Japan's copper ores are sulphurous ores, which contain 30 to 40 per cent sulphur. Thus, in the refining processes, a great deal of sulphurous acid is produced ($CuS + O_2 = Cu + SO_2$). When this sulphurous acid is discharged into the air, the smoke-related damage is extensive. Copper ore also contains a certain amount of arsenic, cadmium, zinc, and lead, and small amounts of gold and silver. In the refining processes, arsenic is also released into the air with the sulphurous acid gases, and this results in very serious damage to all forms of life.

Highly concentrated sulphurous acid gases bleach the leaves and thereby kill the leaves. New leaves can appear just once more, but these too are damaged by the poisons, and thus trees several hundred years old are killed as the roots become exposed to the poisons through the flow of rainwater. As a result, the recovery of forested areas becomes almost impossible. This was especially true of the Ashio copper-mine area, where annual precipitation is more than 2,000 millimetres of rain. As trees are damaged and destroyed, the topsoil is washed away and the area is no longer able to retain water. Besides that, the sulphurous acid and arsenic begins to attack horses, cows and all other animals, and soon the health of human beings living in the affected

areas is seriously compromised. As indicated in previous sections, Matsuki Village was one example of this, in which people living upwind from the refinery were no longer able to cope with the poisons and had to leave their village.

It is said that before the introduction of the Ashio mining activities, the surrounding area was densely forested, just as the mountains of Nikko are today. In addition to the damage brought about by the excessive intrusion of various chemical poisons, the mine used a great deal of wood and charcoal as fuel, and to meet these additional energy requirements a very great number of trees were cut down in the surrounding mountains. Because of the denudation of the forest areas, the Watarase River overflowed its banks even after a small amount of rain, and after a short spell of fine weather the river would be emptied of water in no time. The flood caused poisoning of agricultural products daily, because a great deal of acid-laden water was discharged from the mine and from the standing slag and unused ore piles, which contained unremoved copper and other poison elements. Other heavy metals and acids were also leaked from the slag and unused ore piles. It is not rare for the area to be inundated by 100 millimetres of rainfall in one hour, especially in the typhoon season; on these occasions, great amounts of poisons flow into the natural environment. To add to the problem, the Ashio copper mine lacked storage facilities for slag and untreated ores. In the 1890s, when the poisoning problem became a great social issue, the company dynamited the slag piles to dispose of them, thereby driving the slag into the river. As a result, copper-mining-derived poisoning was greatly exacerbated in the lower reaches of the river. Heavy metals contained in the waste ores and slag accumulated in the rice-fields through the irrigation systems, which used the river water, and the topsoil took on a cement-like consistency. Because the soil could not retain oxygen in the rice, wheat, and vegetable root systems, these plants would simply die away. At other times in the past, harvests were reduced because of flooding, but these same floodwaters brought rich soils to the farmers cultivating land in and around the lower reaches of the river system. However, as copper mining developed, damage to agricultural systems increased and the farmers had to close the irrigation canal gates to keep out the poisons every time it rained in the upper reaches of the river. Even so, the damage resulting from flooding by these poison-laden waters spread to over 100,000 hectares of irrigated land (see figure 1.2).

The damage went beyond the simple pollution of the working soil and the irrigation waters, for the farmers suffered from financial difficulties and malnutrition as well, because they had no harvests. Also, the poisons from the copper mine were introduced directly into the drinking water, which had a deleterious effect on people's health. There is no way of discovering the extent of the damage that existed in 1900, but, according to the analyses made by the Water Bureau of Kiryu City, Gunma Prefecture, which gets its drinking water supplies from the upper reaches of the Watarase River, there is still several times the amount of arsenic that could be expected in the drinking water after a heavy rain, in spite of control mechanisms to limit the mine


Chuuzenjiko
Matsukosawa
Nitamorizawa
Kuzoizawa
Ashio
Ashio Dam
Honzan
Kotaki
Bizentakayama
Akagiyama
Kurohone-mura
Azuma-mura
Kusakiko
Kusaki Dam
Gunma-ken
Ohmama-machi
Takatsudo
Kiryuu-gawa
Kiryuu-shi
Aioi
Kasagake
Sakaima
Hirosawa
Omata
Ashikaga-shi
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Morita
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Ashikaga-machi
Nogami-gawa
Tochigi-ken
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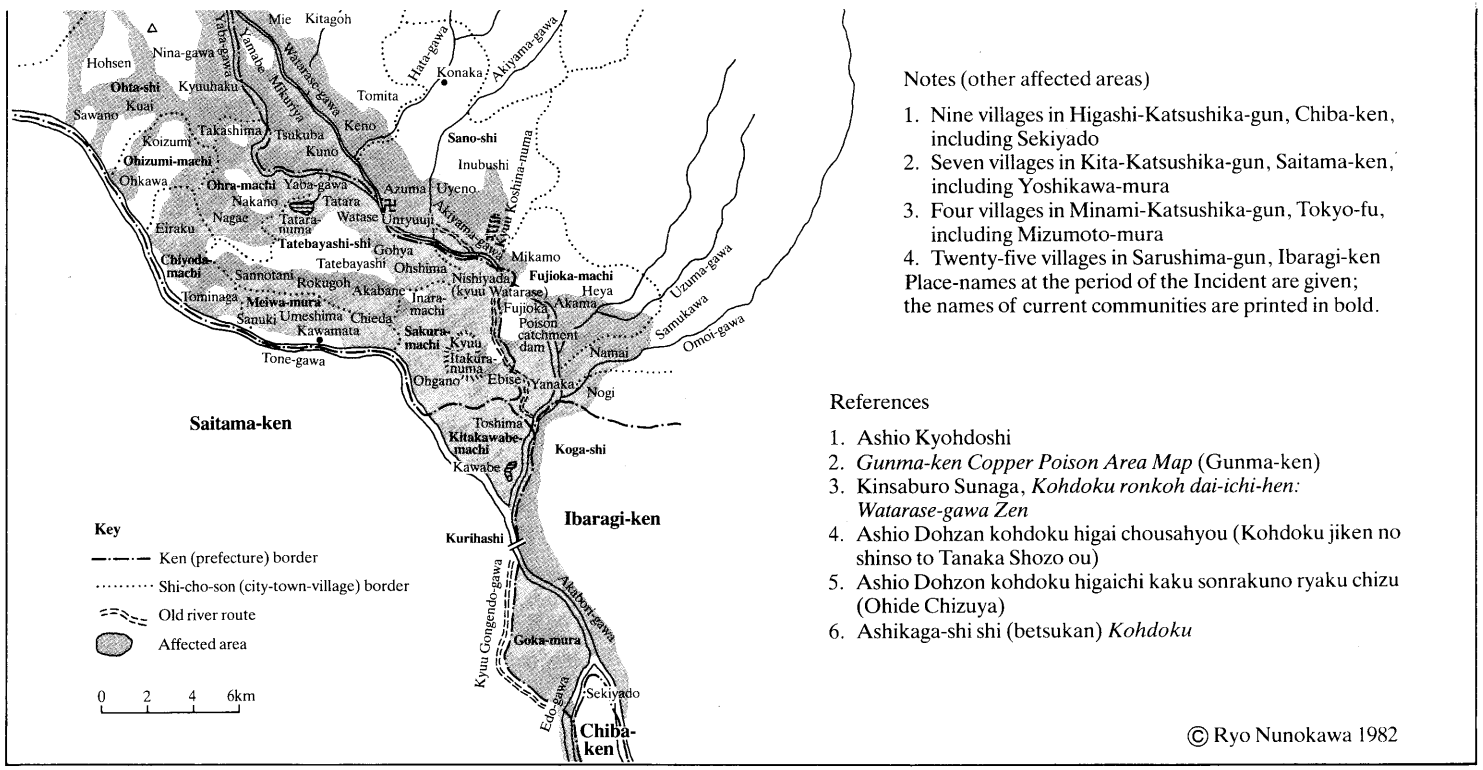

Notes (other affected areas)

1. Nine villages in Higashi-Katsushika-gun, Chiba-ken, including Sekiyado
2. Seven villages in Kita-Katsushika-gun, Saitama-ken, including Yoshikawa-mura
3. Four villages in Minami-Katsushika-gun, Tokyo-fu, including Mizumoto-mura
4. Twenty-five villages in Sarushima-gun, Ibaragi-ken

Place-names at the period of the Incident are given; the names of current communities are printed in bold.

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2. *Gunma-ken Copper Poison Area Map* (Gunma-ken)
3. Kinsaburo Sunaga, *Kohdoku ronkoh dai-ichi-hen: Watarase-gawa Zen*
4. Ashio Dohzan kohdoku higai chousahyou (Kohdoku jiken no shinso to Tanaka Shozo ou)
5. Ashio Dohzon kohdoku higaichi kaku sonrakuno ryaku chizu (Ohide Chizuya)
6. Ashikaga-shi shi (betsukan) *Kohdoku*

Fig. 1.2 Area Affected by Copper Poisoning and Smoke Hazards from Ashio Mine (based on a survey in 1897)

poisons. This means that in the past, when there were no controls on the copper-mining poisons, the water quality was severely compromised, especially during the 1900s. There is no way of knowing the total extent of the adverse effects on human and animal life by the heavy metals in the water. Therefore, the government and most scholars emphasized that copper-mining-related poisons had some adverse effects on agricultural productivity, but there were no ill-effects to be noted with respect to human and animal life. However, 70 to 80 years later, the cadmium in the soil continues to cause health problems among farmers, because the rice that they grow and eat still contains large amounts of cadmium; this indicates that the copper-mine-related poisons did indeed bring about many serious health problems. Knowing this, Shozo Tanaka and the farmers never ceased in their appeal to the government to stop the devastation produced by the poisoning. Whether immediately visible or not, the fact is that copper mining brings death and destruction to the human environment.

2. The Political and Economic Background to the Copper-poisoning Incident

The period in which the Ashio copper mine became a major social issue was the 20 years beginning in 1890, with farmer opposition to the poisonings at a peak between 1896 and 1902. During this period Japan was involved in the Sino-Japanese War (1894–1895) and the Russo-Japanese War (1904–1905) and it was then that Japan's industrial capital, centring around textile industries, was established. By contrast, light industry, and heavy industry such as iron and steel and shipbuilding, were just getting started. The Sino-Japanese War was the first war that Japan waged with another country, and Japan emerged the victor. The huge amounts of reparations extracted from China were used for the expansion of the armed forces and for the development of heavy industry.

Along with great change in the economic spheres, there were also major changes in politics. The Imperial Diet was inaugurated in 1890 and the majority of the seats were controlled by one party, the Minto (literally Populist Party), whose members were activists leading the liberal democratic movement of the time. At first this party represented farming interests against the government, but from 1898 it established cohesive relationships with the bureaucrats and thus came to lose interest in the farmers. At first the Minto party stood against absentee-landowner farming methods and called for a system in which land ownership would go only to those who lived on the land and cultivated it. At the same time, the government came to realize that unless it co-operated with the Minto, smooth political action would not be possible, and this led to a compromise with the Minto on many issues.

In the period between the Sino-Japanese War and the Russo-Japanese War, Japanese capitalism developed rapidly. At that time, the Ashio copper-mine poisoning incident became a serious social problem. As relations with Russia were strained, the government adopted a policy of military expansion.

The Ashio copper-mine poisoning incident was one of the most important domestic issues that it had to deal with. By a carrot-and-stick policy, the government divided the farmers' movement, and tried to suppress the poisoning problem.

The politicians and journalists who supported the farmers against the Ashio copper mine fell away when the Russo-Japanese War broke out; in fact, the opposition networks against the mine were completely disbanded during the war, for the government's mobilization effort had the effect of stifling all such movements. In other words, the war contributed to a glossing over of the very serious environmental problems created by the mine.

3. Effects of the Copper-poisoning Incident

The government had more difficulty with the issue of the copper mine as it took on a social dimension, and as the problem became more intractable they began issuing orders to other copper mines to install the most minimal anti-pollution systems. At that time the Besshi copper mine in Ehime Prefecture, operated by Sumitomo capital, was becoming another problem area because of the smoke from the mine. The government was especially worried that the poison victims' movements surrounding Ashio would spread to Besshi and to other copper mines. The farmers' movement in Ashio was a serious obstacle to the government's programme to promote the development of industry and exports, especially considering the fact that Japan would have to run a race with the Great Powers with very few natural resources for industrialization and precious little land for farming. So a widening of the anti-copper mine movement would have been a serious threat to the government's plans for the development of an industrial state.

In March 1897, with the farmers' demonstration in Tokyo against the damage caused by the copper mine, the matter became a very serious social issue, and the government established the First Copper Poisons Survey Committee. The committee recommended that Ichibei Furukawa build a special area for the accumulation of slag and waste ores, a poisons catchment basin, and drainage for the copper mine itself, and that the water coming from the refinery be neutralized with lime. Although these attempts to protect the environment were wholly inadequate, the repeated orders from the government to Furukawa to provide protection, and the actual application of protective measures, succeeded in providing some degree of amelioration. Also, these policies were to some degree effective in calming the heightened public concern over the problem that had been generated in the urban population. Therefore, the government also ordered the same pollution-control mechanisms to be installed in other copper mines. If companies lacked the funds to provide the required protective set-up, the government threatened to revoke mine-operating licences. Since they did not have the funds to make these improvements, the smaller companies were forced to sell out to larger companies. An example of this is the takeover of the Akazawa copper mine by the Hitachi copper mine. With the coming of serious copper-mine-related

environmental destruction, the public outcry and the social issues involved did result in the formulation of certain policies, however incomplete, to cope with the problem.

However, the technology of the time was not up to dealing with the damage derived from refinery- and mining-related smoke. In 1897, the government ordered the installation of devices that would protect the environment against the ravages of sulphurous acid gas; this involved the smoke being washed with lime-water before being discharged into the air. The smoke-stack was built at great expense but its effectiveness was so limited that the government would not allow it to be counted as a solution to the problem. In fact, no solution was possible, since nowhere in the world were effective smoke-elimination technologies available in those days.

The damage from the gas-containing smoke was seen mostly in the regions upstream of the refinery. Very few people lived there, so Furukawa moved all inhabitants to other places. Thus the company solved the human problem, but it did nothing to preserve the environment, simply allowing the complete destruction of all living things and creating thereby a "death valley." The Furukawa Company built an installation for removing sulphurous acid gases as late as 1955, some 60 years after the first attempt to solve the problem. In other copper-mining areas in Japan there were many people living and working in and around the installations, and it was clearly impossible for the entire community to be moved away from the mining area.

Now let us look at the policies in relation to the copper-related poisons and smoke damage during the Tokugawa period. The shogunate had a policy of exempting those subjected to such poisons from taxes (in the form of a provision) and the amount of exemption was determined by the amount of destruction suffered. In these cases the amount of exemption was also influenced by the farmers' movements for reductions. However, under the modern tax system instituted by the Meiji government, the farmers were not allowed tax-exemption status until the problem became an intractable social issue and the government was forced to act. The mine companies also provided a certain amount of compensation money to the poisoned farmers, but this was always on condition that they sought no further damages and never complained about the problem thereafter. This was used as a means of undermining the power of the opposition movements. These same tactics were practised in relation to the Besshi copper mine of the Sumitomo group and the Kosaka mine of the Fujitagumi group.

After the Russo-Japanese War the smoke problem in relation to the copper mines became a very serious issue, with the exception of the Ashio mine. This was due to the fact that, though the government had ordered very limited environmental protection practices to be instituted, and though a certain amount of compensation, be it very small, had been paid to farmers who protested most vociferously over the mine poisons, no policies had been established in relation to the smoke problem. That was why this came to be an issue of primary concern for the people.

About the time of the Russo-Japanese War, the Shisakajima refinery of the Besshi copper mine came to be widely known because of its endemic

smoke problem. The Besshi copper mine, which laid the foundation for the Sumitomo *zaibatsu*, was one of the four major mines—Ashio, Besshi, Kosaka, and Hitachi—of the time. The mine had been managed by Sumitomo since the Tokugawa period, and even after the Meiji Restoration it had not come under government control. Sumitomo promoted the modernization of the mine by moving its refinery from deep within the mountains of Ehime Prefecture to Niihama City on the Inland Sea. This move was made because they had a plan to build a modern refinery in Niihama to facilitate shipment. In 1893, as soon as the new refinery began operations, damage was done to agricultural products by the emitted smoke. The farmers in the area were fiercely opposed to the refinery but, when the Sino-Japanese War broke out, the police were called in to break up the opposition movement and the farmers were prosecuted as criminals. The company paid a small amount of money to the farmers for the smoke damage, and then acquiesced to moving 18 kilometres away from Niihama to Shisakajima in order to reduce the ill-effects of the smoke.

In 1898, because of the demonstrations staged by the Ashio-mine farmers in Tokyo, copper-poison problems became a national issue, and the government ordered Sumitomo to install anti-pollution equipment and to move the Niihama refinery to Shisakajima. In 1899, the old Besshi Yamanaka refinery, which was producing half of the Besshi mine copper, was flooded because of heavy rains and the Sumitomo Company requested a two-year extension from the government relative to the planned move of the refinery. In the meantime the company doubled the size of the Niihama refinery. This being done, the farmers became angry with Sumitomo over the latter's refusal to keep their promise. This was during the period when Shozo Tanaka was attempting to make an appeal to the Emperor and there was considerable public disquiet in regard to pollution problems. The farmers of Niihama were influenced by all of this, and as a result they also stepped up their protest about Sumitomo practices. The Minister of Agriculture and Commerce tried to mediate between the farmers and Sumitomo through the offices of the Prefectural Governor, but Sumitomo refused to accept the mediation and no compensation was paid. However, Sumitomo could no longer extend their period in Niihama and therefore started initial operations at the Shisakajima refinery in August 1904.

As soon as operations began in Shisakajima, four very wide coastal areas along the Inland Sea in Ehime Prefecture began to be polluted by copper refinery smoke. The sulphurous acid gas discharged from the refinery spread over a twenty-kilometre area along the coastline. No one, including a number of influential and well-known scholars, had expected this to happen. The Sumitomo Company was well aware of the damage to agricultural systems but did not respond to the farmers' protests. The farmers held many protest rallies, which were attended by several thousand people. In 1908, the protest group closed the Niihama refinery. Finally, the company was obliged to admit that its activities at the Shisakajima refinery were the cause of the damage to agriculture, though they did nothing to solve the problem.

At about that time the smoke damage from the Kosaka copper mine in

Akita Prefecture and the Hitachi copper mine in Ibaragi Prefecture became serious issues and the farmers' protest at copper-mine poisonings took on a nationwide scope. In 1909 the government issued an urgent statement that the elimination of copper-mine poisons was necessary for harmony between industries. Under the supervision of the Ministry of Agriculture and Commerce, the Third Copper Mine Poisons Committee was established, and discussions began again on policies to solve the copper-mine smoke problems. Some technicians were sent abroad in search of means of protecting the environment from the ravages of copper-smelting smoke, and specialists were sent to the most heavily ravaged areas to assess the damage. The government was afraid of the expansion of the farmers' movements in relation to the delay in Sumitomo's response, and in 1910 it interfered in the negotiations between the company and the farmers. The government called for the presence of both Sumitomo, who had no intention of paying damages, and the farmer victims at the official residence of the Minister of Agriculture and Commerce, and had talks with the representatives of both parties for a 20-day period. Then the Minister proposed measures to which both sides could agree. The results of the negotiations included: the payment of about 340,000 yen for damage which occurred before 1910, and 77,000 yen annually after 1911, these amounts being negotiable every three years; production of refined copper limited to about 210,000 tons per year; and, during the 40 days when rice and wheat grow, a limit on copper refining, with a complete halt in operations for 10 of these 40 days. These conditions were fairly difficult for the Sumitomo Company, so the company made efforts to find means to eliminate sulphurous acid gas. The solution came from the discovery that sulphuric acid could be recovered from sulphurous acid gas and used in the production of ammonium sulphate, which is used as a fertilizer. In 1939, Sumitomo finally completed their total recovery system, but in the meantime the company had had to pay over 6 million yen damages to farmers.

The farmers in opposition to the Ashio copper-mine refinery followed the mine-poisoning protests that were being led by Shozo Tanaka, but did not limit their protests to copper mine-related problems only. The government negotiators tried to emphasize harmony between mining and agriculture so as to promote the interest of both sides, as did the farmers' leaders. But the tenant farmers, in contrast, demanded an end to the copper mine and the removal of the refinery. Thus they were in opposition to both the government and their own leaders. This heralded the destruction of the old village order. Behind the government's negotiating stance was the August 1910 invasion and annexation of Korea, which reflected Japan's imperialistic policies. In order to get support from the public for these policies it was essential that the old village order, which was being destabilized by the protest activities of the farmers, be maintained.

In relation to the intractable smoke problem Sumitomo had to make promises to limit copper production, to pay for damages, and to make seasonal adjustments in their production schedules. At that time, these were epoch-making pollution-prevention measures. Only the Besshi copper mine was

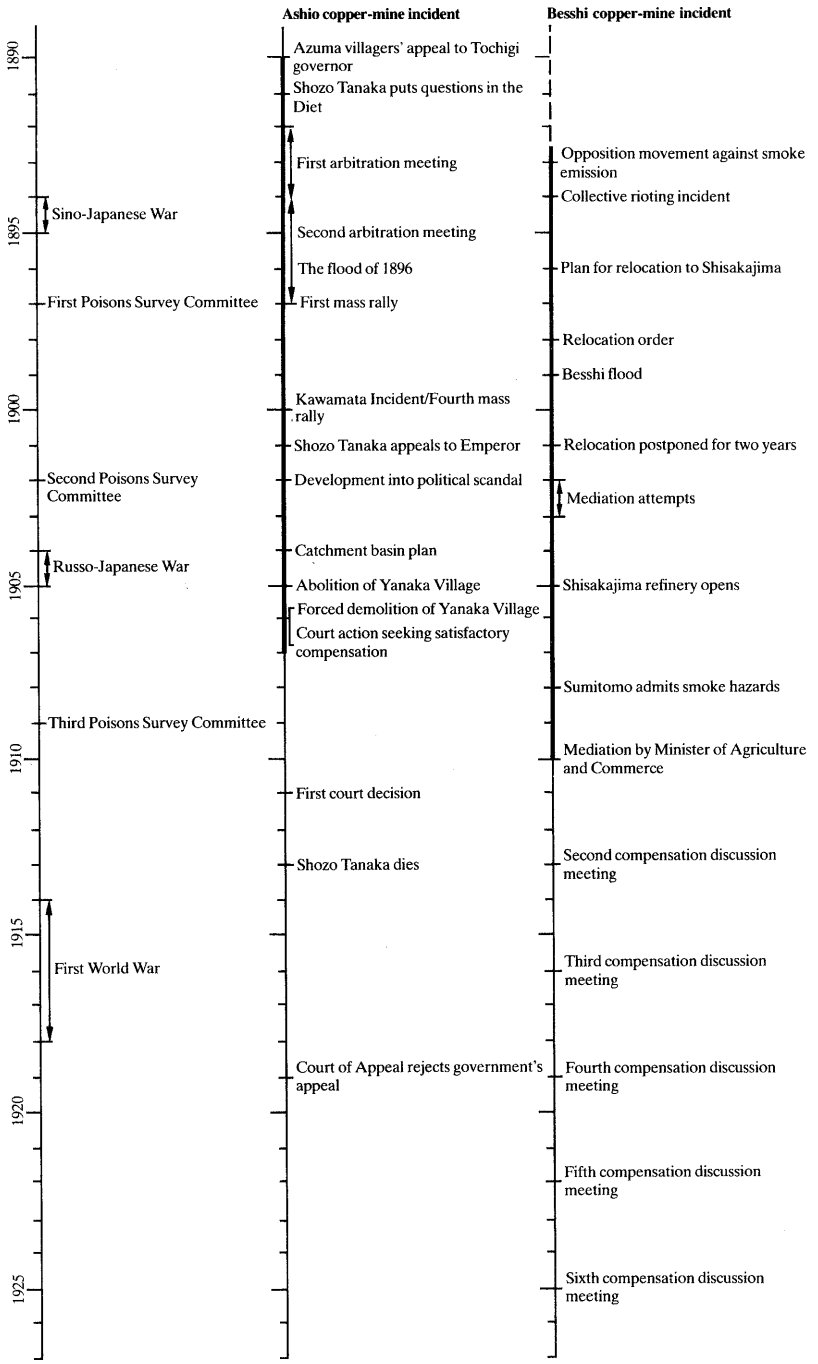
required to introduce limits on production, but damage compensation of one kind or another was required of all poison-producing copper mines throughout the country. Seasonal production adjustments according to weather conditions were also made by the Hitachi mine.

In 1907, the Hitachi copper mine began operations under the management of Fusanosuke Kuhara, and within two years it had become one of the four largest copper mines in Japan. As soon as the mine began operations, the company bought the land where environmental pollution was expected, and also made contracts with farmers to the effect that whenever environmental damage occurred compensation would be provided. However, once the refinery began to operate, and production increased, smoke damage was seen over a wider area than the company first expected. So the damages which had to be paid by the company increased by leaps and bounds. The Ministry of Agriculture and Business ordered the use of fans in order to dissipate the smoke from a large low-standing chimney; but the chimney forced sulphurous acid gas back into the refinery and contaminated the air inside, affecting the workers' health. The chimney, which was more harmful than useful, was called the "stupid chimney"; Kuhara ordered that it no longer be used, and the original chimney was brought on line again. The old chimney was called "the centipede chimney" because it was built on the slope of a hill and it had many holes in it from which the smoke was discharged, thus looking like a centipede. But in no time Kuhara was no longer able to pay all the damages demanded, and therefore decided to build a very tall chimney, which was contrary to government ministry orders. In 1915, a chimney 155 metres tall—this was the tallest chimney in the world at that time—was built on the top of a mountain near the refinery. In this regard, Kuhara was the first to make use of the upper-layer air current. Depending on the weather conditions, the refinery production was modified and the ore combinations were changed in order to cut down on environmental damage and increase productivity. Because of these efforts, funds provided for compensation purposes were greatly reduced. Also, Kuhara was very enthusiastic about planting trees, and as a result there are very few bald mountains to be found in the vicinity of the Hitachi copper mine.

The copper poisons issue became a serious social problem in the Hitachi area, but the reason Kuhara managed to cope with it was not merely because he made strenuous efforts to do so, but also because the mine was located close to the Pacific Ocean. If it had been in the mountains, like the Ashio mine, it would have been impossible to build an adequate poisons dispersion system and the tall chimney would have simply spread the damage further. The tragedy of the Ashio copper mine was caused by its location; the mine was located on the upper reaches of a complex river system that flowed through the largest and most fertile Kanto Plains.

Table 1.5 shows the historical aspect of the poisoning and smoke damage caused by the four major copper mines, and table 1.6 the characteristics of these various incidents. These two tables suggest that the Ashio mine victims' movement was unsuccessful in stopping the destruction, but that the struggle

Table 1.5. Chronology of Four Major Copper-mine Contamination Issues



a. The bold lines indicate the periods during which the respective issues became social issues.
Source: Masuo Sugai, "Nihon shihon-shugi no kogai mondai — 4 dai dozan kodoku · engai jiken," *Shakai kagaku kenkyuu* (University of Tokyo), vol.30, no.4 (1979): 122.

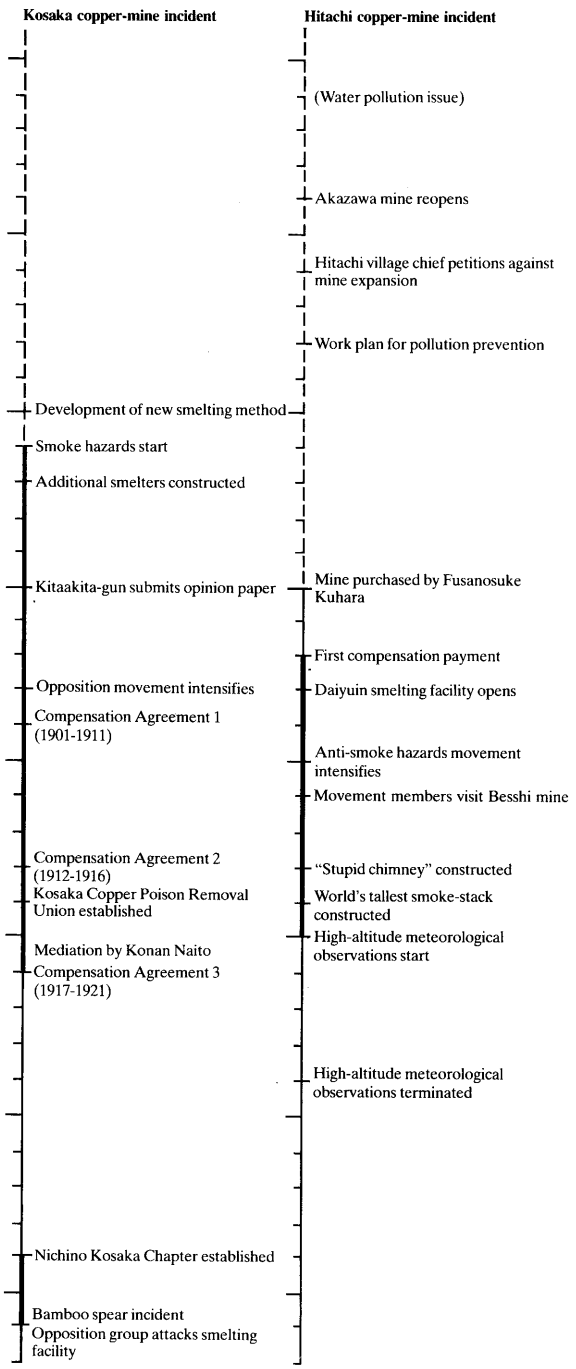

Kosaka copper-mine incident
Hitachi copper-mine incident
(Water pollution issue)
Akazawa mine reopens
Hitachi village chief petitions against mine expansion
Work plan for pollution prevention
Development of new smelting method
Smoke hazards start
Additional smelters constructed
Kitaakita-gun submits opinion paper
Mine purchased by Fusanosuke Kuhara
First compensation payment
Opposition movement intensifies
Daiyuin smelting facility opens
Compensation Agreement 1 (1901-1911)
Anti-smoke hazards movement intensifies
Movement members visit Besshi mine
Compensation Agreement 2 (1912-1916)
"Stupid chimney" constructed
Kosaka Copper Poison Removal Union established
World's tallest smoke-stack constructed
High-altitude meteorological observations start
Mediation by Konan Naito
Compensation Agreement 3 (1917-1921)
High-altitude meteorological observations terminated
Nichino Kosaka Chapter established
Bamboo spear incident
Opposition group attacks smelting facility

Table 1.6. Major Events in Four Mining-related Pollution Issues

Issues		Period when the issue surfaced as social problem	Hazards and damages	Residents' movements		Reactions of mining companies and government		Notes
				Demands	Type of movement	Mining companies	Government	
Ashio copper-mine issue	(1)	1890–1896	Copper poisoning (flooding of contaminated river water)[a]	Installation of containment facility, or closing of mine	Petition and appeal	"Dust-collector" Intermediate out-of-court settlement Permanent out-of-court settlement	(Suggestion of out-of-court settlement)	1894–85 Movement interrupted by Sino-Japanese War "Dust-collector" is a production facility
	(2)	1897–1901	Smoke hazards[b]	Closing of mine and reinstitution of villagers' rights	Petition and appeal Demonstration (against government) Court war	Installation of containment facility by government order	First Poisons Survey Committee (recommendation for mandated installation of containment facility and villagers' tax exemption) Oppressive police action	1900 Kawamata Incident 1901 Shozo Tanaka appeals to Emperor; expansion of supporters' activities

	(3)	1902–1907		Closing of mine and cancellation of decision to abolish Yanaka Village	Petition and appeal	Installation of containment facility by government order	Second Poisons Survey Committee (recommendation for mandated installation of containment facility, corrective adjustment of land-price evaluation figures, and construction of catchment basin)	1904–5 Movement disbanded during Russo-Japanese War 1906 Yanaka Village abolished 1907 Forced relocation of remaining Yanaka villagers
Besshi copper-mine issue	(1)	1893–1904	Smoke hazards (Araihama refinery)[a] Copper poisoning (river water contamination)[b]	Compensation plus installation of containment facility or closing of mine	Petition and appeal (preceded by direct action)	Cash donation Installation of containment facility Relocation of smelter to Shisakajima Acquisition by payment of contaminated lands	Oppressive police action Order for installation of containment facility Order for relocation to Shisakajima Mediation (failure)	1894 Collective rioting incident 1899 Besshi flood 1901 Extension issue (Shisakajima relocation project)

Table 1.6 (*continued*)

Issues		Period when the issue surfaced as social problem	Hazards and damages	Residents' movements		Reactions of mining companies and government		Notes
				Demands	Type of movement	Mining companies	Government	
	(2)	1905–1910	Smoke hazards (Shisakajima refinery)[a]	Reparation of damages plus installation of containment facility or closing of mine Revision of Mining Law	Petition and appeal Direct mass negotiation Negotiation between representatives	No measure taken until 1909 After mediative intervention by government – Payment of reparations – Reduction of output	Third Poisons Survey Committee Mediation by Minister for Agriculture and Commerce	1907 Rioting in Besshi mine Sumitomo delays admission of smoke hazards Confrontation between landowners and tenant farmers
Kosaka mine issue	(1)	1902–1916	Smoke hazards[a] Copper poisoning (Ynashiro River watershed)[b]	Compensation plus installation of containment facility	Petition and appeal Mediation by local government office Direct negotiation	Partial reparations Installation of containment facility	(Smoke hazards assessment study) (Recommendation for damage compensation?)	1900 Development of new smelting method—smoke hazards No measures taken to compensate damage to national forests

							Inadequate compensation and inconsistent containment measures Confrontations between landowners and tenant farmers
Hitachi mine issue	1907–1914	Smoke hazards[a]	Compensation plus installation of containment facility	Petition and appeal Mainly direct negotiation	Compensation for damages Construction of giant smoke-stack	No intervention "Stupid chimney"	Advantages as latecomer Post-Second World War economic boom and anti-smoke hazards measures
Kosaka (2) mine issue	1924–1926	Smoke hazards[a]	Increase in reparation money	Direct negotiation Leadership by farmers' union Solidarity between miners and farmers	Oppression by violence Firing of solidarity miners Agreement on reparation increase	(No direct intervention) Mediation by local police chief	1924 Nichino Kosaka Chapter established 1926 Bamboo spear incident 1926 Attack on smelting facility

a. Directly triggered opposition movements.
b. Were the indirect cause of the movements.
Source: Masuo Sugai, "Nihon shihon-shugi no kogai modai—4 dai dozan kodoku engai jiken," *Shakai kagaku kenkyuu* (University of Tokyo) vol. 30, no. 4 (1979): 144.

made clear the necessity for environmental protection measures in the form of various construction projects as well as creating general orientations for methods of compensation for the damage done. At the same time, it is made clear that Japanese capitalism, which was rapidly moving towards monopolistic capitalism, slightly changed its policy. It is obvious that its policies were oriented to industrialization at the expense of agriculture, but the government had begun to recognize the need to protect the agricultural community in order to ensure a good supply of labourers and soldiers. So there was a need for the application of social policy on a wider scale if order was to be maintained in the farming communities.

VII. Copper-poisoning Issues and Their Aftermath

1. From Copper Poisoning to Flood Prevention

In the processes involved in Japan's development as a capitalistic nation, the Ashio copper-mine poisoning incident became a central social issue, but once Japan was involved in the Russo-Japanese War the farmers' movement experienced a significant setback. After the war, when Japanese capitalism took on an imperialistic bent, Yanaka Village was demolished and used as poisoned water catchment basin. Thus the problem was downgraded as a social issue, but the damage from the poisons was not eliminated. This is because, in the Ashio mine situation, no effective measures were taken against poisons which caused environmental destruction over a very wide area, and the responsibility for improving the situation came to rest solely with the farmers; even the compensation made by the copper company was not official. What meaning, then, can we derive from the mass movements of the farmers? The farmers who lived in the poisoned areas along the Watarase River hardly benefitted from them. However, the movement did draw public attention to the environmental problems, and had a great influence on the management of the copper-smelting smoke problems common to all the copper mines in Japan.

The construction of a dam at the site of Yanaka Village caused a conflict of interest between the farmers who lived in the upper regions of the Watarase River and those living in the lower regions where the Watarase and Tone Rivers meet. The government was pressing for a solution to the poisons problem that would involve flood control and would necessitate the demolition of Yanaka Village and the surrounding areas through the construction of a dam and a catchment basin. Under pressure from the government and the intense social climate brought about by the Russo-Japanese War, the farmers along the upper reaches of the Watarase River, except those in and around Yanaka Village, accepted the government's plans for flood prevention and catchment basin construction projects. In this manner, the problem of copper-mine-induced poisonings was glossed over and concern was directed

toward the containment of floods. Sixteen families continued to live in and around Yanaka Village and, although their lives were extremely difficult, they struggled for the restoration of the village by continuing their lawsuit over the price to be paid for their land. However, in 1917, the struggle ended in acceptance of the proposal made by Tochigi Prefecture. In September of the previous year, Shozo Tanaka, leader of the farmers' struggle, died at the age of 72. Tanaka's followers built a shrine in memory of his struggle, and this remains as a symbol of his and his followers' continuing protest movement.

With this metamorphosis of the copper-mining poisons problem into a problem of flood control, the majority of farmers had great hopes for the flood-control improvements to be carried out on the Watarase Rive. The work was started in 1910 and was completed in 1927, at a cost of 12 million yen. Soon after this construction project had been started the farmers became aware of the fact that the mine-poisons problem had not been solved, and was in fact continuing. After the project had been finished, it was noted that there had been no improvement in the situation in regard to the poisons in the water. The reason for this was all too clear, for the Ashio copper mine remained a very intractable source of pollution and environmental destruction over the entire Watarase river basin. Although a sedimentation catchment basin and slag-retention areas had been provided, the size of the pollution-prevention construction was too small and the functions provided by the control facilities were limited to make any meaningful difference to the poisons brought by the natural water systems. This was because the refinery smoke had denuded the mountains, which, as a result, were unable to retain rainwater. Thus the water of the river rose with the coming of the rains, while it was low after a spell of fine weather. The farmers who made use of the river water for irrigation were troubled by floods and droughts; with the floods, the poisons were spread over extensive farming areas. In order to deal with these new problems, the farmers had to come up with their own unique forms of irrigation and their own water-system infrastructures. They made requests to the mining company for donations through which these poison-prevention systems could be built, but most expenses had to be covered by their own funds or a limited supply of government funds. The problem of copper-mining poisons was never solved, but simply became latent. In order to rid the irrigation system of the poisons, it was necessary for each farmer to construct his own poisons sedimentation pond at the location of the water input from the river. The farmers made every effort to rejuvenate the poisoned land, but Furukawa only supplied a small amount of lime for these purposes whenever the farmers became angry over the problem and demanded help. The Ashio copper-mining company never provided formal compensation for the excessive damage done, even after the Second World War.

Although the flood-prevention construction had been completed, the Watarase river basin was flooded again and again by high water, and each time new plans were made. In 1947 damage caused by typhoon Katherin

extended from the central reaches of the river basin all the way to Tokyo. Because of this devastation, dozens of billions of yen were invested in flood-control projects.[1]

2. Recurrence of the Copper-poisons Issue

Even though the copper-mine poisoning problem continued to be an issue for several decades, Furukawa indicated as early as 1897 that the company would take no responsibility for the damage done after the poison-protection construction had been completed, and that any remaining problems relative to poisons found in the natural environment were a result of inadequacies of method left over from mining activities in the Tokugawa period. In this desperate situation, the farmers had no recourse but to ask for lime and a small amount of compensation from the mining company. But on 30 May 1958, the sudden destruction of the poisons-retention basin at Gengorozawa revealed the seriousness of the mining poisons problem.

After bringing an apparent end to the poisons issue through the total demolition of Yanaka Village for a catchment basin, Furukawa began to extend its activities into various fields such as banking and electric wire and rubber production. In the booming economy of the Second World War, the Furukawa Company was turned into a corporation, but mismanagement in the general business section led to the closing of the bank and a decline in business. From the Manchuria Incident onward to the Sino-Japanese War and into the Second World War, the Furukawa Corporation's industrial section grew very rapidly. The Furukawa *zaibatsu*, unlike the other *zaibatsu*, was not dissolved by the occupation forces after the end of the war, but the Furukawa copper mine was forced to become an independent company. Production from the mine declined in the last years of the war, reaching its bottom during the period immediately after the war because of the economic recession and a lack of materials. But when new mining technologies were introduced during the Korean War, the Ashio mine's production rose and the mine once again moved into high-gear production. In 1955, the company imported a refining method from Finland which was able to oxidize the sulphur in the ore, and with the higher concentrations of sulphurous acid gas it became much easier to produce sulphuric acid from it. Through the application of this imported technology, the environment was, at long last, protected to a more meaningful degree from the ravages of the sulphurous acid gas, but it took another 20 years before there was complete relief from the damage produced by the refinery smoke. With the new refining method brought on line, attention was focused again on the problem of copper-mining poisons. During this period, Japan was again entering on a period of high economic growth and her production capacity reached pre-war levels.

The Gengorozawa poisons retention basin was constructed in 1943. This was one of 14 slag-pile retention basins, a little smaller than the others.

When the basin burst its seams, the weather was fine, so the responsibility for the destruction rested very clearly with Furukawa's mismanagement.

About 2,000 cubic metres of slag were flooded and three railway lines belonging to Japan National Railways were washed with the slag into the Watarase River. When heavy rains fell in Ashio, the farmers made it a rule to close irrigation system inlets from the river, but at the time of the accident all the irrigation inlets were open because there had just been a spell of good weather and because it was just before rice-planting time. Thus the poison-laden slag was washed into 6,000 hectares of rice-fields immediately before planting time. Over 25,000 farmers in Morita Village (now Ota City), Yamada-gun, Gunma Prefecture, were once again faced with the intractable problem of a poisoned agricultural environment. Led by Shoichi Onda, chairman of the Agricultural Co-operative Association, a new farmers' protest sprang up against the Ashio copper mine. Onda emphasized the importance of the farmers not accepting token payments from Furukawa, as they had in the past. In July Onda organized an association in Morita Village for the purpose of halting copper production. In August he was able to form the same kind of organization in three other cities and three provinces. Each of these three organizations allied itself with the other two and elected Onda chairman.

The monstrous slag piles, built up over a long history of mining, could be seen in many places in Japan and continue to pollute farmland, leading to many deaths. The largest slag-pile dam collapse in Japan's modern history occurred at the Okusawa mine, owned by the Mitsubishi Mining Company, on 20 November 1936. The accident caused 362 deaths and 81 serious injuries, and destroyed some 400 houses.[2]

Fortunately, the destruction of a slag-pile containment basin had never happened in Ashio. However, at the time of this unfortunate accident, the greatest social issue centred around pollutional discharges from the Edogawa (Edo River) Factory of the Honshu Paper Mills Company in Tokyo. Untreated water containing black sludge was being discharged into the river, destroying fishery resources in the estuary and in Tokyo Bay. Fishermen from the areas, especially Urayasu-cho, Chiba Prefecture, were opposed to the paper mill company, and approached the Tokyo Metropolitan Government and the Honshu Paper Mills Company to appeal for help. Many fishermen came into direct confrontation with the police and were arrested. After this Urayasu Incident, the government began tightening up on water-quality controls and two water-quality laws were passed. These laws had to do with the safety of water resources in public locations and with the quality of water discharged from factories. Although these legislative efforts did not really result in any substantial gains in actual preservation of water resources, they were the first such regulations laid down in Japan. The water-safety laws were passed in April 1959 and a Water Quality Inquiry Commission was established by the government to set water-quality standards for rivers and lakes in Japan.

Hundreds of farmers from the organizations against environmental pollution in the three cities and three provinces went by bus to appeal to the government for the establishment of water-quality standards and regulations for the Watarase River. At last, in 1962, the government decided to examine

the Watarase River, and asked Onda to be a member of the Watarase River Inquiry Commission on the condition that he resign as chairman of the allied farmers' associations. Onda was very angry at this condition, but he nevertheless tendered his resignation. In the deliberations of the Inquiry Commission Onda insisted that the standard for copper pollutants in the water should be 0.01 ppm (parts per million = parts of pollutant per million parts of water), while the representatives of the Ministry of International Trade and Industry and the Ministry of Agriculture and Forestry were bent on setting the standard at 0.06 ppm. However, after a series of long and difficult discussions, a majority of commission members voted for the copper-pollutants standard of 0.06 ppm, and Onda's request was rejected. So the commission agreed that the pollutants' standard for the Watarase River should be 0.06 ppm on an annual average basis.

Between 1969 and 1970, many grass-roots movements against environmental destruction came to the fore. During that time poisonous metals, including arsenic, were discovered in the waters of the Watarase River when the amount of water had increased owing to heavy rains. What Onda had feared most came true. From the 1971 crop of rice harvested in the Morita Village paddies, cadmium exceeding the permissible level was found, and in January of the following year the shipment of the crop was partially halted. The Morita Village farmers' association sent a petition to the newly created Environment Agency, and asked the Environmental Dispute Co-ordination Commission (Kogaito Chosei Iinkai) to step in as arbitrator, on the basis of the Environmental Pollution Disputes Settlement Act (Kogai Funso Shoriho), in their negotiations with the Furukawa Mining Company for damages. The 970 members of the association, led by Meiji Itabashi, were demanding from Furukawa 3.9 billion yen (about $27 million) as compensation. The negotiations went well for the farmers, partly owing to the increasing national outcry and the growth of movements against environmental destruction.

In November 1972, while the matter was under arbitration, Furukawa suddenly announced that it was going to close the copper mine. The company maintained that the closure was due to the fact that the ore veins were exhausted, but it was seen to be not unrelated to the arbitration that was then in progress. In the following February, the Ashio copper mine was closed, and the equally old Besshi copper mine was also shut down in March. However, though the mining operation was halted, the smelting of ores still continued using imported ores. In fact, copper production at Ashio increased after the closure of the mine.

The arbitration came to an end on 11 May 1974, when both the farmers and Furukawa Mining agreed on the conditions offered by the Co-ordination Commission and signed the final document. The agreement provided that the company pay 1.55 billion yen (about $10.7 million), improve the copper wastes effluent treatment system, improve the quality of the poisoned farmland, and sign an agreement for pollution control. This was the first time in the 100-year history of the company that Furukawa actually paid money to the farmers in compensation for damage done instead of simply providing

token donations from time to time. Unfortunately the negotiations went on behind closed doors, and as a result there was no national media debate about the problem, which would have strengthened the hand of other anti-pollution movements. These negotiation processes and the related statistics could make a valuable contribution to future attempts to protect the natural environment.

Although the copper-poison issue, which was rekindled by the bursting of the Gengorozawa catchment basin in 1958, was settled by the intervention of a government agency, people in the area are still suffering from the effects of the Ashio mine operation. The Ashio refinery is surrounded by 14 very large slag-pile accumulation basins and these are a constant menace to the natural river system, for any one of them might collapse into the river if there were heavy rains or an earthquake. Although the company insists that the poisons in these slag-piles are under constant supervision, there are small amounts of poisons seeping from them all the time, and these can be detected in the lower reaches of the river system. Still, to this day, nothing will grow on 3,000 hectares of mountain ranges around the refinery. The Ministry of Agriculture and Forestry has spent over 10 billion yen ($69 million) on the restoration of greenery in the area, but it will take several more generations and the expenditure of many more millions of yen before the regeneration of life can take place. The plan proposed in 1977 for reforestation of the area called for an estimated 130 billion yen ($900 million) in funds. However, these mountains have lost all of their topsoil from erosion and nothing but bare rocks is left. Once it has been radically destroyed, the restoration of nature is difficult in the extreme, even in a country like Japan where there is plenty of rain.

VIII. Conclusions: Lessons for Today from the Ashio Copper-mine Poisonings

More than 90 years have passed since the first public warnings were issued in relation to copper-mining-related environmental problems. However, there still exist today very real possibilities of disaster should one or more of the slag accumulation basins collapse and be washed or moved into the river systems. The extent of the damage caused by the smoke from the refinery can be seen in the 3,000 hectares of bare mountains surrounding the area where the Watarase and Tone Rivers meet. The vast desert in this area attests to the fact that, at the end of the nineteenth century, Japan attempted to catch up with the advanced capitalist nations of the world through policies that stressed the development of industrial capacity and military might; the deeply ravaged conditions of the once pristine forest areas around the Ashio copper mine are the result of this primary-order introduction of technologically based industrial capacity into Japan without the slightest consideration for environmental preservation. We cannot close our eyes to the fact that modern civilization has been poisoned by the materialism of the Industrial Rev-

olution and that this is manifested in the manner in which Japan adopted modern technology and in the unprecedented environmental destruction.

Environmentally destructive production technology, in the hands of management personnel who lay more emphasis on productivity than on safety and environmental integrity, is in the ascendant in Japan. The environmental poisons that arise from today's industrial technologies are no longer detectable with human sense organs. Morever, these pollutants, which (in the case of ionizing radiation) will be present for many years to come, are expected to increase very rapidly only after the next few generations. The present condition of humanity recalls the words of Shozo Tanaka, who wrote that the remnants of human life would be destroyed by technological civilization. It is as though Tanaka were continually appealing to the people who visit his shrine, in the hope that they and the victims of environmental destruction will join forces in a worldwide movement for the survival of humanity, even though they are bogged down in the muck of a technological and materialistic civilization that seeks its own destruction. His appeal is for radical change in this and other societies which create such enduring environmental problems and which, in the process, completely suppress and deny human rights. He appeals for continued resistance against the forces of death and in support of the spirit of life.

Notes

1. For further information on copper-mining poisons after the Yanaka Village Incident, see Masuro Sugai, *The Development Process of Mining Pollution at the Ashio Copper Mine* (United Nations University, 1982).
2. Tsuusan Daijin Kanbo Chosa Tokeibu, *Honpu kagyo no suusei 50 nenshi kaisetsu hen* (1980), p. 68.

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