

論文の内容の要旨

論文題目

Yokkaichi Asthma and the Formation of Environmental Standards and the Certification System in the 1960s and the 1970s

(1960、70年代における四日市喘息と環境基準と認定制度の形成)

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This thesis investigates the history of Yokkaichi asthma, and discusses the process of establishing environmental standards and an environmental certification system in the 1960s and 1970s. It focuses on how air pollution erupted and asthma patients emerged in the Yokkaichi area, how early measurements and investigations were conducted by scientists in Yokkaichi and other cities, and what pollution control measures were taken by local and national governments. It will closely examine the construction of standardized procedures for measuring meteorological conditions or diagnosing asthma patients in order for governments to establish certification systems. Particular attention will be paid to the environmental standard and the certification standard for designating patients affected by pollution.

Numerous works have already been written on this historic event, but as this thesis attempts to demonstrate, there is still a need for an analysis and narrative of the whole historical process of Yokkaichi asthma that focuses on the development of various standards to deal with issues emerging from air pollution. Those who were involved with this environmental problem, both researchers and administrators, set up an environmental standard and attempted to establish a certification system of patients suffering from air pollution. In creating such a system, medical experts also learned the need to standardize ways of diagnosing suffering patients. This thesis thus attempts to analyze the role and significance of various aspects of standards and standardization, while narrating the historical process of air pollution in the Yokkaichi area and its environmental, medical, and legal effects.

When the new petrochemical complexes in Yokkaichi started to operate in the early 1960s, a new type of asthma began cropping up in Shiohama district. It soon became known as Yokkaichi asthma. Local scientists and government responded rapidly to the reports of the new asthma. The lead-peroxide candle method and conductometric method were adopted as the main measuring procedures to measure levels of the pollutant sulfur dioxide. Katsumi Yoshida, a professor of medicine at Mie Prefectural University, initiated an epidemiological investigation based on the medical bills of affected residents. To do so, he received special permission from the local government to inspect the confidential data from medical bills stored at the local government office because of the National Health Insurance System. Yoshida's research indicated the plausibility of a statistical correlation between the frequency of residents' asthma attacks and the regional concentration of sulfur dioxide. It provided valuable data for the national investigative team that was dispatched by the Ministry of Health and Welfare and the Ministry of International Trade and Industry—the Kurokawa Investigative Team. Based on Yoshida's epidemiological data, the team decided to make Yokkaichi one of the designated areas of the Smoke and Soot Regulation Law, and proposed measures to diffuse the gas discharged by petrochemical complex plants by raising the height of their smokestacks.

Yoshida's research and his data also became a valuable basis for establishing a certification system for pollution-related patients and environmental standards for sulfur oxides in Japan. As is discussed in Chapter 4, the establishment of the certification system was difficult due to the non-specific nature of asthmatic respiratory diseases. In establishing this system, government officials and experts relied on a previous system that had been developed to certify atomic-bomb survivors. Leukemia, for instance, occurred at higher rates after the detonation of the atomic bomb, but it also occurred among the general public even without the after-effects of the atomic bomb. To certify such patients, the government relied on statistical judgment and introduced epidemiological criteria to identify patients who were likely suffering from leukemia due to radiation exposure. Besides the designation of the specific diseases reasonably caused by radiation, the government designated a specific area around the bomb's hypocenter and a specific duration during which people with leukemia had to have resided in that area to be considered certified atomic-bomb patients. In the Yokkaichi certification system, specific geographical areas and the temporal duration of residence within these areas were also designated as the two key epidemiological criteria for certification, in addition to a diagnosis with a specific pathological disease. As medical

experts recognized, the diagnostic concepts of respiratory diseases that served as the basis for epidemiological investigation also needed to be standardized.

The epidemiological data and concepts that led to the establishment of the local government's certification system also affected the lawsuit instituted by patient-residents against corporations, which resulted in a victory for the residents. The Yokkaichi lawsuit set a standard for the amount of legal compensation victims could receive, and influenced the later national Relief Law and Compensation Law. The Yokkaichi lawsuit ordered accused corporations to pay measureable compensation for the victims' monetary loss due to their incapacity to work because of disease. The Compensation Law, based on this judgment, set a new model worldwide for dealing with such issues. The Yokkaichi lawsuit, for the first time, provided an official method of calculating the compensation for damages due to air pollution events in Japan.

The effort to measure air pollution in Yokkaichi formed part of the national process of setting environmental standards for air pollution. The early epidemiological investigations in Osaka also provided valuable data for this environmental standard setting. Osaka was a successful case in regulating the pollution measures in these early days. It approved the environmental management standard for sulfur dioxide to control industrial pollution in the city. The special attention the national government paid to pollution started with establishing the department of environment pollution, which was set up within both MHW and MITI. As the first head of the department at MHW, Michio Hashimoto played a central role in mediating pollution issues and establishing an environmental pollution control law. In the Basic Law for Environmental Pollution Control enacted in 1967, the concept of *kōgai* and environmental standards were interpreted in detail. The latter was defined as an administrative goal desirable to maintain. The phrase often at issue was "harmony with the economy." It was inserted in the finally approved version of the Basic Law in 1967, but was eliminated from the 1970 amendment.

Based on early epidemiological data in Yokkaichi and Osaka, standard values for sulfur oxides were established. The Environmental Pollution Council in MHW assembled an expert panel on environmental standards for sulfur oxides in November 1966. They focused on two issues: measurement and medical influences on the human body. After a year and two months of deliberations, the expert panel submitted a report on the SO_x standard in January 1968. A one-day value of 0.05ppm and a one-hour value of 0.1ppm were approved as the threshold values. This was determined based on the four epidemiological conditions including those concerning the statistical

tendencies of the death and prevalence rates under these values. When it was established, it was one of the most stringent standards in the world. However, objections from industrialists and others made MHW reconsider the strict standard values. While the threshold values remained unchanged, the final standard values were twice relaxed owing to objections from the industrial sector. The values were based on early epidemiological investigations conducted in Yokkaichi and Osaka. In the social process of setting environmental standards, citizens' movements should not fail to be mentioned. Local citizens launched a series of protest movements—including mounting a signature campaign, measuring pollutants themselves, and filing the joint lawsuit—that influenced the government in deciding to reconsider the SO_x standards. Soon after the judgment on the Yokkaichi lawsuit was pronounced in 1972, the newly established Environmental Agency focused on formulating environmental policies. Under the new policies, not only SO_x, but also many other air pollutants were restricted to meet certain standard values.

The decade from the early 1960s to the 1970s witnessed the emergence of a social and legal mechanism to control environmental pollution and compensate the sufferings of pollution victims primarily based on epidemiological analysis and estimation of the correlation between the pollution and the suffering. As the present case study shows, this mechanism emerged through a decade-long process of social negotiations and reconciliations that involved patients, industrialists, politicians, doctors, lawyers, and scientists. This decade-long process did not lead to a complete settlement between the sufferers and those responsible for their suffering, and the process of negotiation continued further. Yet, the emergence of such a socio-legal control mechanism was a significant event in the environmental history of Japan. The present research focused on the process of setting a variety of standards and the crucial role played by epidemiological science in this process. The non-specificity of asthma and other related diseases as well as the difficulty in establishing causal relationships between individual actors posed difficult problems that could not be solved solely by political decisions or scientific argument. They could be solved only through the collaborative efforts of patients and politicians as well as legal and scientific experts. The social history of Yokkaichi asthma is a typical case of what Sheila Jasanoff has called “regulatory science.”