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Scientific Wastelands and Toxic Utopias:
The New Environmentalism of 1970s Japan

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in History

by

Kevin H. Richardson

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ABSTRACT OF THE DISSERTATION

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Doctor of Philosophy in History

University of California, Los Angeles, 2020

Professor William Marotti, Chair

By the end of the 1960s, a severe environmental crisis had gripped the Japanese public and ushered in an era of national concern over the toxic burdens of industrial growth. Poor rural communities poisoned by industrial runoff and middle-class metropolitan residents choked by air pollution found that Japan's two decades of rapid economic growth required a toxic sacrifice that their bodies were made to bear. They were experiencing a crisis that originated in the dream of Japan's post-World War Two economic revival. Seeking to reengage the international political order through economic competition and to create a high-wage labor force, the Japanese state, private industry, and leading academics zealously envisioned rebuilding the economy through a large-scale industrial expansion. In order to fulfill that vision, they set in motion a rapid and unregulated industrial buildout centered on the petrochemicals and steel.

Japan's toxic nightmare inspired an activist movement that aimed to reimagine the foundations of the country's postwar economic order. A new environmentalists movement emerged from the late 1960s and early 1970s pollution crisis to challenge the vision of postwar industrial development. 1970s environmentalism in Japan was bifurcated into two interrelated types. Anti-pollution protests tended to be localized movements led by members of particular communities who fought against polluting factories and for the right to say no to unwanted industrial development in their area. At the same time, in Tokyo and other metropolitan centers, environmental writer-activists worked to support and expand environmental activism by analyzing the national and global vectors of economic developmentalism. The field of environmental writer-activists included journalists, scientists, engineers, union activists, and academics who had become disillusioned with the model of toxic economic growth.

My dissertation historicizes the new environmental consciousness that developed among urban writer-activists in the first half of the 1970s by looking at the intersection of these two poles of the environmental movement. In this study I examine the magazine *Technology and Humans* (1972-2005), one of the central organs for environmental criticism during the heyday of Japan's environmental movement. I argue that the new environmentalism of 1970s Japan that *Technology and Humans* promoted originated in a particular and highly political relationship between *geography* and *writing*. This environmentalism was premised on a direct engagement between the urban writer-activist and what writers called in Japanese the "genba," which meant the "site" or "place," and generally denoted communities that were key points of contestation over pollution. For these environmentalists, engaging genba became the underlying basis for their activism and environmental thought.

I further argue that this genba-based environmental movement was a historical response to and explicit rejection of the meta-narratives of industrial and scientific progress of the 1950s and '60s. In other words, the pollution crisis created a political rupture in how one envisioned social change by destabilizing the given narrative of scientific progress lifting all boats. Environmentalism was structured around the contestation between generalist, overarching forms of knowledge—the bread and butter of Japan's technocratic-style governance—and what activists at the time valued as concrete, localized forms of knowledge encapsulated in the idea of genba. The end goal was not simply to value local knowledge. At the heart of environmentalist thought was the belief that generalist forms of knowledge could not produce a “true” knowledge of society in its totality. In other words this political rupture opened up a space to contest what constituted a legitimate claim to truth and reality, activism and politics. I uncover two historical trajectories that defined this environmentalist turn toward the local and concrete. The first trajectory was the breakdown in the status quo of science caused by the epistemological and ethical crises that pollution presented. The second trajectory was the growth of the postwar development state around acquiring and, in the words of environmentalists, devouring land for toxic industrial expansion. My study shows how the writer-activist flavor of environmentalism in Japan primarily aimed to construct a holistic knowledge of society by deconstructing both trajectories from the perspective of genba.

The dissertation of Kevin H. Richardson is approved.

Seiji Lippit

Katsuya Hirano

William Marotti, Committee Chair

University of California, Los Angeles

2020

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Vita

Education

- 2015- Ph.D. Candidate, History, University of California, Los Angeles
Dissertation Title: “Scientific Wastelands and Toxic Utopias: The New Environmentalism of 1970s Japan”
- 2015 M.A., History, University of California, Los Angeles
- 2009 B.A., History, University of California, Los Angeles

Publications

“Spaces of Development and Spaces of Resistance: Environmental Criticism in 1970s Japan.” *Japan Forum*. (Forthcoming 2020).

Review of: *Brewed in Japan: The Evolution of the Japanese Beer Industry, Pacific Affairs*. Vol. 88, no. 3. 2015. 713-715.

Presentations

“The Activist Scientist: Scientists, Engineers, and Industrial Pollution in 1970s Japan.” The Japanese Scientist in Japan and the World Workshop. Cardiff University. September 9-10, 2019.

“Industrial Monsters: Environmental Criticism as Horror in 1970s Japan.” Japanese Environmental Humanities Conference. University of California, Irvine. December 10-13, 2018.

“Desk Work Violence and the Expropriation of the Local.” 27th Annual Columbia Graduate Student Conference on East Asia. Columbia University. February 24, 2018.

“Technology, Pollution, and Figures of Revolutionary Possibility in High-Economic-Growth Japan.” Pacific Coast Branch-American Historical Association Conference. California State University, Northridge. August 5, 2017.

“*Shakai undōshi (Social Movements History)* and the Politics of History.” Trans-Pacific Symposium. University of California, Los Angeles. June 5, 2015.

“Historians and Student Politics: The Remaking of Historical Practice after 1968.” Japan Arts and Globalization Works-in-Progress Event. May 22, 2015.

Fellowships and Grants

- 2018 Department of History Dissertation Year Fellowship, UCLA
The Millennium Endowed Graduate Fellowship, UCLA
- 2017 Terasaki Graduate Fellowship for Dissertation Writing, UCLA

2016 Sasakawa Fellowship, Terasaki Center for Japanese Studies, UCLA
2015-2016 Japan Foundation Japan Studies Fellowship, The Japan Foundation
2014 Aratani Field Fellowship, Terasaki Center for Japanese Studies, UCLA
2012-2013 Nippon Foundation Fellowship, Nippon Foundation
2012-2013 Sasakawa Language Fellowship, Terasaki Center for Japanese Studies, UCLA
2011 The Paul I. and Hisako Terasaki Center for Japanese Studies Fellowship, UCLA

Introduction

I. The Geography of Pollution

In a September 1974 article in the Japanese magazine *Technology and Humans*, Kyushu-based anti-pollution activist Takematsu Teruo wrote about how chemical and steel plants in the city of Ōmuta, Fukuoka Prefecture had polluted the local air, water, and soil with a toxic stew of dangerous chemicals and metals that included cadmium, mercury, sulfuric acid, zinc, and benzene.¹ Pollution had caused Ōmuta River to catch fire, like the 1969 Cuyahoga River fire in Cleveland, Ohio, and local residents feared they would become the next victims of a number of major pollution-related disease unless heavy industries cleaned up their operations. Ōmuta was symptomatic of a pollution crisis that spread across the Japanese archipelago through the rapid expansion of major polluting industries in the 1950s and '60s. Stories like the Ōmuta case were frighteningly common in Japan in the early 1970s, and they were generally depicted by activists and mainstream media as industrial facilities victimizing local residents.² But Takematsu's purpose in writing the article went beyond simply recounting environmental damage.

In order to challenge the root causes of environmental degradation, Takematsu Teruo wished to push beyond the lens of victimization. As was the case for many other contributors to *Technology and Humans*, Takematsu believed that while the battle between factories and resident-victims (*jūmin*) was crucial, activists' primary focus on local government officials and factories that polluted neighborhoods and agricultural spaces allowed, as one *Technology and*

¹ Takematsu Teruo, "Gendai ni okeru saigai kōgai no taikei: Ōmuta no jittai," *Gijutsu to ningen* (September 1974): 37.

² Simon Avenell, *Transnational Japan in the Global Environmental Movement* (Honolulu: University of Hawai'i Press, 2017), 14.

Humans editor put it, “the real enemy to remain concealed.”³ The real enemy was a development-obsessed central government and industrial conglomerates that conspired together to expand industrial production to reckless new heights. In his article, Takematsu, for example, connected pollution to high rates of occupational diseases at industrial sites, including various forms of cancer, nervous system disorders, and heavy metal poisoning. This analysis thus considered the effects of pollution on industrial workers (*rōdōsha*), who were generally excluded from discussions of environmental issues.

Ōmuta was a mixed space where large factories clustered near large populations, which was common for Japan’s industrial sites and intensified the severity of environmental harms.⁴ Petrochemical and steel companies, who were among the largest polluters, worked diligently to ensure company-hired doctors diagnosed industrial workers’ health problems as unrelated to the pollutants, calling them “personal diseases” (*shishōbyō*) rather than “pollution-related diseases” (*kōgaibyō*). Pollution, Takematsu argued, negated the “border” (*sakai*)—the “division of space” (*yōchi wo kubetsu*)—between residential and industrial zones, forcing workers and residents to share the same toxic space.⁵ Takematsu Teruo believed that only by campaigning against pollution in the factories, as well as in residential spaces, could pollution be resolved.⁶

³ Takahashi Noboru, “Gendai no kajū konbinaato wo ou: mizushima kōgyōchitai wo yuku,” *Gijutsu to ningen* 1, no. 1 (Spring 1972): 20.

⁴ Charles Fisher and John Sargent, “Japan’s Ecological Crisis,” *The Geographical Journal* 141, no. 2 (July 1975): 165-176.

⁵ Takematsu Teruo, “Gendai ni okeru saigai kōgai no taikai: Ōmuta no jittai,” *Gijutsu to ningen* (September 1974): 31-33

⁶ Takematsu Teruo, “Gendai ni okeru saigai kōgai no taikai: Ōmuta no jittai,” *Gijutsu to ningen* (September 1974): 37.

Emblematic of the new environmentalist who emerged amid the late 1960s and early 1970s pollution crisis in Japan, Takematsu Teruo recognized how environmental degradation had little regard for social and economic divisions. The geography of the pollution crisis and its toxic dissolution of political boundaries in places like Ōmuta helped to shape an environmental movement built around undoing the concentration of power in the central government and leading industrial conglomerates. Environmentalism was not about a narrow category of issues—such as conservation or individual pollution cases. Rather, environmentalist believed the tenets of their movement should be about fundamental social change, what we would now call systemic change. It was about power.

In this dissertation I examine *Technology and Humans*' critical writings on environmental issues and activism in the first half of the 1970s. Through the magazine, I highlight the world of urban-based, environmental writer-activists: scientists, engineers, journalists, academics, and union activists who engaged localized anti-pollution movements and imagined a future free of environmental degradation. Using the magazine's work, I show how environmentalists predicated their environmental thought and activism on a holistic critique of the power dynamics of postwar Japan. These environmentalists began by looking at the relationship between pollution and the economic and political system built on industry that expanded in the postwar period.

I argue that the new environmentalism of 1970s Japan that *Technology and Humans* promoted originated in a particular and highly political relationship between *geography* and *writing*. This environmentalism was premised on a direct engagement between the urban writer-activist and what writers called in Japanese the “genba,” which meant the “site” or “place.”⁷ For

⁷ Recently, the term “genba” has become a mode of analysis for Asian Studies scholars working on pollution. See *Positions*' special issue on environmental degradation in Asia structured around the concept of genba: Lisa Onaga

these environmentalists, engaging genba was the underlying basis for their activism and environmental thought. Genba provided a method for valuing and emphasizing the events, people, and toxic conditions at the local, granular level. In '70s Japanese environmentalism, a genba was a crisis point for environmental degradation and connected to an affected community. Genba were also the loci of environmental activism that emerged from individuals and communities directly harmed by pollution.⁸ The template for genba-based activism had been the large-scale protest movement led by citizens of the towns of Numazu, Mishima, and Shimizu in Shizuoka Prefecture that in 1963-64 successfully stopped the development of a petrochemical complex by Fuji Oil and Sumitomo Chemicals, a complex that had been pushed by the central government in Tokyo.⁹ The possibilities contained within those struggles inspired numerous other localized movements, as well as the imaginations of urban writer-activists over the next decade.

The focus on genba liberated environmentalists from an attachment to existing political ideologies, such as Marxist-Leninism on the Left and the then-dominant ideals of economic and scientific progress. At the same time, in making genba their focal point, environmentalists also cornered themselves into a narrow frame where they valued local control over activism while desiring—without dictating—that such movements would expand to a national or international level. Environmentalists attached a sense of urgency to genba as the sites at which the pollution

and Harry Yi-Jui Wu, “Articulating Genba: Particularities of Exposure and Its Study in Asia,” *positions* 26, no. 2 (May 2018): 197-212.

⁸ In Japanese nouns like genba are both plural and singular, and I use the term as singular or plural depending on the sentence.

⁹ Miyamoto Ken'ichi, “Japanese Environmental Policy: Lessons from Experience and Remaining Problems,” in *Japan at Nature's Edge: The Environmental Context of a Global Power* Miller, eds. Ian Jared Miller, Julia Adeney Thomas, and Brett L. Walker (Honolulu: University of Hawai'i Press, 2013).

crisis needed to be addressed and from which local actors had to grow their own environmental activism. Indeed, the *Technology and Humans*' approach to environmental activism was based on respecting the rights of local actors—going so far as to believe that activism had to emerge organically at the local level—and yet imagining that locally grown activism across Japan would eventually coalesce into a transformative movement. *Technology and Humans*, like other environmental magazines, made commitment to building their analysis of the environmental crisis and their visions for resolving it through grassroots activism based on a direct and continuous engagement with pollution genba. Attending to genba, as the sites of crisis and activism, in turn provided the foundation for an environmentalist critique of postwar Japanese society. The writing published by the magazine had to follow this geographic connection.

Environmentalism in Japan turned toward the “local” through an intensive focus on the places and peoples directly affected by pollution in order to understand and challenge the national scope of environmental degradation. In *Technology and Humans*, the concept of genba was never about singular places or communities in isolation. Instead, writers always discussed the connection of the local to a broader context. Indeed, the environmentalist use of the term “genba” had a formal resonance with late 1960s political activism in Japan. Late ‘60s struggles had turned to the local site as a place to produce broader, structural contentions and forms of activism that engaged structural issues from a grounded perspective. 1970s Environmentalists’ primary ethos was that in order to understand the systemic politico-economic causes of the pollution crisis, which always seemed abstract and beyond the grasp of ordinary citizens, one had to start with genba. By looking at the localized battle between factory and neighboring residents, it was important to look past the boundaries of that conflict to see the whole picture of the environmental crisis, while nevertheless respecting the autonomy of local activists.

For environmentalists in Japan, pollution had broken open the fundamental principles upon which the postwar state was built: science, technocratic politics, and an attendant mythology of economic growth. The scientific complexity of environmental degradation—the multiplicity of toxins penetrating a dynamic ecological space—challenged the methodology and politics behind scientific inquiry and medical diagnosis. The geographic or spatial conundrum of pollution also disrupted existing political and social boundaries, such as the division between factory and everyday life. This prompted an anti-pollution movement that sought to cross existing social, class, and professional boundaries by bringing together industrial workers, rural residents, scientists, and other groups. By organizing across the boundaries through which pollution had broken, anti-pollution activists envisioned mobilizing a heterogeneous mass movement not only to resolve the pollution crisis but also to challenge the top-down, technocratic vision of the postwar state. In other words, early 1970s environmentalists aimed to reassert the power of the people against what they identified as a growing domination of everyday life by technology and technocratic governance.

Environmentally conscious writer-activists in *Technology and Humans* brought these elements together—the problems of science, space, and activism that environmentalists negotiated—to develop their fundamental critique of postwar society. They did so during a historical moment marked by intensive activist creativity, a widespread sense of political possibility, and an ever-present fear of an imminent environmental collapse. In this brief half decade from 1970 to 1975 public opinion had strongly turned against the idea of putting industrial development ahead of health and environment, and hundreds of new anti-pollution organizations led by local communities emerged. However, by the middle of the decade, economic stagnation brought on by the 1972-73 Oil Crisis had significantly diminished

environmental concern among the general public.¹⁰ I capture this brief but vigorous period of environmental activism and imaginings as it unfolded in the pages of *Technology and Humans*.

Beginning in 1970, environmentally conscious magazines were, in the words of one *Technology and Humans* editor, “popping up like bamboo shoots after the rain” in response to the explosion of public awareness of pollution.¹¹ Most of these magazines were written by urban writers from journalistic, academic, scientific, or labor activist backgrounds. The magazines additionally published the work of local activists such as Takematsu Teruo. *Technology and Humans* was one of the most important examples of this field of environmental publishing that included similarly famous examples such as *Research on Environmental Disruption (Kōgai kenkyū, 1971 to present)* and publications by *Jishū kōza*, activist-scientist Ui Jun’s organization. *Technology and Humans* reached 6,000 readers per issue on average and brought together many prominent thinkers and activists connected to the environmental movement. As hundreds of localized anti-pollution movements exploded across the country, there was no unifying national organizations to connect the disparate movements. Magazines became the threads of connection between these movements, as editors and writers strived to support localized movements and to imagine how the upswell of grassroots energy might become the basis for a nationwide, counter-hegemonic force.

II. Science and Economic Development: Scientific Wastelands, Toxic Utopias

The concept of *genba*, upon which the environmentalism *Technology and Human* was built, was defined by this polarized impulse to respect local autonomy while also striving to

¹⁰ Kawana Hideyuki, *Dokumento nihon no kōgai 1: Kōgai no gekika* (Tokyo: Ryokufū Shuppan, 1995), 402-403.

¹¹ Sugioka Sekio, Tanaka Kimio, and Tanno Kiyoshi, “50 gōkinen zadankai: *gijutsu to ningen* 50 gō no kiseki,” *Gijutsu to ningen* (September 1977): 51.

create a “true knowledge” of society as a totality of complex political relations. I read this double movement toward the local and toward the totality as an attempt to navigate beyond the overarching modernist narratives of scientific progress and economic growth, which were pervasive in the 1950s and ‘60s. However, I do not believe that these writer-activists ever imagined fully capturing the “essence” of local genba or the entire social totality in which they hoped to tap. Instead, they set their sights on these two targets in order to ensure that their analysis and activism engaged both in a dialectical project. By making genba the focus, environmentalists hoped to produce something creative, new, and transformative.

The environmentalist movement that spilled out on to the pages of the magazine reacted against the optimistic, modernizing impulses of post-World War II industrializing nations and the concomitant belief in science, expertise, and narratives of progress. From the 1950s through the early 1970s, a utopian dream of scientific progress paired with rapid industrial development offered a vision of society remade and perfected after the horrors of war and fascism, a vision shared by many industrialized nations during that era. I historicize genba environmentalism of the early 1970s as an explicit rejection of the overarching scientific and political visions that dominated Japan’s postwar economic growth policies and popular perceptions of Japan’s future development. Environmentalists framed the vision of endless progress as abstract and imposed from above—the very opposite of genba.

Scientific progress and industrial development provided the bulwark for economic growth policies in Japan and thus became the main targets of environmentalists. The first vision contended that relentless scientific progress, primarily carried out by the development of industrial technology, would inevitably perfect society. This was the ideology of “scientific modernization” that promised that scientific advancements would rebuild Japan from the ashes

of World War II and reconstitute it as a democratic society. Contained within that vision was an unquestioned faith in scientific experts to improve human existence.

The second vision, premised on the scientific expertise of the first, was the state's economic development framework (*sōgō kaihatsu*). That framework empowered technocratic government officials to “scientifically” plan future economic growth by restructuring the Japanese landscape to accommodate a massive expansion in petrochemical and steel production. Building out large industrial complexes was seen as the pathway to realizing scientific progress. The geographic dimensions of development shaped how many Japanese activists engaged environmental issues. The primary mechanism for development was the acquisition of coastal land for massive industrial complexes called “petrochemical combines” (*sekiyu konbinaato*) or simply “combines” (*konbinaato*). The petrochemical and steel buildout provided the material foundations of postwar economic growth—and the toxic substances behind the pollution crisis.

Modeled on Soviet-style steel complexes, from which the loan-word “konbinaato” came, combines grouped together oil refining with energy, petrochemical, and steel production in the same large and volatile complex in order to streamline the transfer of materials between different industries.¹² To build the complexes, the Japanese government helped industries disrupt local communities to acquire land, and the resulting industrial infrastructure devastated local ecology and harmed residents' health.¹³ By the early 1970s, every existing and in-progress combine site became a flashpoint for environmental contestation. The communities who resisted combine development inspired the push toward *Technology and Humans'* genba-focused

¹² Murata Tomijirō, “Sekiyukagaku Konbinaato ron: seisei no hissensei to rekishiteki igi,” *Gijutsu to ningen*, no. 8 (Winter 1974): 26-28.

¹³ Honma Yoshihito, *Kokudo keikaku no shisō* (Tokyo: Nihon Keizai Hyōronsha, 1992), 6-10.

environmentalism. Using the perspectives of local affected communities, *Technology and Humans*' environmentalists opposed the state's positive vision of restructuring Japan's landscape to build out combine infrastructure with the horrific imagery of industrial devastation that combines created.

Behind the critique of science and economic development and the battles against nightmarish industrial complexes, *Technology and Humans*' environmentalists made a more fundamental claim about knowledge and activism. The form of environmentalism they promoted was a direct contestation of one of the postwar state's foundational assumptions: that society ought to be objectively governed from above by experts and that scientific expertise could fulfill the state's utopian aspirations. They believed that the mythology of scientific progress and economic developmentalism had produced their own opposites: a wasteland of scientific development where science had created more harm than good and a toxic utopia of industrial infrastructure that polluted urban and rural spaces. By shifting instead toward *genba*, which represented for environmentalists something more concrete and real, *Technology and Humans*' environmentalists made a claim for the primacy of activism and knowledge that was situated in place, based not in expert visions but "real experience" from the *genba*.

Through the use of *genba* as a "concrete" foil to the "abstract" ideologies of governance, environmentalists claimed to have a better method for creating accurate knowledge of society, knowledge that they believed ought to inform how government operated at the local and national levels. Environmentalists framed scientific modernization and economic developmentalism as fostering a worldview that mystified reality. According to this narrative, scientific modernization was a false or partial knowledge that obscured the complexities of nature, humanity, and their interconnectedness. Drawing on the work of the 1920s Hungarian Marxist thinker Györg Lukács

and critiquing a dominant scientific epistemology based in early-twentieth-century physics, environmentalists conceived of the epistemological problem of postwar society as an inability to see society as a totality—a system that mistook partial elements, such as scientific progress or the viewpoints of technocratic experts, for the whole.¹⁴ Environmental activists believed that they had the means to understand and analyze the “totality”—society as a total system of social, political, and economic relations, and indeed their activism was predicated on comprehending it. For them, genba offered a pathway to recapturing the totality, to reconstituting the “truth” of Japanese society by understanding it from the perspective of a wide variety of genba. Through the accumulation of perspectives from different genba they believed that it was possible to understand the totality.

Writer-activists originated genba environmentalism. Writer-activists who subscribed to genba environmentalism, however, did not believe that they were supposed to come up with a unified theory of society on their own. Instead, they hoped that local activists at the genba would produce a vision for an environmentally sustainable future. Their environmentalism, thus, was an open-ended project built on the dialogue between geography—genba and local communities—and writing.

III. Technology and Humans: An Engineer Finds His Conscience

The story of the magazine *Technology and Humans* and its editor-in-chief, Takahashi Noboru serves as my entry point into the world of environmental activism and writing in Japan. The magazine’s history begins with a group of scientists and engineers who decided to become political activists in response to the pollution crisis of the late 1960s. The connection between scientist activism and the environmental movement provides the narrative for much of this

¹⁴ György Lukács, *History and Class Consciousness* (Cambridge: The MIT Press, 1971) 102-110.

dissertation. In 1970 Takahashi Noboru, an engineer specializing in non-ferrous metals, began working on what would later become *Technology and Humans* out of a conscious regret for the part science played in creating the horrors of the pollution crisis. He and other engineers with whom he collaborated were contrite over how their scientific optimism had supported the rapid and toxic industrial expansion of the '50s and '60s.¹⁵ They moreover disdained scientists who had collaborated with governments and industries to disprove pollution victims' claims. Takahashi believed that this collaboration exposed the bankruptcy of scientific practice. *Technology and Humans'* scientists and engineers began by questioning science as an institution, profession, and field.¹⁶ In their writings, environmentally conscious scientists addressed the professional and intellectual framework of the scientist who was expected to narrowly focus on research and technology.

These scientists-turned-activists aimed first to rethink the field of science—what it does and what it is supposed to do. They also reimagined the role of the scientist.¹⁷ In Chapters One and Two, I explore this effort to reclaim science from the clutches of both industrial science—or technological development in the service of profit—and the blind faith among state and industry that scientific development could cause no harm and only expanded economic growth.¹⁸ The political contestation in the magazine over the role of science in society extended to a battle over what happened in the laboratory. *Technology and Humans* participated in an ecological

¹⁵ Sugioka Sekio, Tanaka Kimio, and Tanno Kiyoshi, “50 gōkinen zadankai: *gijutsu to ningen* 50 gō no kiseki,” *Gijutsu to ningen* (September 1977): 47-60.

¹⁶ Henshūbu, “Kakuyūgō kenkyū kaihatsu e no kigu,” *Gijutsu to ningen* (January 1976): 28-34.

¹⁷ Takahashi Noboru, “Hajime ni,” in ‘*Gijutsu to ningen*’ ronbunshū: *toitsuduketa genshiryoku 1972-2005*, eds Takahashi Noboru, Amagasa Keisuke, and Nishio Baku (Tokyo: Otsuki Shoten, 2012), 7-8.

¹⁸ Nakamura Teiri, “Sengo kagakugijutsushaundō rokujūnendai no kagakusha undo,” *Gijutsu to ningen* (September 1977): 145.

rethinking of science that countered older, physics-based approaches to studying the environment through narrow, controlled laboratory experiments. They argued that science of the environment was chaotic and elusive, and it required an engagement with complexity of life in nature, not a lab.¹⁹ Magazine contributors believed that for scientists to fight the corporatization of their discipline, they needed to step out of the lab and into nature to become an activist fighting on the side of affected communities and individuals.²⁰

The scientist stepping out of her professional boundaries to become an activist provides a lens into the environmental writing by urbanites who sought to complement and support local community and labor activism on environmental issues during early 1970s. I argue that the moment when urban residents realized that neglected and ignored communities and environments outside Japan's cities were important formed the starting point for urban environmentalism during this period. This realization was the springboard that prompted scientists, for example, to rethink their profession and the scientific and political assumptions that allowed them to function in society. Genba presented the possibility of imagining a different society as well as a different way of being scientific. Nevertheless, despite focusing on genba, urban environmentalists were ultimately most interested in the fate of the urban world and the urban writer. Though they recognized the importance of genba, they also instrumentalized genba in order to reform and, they hoped, revolutionize modern urban society. The content of environmental writing was directed at the dull, uniform world of 1950s and '60s bureaucratic government operations and corporate technical management. It was a movement against the

¹⁹ Hoshino Yoshirō, "Setonaikai ni miru shizen to ningen no hakai: atarashii rekishi wo hiraku genten wa nanika," *Gijutsu to ningen* 1, no. 1 (Spring 1972): 17-18.

²⁰ Suga Ryūichi, "Atarashii gijutsuzō e no kitai," *Gijutsu to ningen* (June 1975): 33-41.

business suits, the gray drab of concrete, and the experience of an overcrowded urban landscape where daily life felt homogenized and empty for *Technology and Humans*' writers. The urban world the writers occupied was one that they felt to be increasingly devoid of the possibility of an effective resistance based in activism so they hoped to find a much-needed path toward the revitalization of urban activism by connecting to anti-pollution movements in rural communities.

IV. Secondary Literature Review

Urban writer-activists have been telling the story of the Japanese pollution crisis inside and outside of Japan for five decades beginning in the mid-1960s, but their own history has seldom been explored in secondary scholarship.²¹ This study contributes to the existing field of historical scholarship on the pollution crisis in English and Japanese by unpacking the field of environmental writing. By doing so, my dissertation expands our view of environmentalism in Japan beyond the focus on localized movements. It adds to existing scholarship on the history of the energetic and pervasive group of environmental writers who intensively engaged pollution protest movements and informed the urban public about the environmental crisis.

Much English-language scholarship on anti-pollution activism in the 1960s and '70s has focused on the meaning of environmentalism for Japan's postwar democracy. The best examples

²¹ The exception is *Kōgai Kenkyū* (Research on Environmental Disruption, 1950-present), whose members explored their own history in a volume edited by Miyamoto Ken'ichi and Awaji Takehisa entitled *Kōgai kenkyū no paioniatachi* (Tokyo: Iwanami Shoten, 2014). As with most reflective accounts written by writer-activists of the time, they recount their history in environmentalism and analyze the pollution crisis itself, but they do not analyze the field of environmental writing and its role in environmentalism. In English language scholarship, Simon Avenell has explored the history of *Kōgai kenkyū*, but he primarily argues that the group's work indicates the emergence of a "reflexive modernity" in Japan. In other words, he argues that *Kōgai kenkyū* moved past seeing Japanese citizens as victims of modernization and industrialization to understand that they participated in the victimization of other countries by exporting polluting Japanese industries that benefit Japanese citizens. His analysis hinges too closely on the divide between different nationalities—the Japanese must come to see themselves as perpetrators of pollution on non-Japanese. It also follows a modernization track. Avenell reads this moment when activists recognize their own role in polluting other countries as a sign that Japan has reached a new stage of modernity in the mid-1970s, which, as I show in this dissertation, goes against the anti-modernism language of the environmentalism in Japan. Simon Avenell, *Transnational Japan in the Global Environmental Movement* (Honolulu: University of Hawai'i Press, 2017).

of scholarship centered on the democracy question are Margaret McKean's *Environmental Protest and Citizen Politics in Japan*, Jeffrey Broadbent's *Environmental Politics in Japan*, and Timothy George's excellent study of the Minamata pollution case, *Minamata: Pollution and the Struggle for Postwar Democracy in Japan*.²² All three books consider to what degree Japanese citizens took up the mantle of democracy, while also analyzing how the Japanese government constrained democracy. Underlying all three approaches is an assumed universal definition of democracy that functions as the barometer for whether Japan's citizenry have successfully absorbed democracy or not and therefore escaped what these scholars seem to believe is the Japanese population's decidedly unmodern penchant for authoritarianism. Indeed, these writers buy into the highly problematic interpretation among American and Japanese scholars that Japan formally became democratic after World War II, with a constitutional monarchy, but that its citizenry and institutions had not embraced the spirit of it.²³ Scholarship in this mode continually asks a "will-they-will-they-not" teleological question of whether Japan has finally taken on the "correct" (but arbitrary) characteristics that make a country an authentic, modern democracy.

In another scholarly approach, Simon Avenell and Timothy George argue that individual anti-pollution movements primarily focused on defending or reclaiming their local autonomy and used whatever tactical means necessary, such as allying with conservative politicians, to achieve victory. They contend that local anti-pollution movements were uninterested in a higher purpose or meaning for their cause. Avenell is especially critical of scholars and activists who view anti-

²² Jeffrey Broadbent, *Environmental Politics in Japan: Networks of Power and Protest* (New York: Cambridge University Press, 1998); Margaret A. McKean, *Environmental Protest and Citizen Politics in Japan* (Berkeley: University of California Press, 1981); and Timothy George, *Minamata: Pollution and the Struggle for Democracy in Postwar Japan* (Cambridge: Harvard University Press, 2001).

²³ J. Victor Koschmann, "Modernization and Democratic Values: The 'Japanese Model' in the 1960s" in *Staging Growth: Modernization, Development, and the Global Cold War*, ed. Nils Gilman (Amherst: University of Massachusetts Press, 2003), 236-245.

pollution movements as part of a “progressive history” of citizens rising up against a powerful state and destructive private industries.²⁴ Both authors make a strong case that many movements in Japan foregrounded the language of local autonomy in their protests and demands, rather than being interested in becoming invested in a national cause.

However, Avenell and George, who also draw on the work of environmental writer-activists such as Miyamoto Ken’ichi and Ui Jun as secondary sources, tend to take a face value the statements of local activists, as urban writer-activists of the time often did. While both authors have done excellent work on particular movements, my study moves away from the focus on local autonomy by highlighting the tension between local and national goals within anti-pollution movements and within the field of environmental writer-activists. In Chapter Three I take up the 1970 Nationwide Local Struggles Symposium, a meeting of 400 activists from “local” (*chiiki*) movements, to show how by the 1970s many protest movements had begun to sense an impasse in the local orientation of their goals and activism. As a result, activists participating in the symposium sought to expand the horizon of their individual movements by linking up with other “local” movements and with student groups and union activists in order to create systemic change that would ensure their victories would endure long term. They did this while also seeking to ensure that the goals of individual movements were fully accomplished and not sacrificed in the course of a broader struggle.

With such lofty goals, throughout the symposium there was a clear tension and indeterminacy over how to negotiate between the local and national levels of activism. The fundamental belief expressed at the symposium and embraced by writer-activists like those in *Technology and Humans* was that a heterogeneous coalition of activists would resolve those

²⁴ Simon Avenell, *Making Japanese Citizens* (Berkeley: University of California Press, 2010), 7.

problems organically if they remained respectful of local autonomy. The impasse between local autonomy and national activist goals, as well as the desire to create a national movement, set the stage for environmentalists involved in *Technology and Humans*. Writer-activists in the magazine engaged the tension between local and national levels from a different perspective that emphasized the need for a meta-critique of government abuse and economic inequality. Still their goal was the same as those who attended the symposium: to help unify a heterogeneous coalition of different movements that would emerge organically from localized activism.

By engaging the tension between local and national visions for environmentalism in *Technology and Humans*, as representative of a broader phenomenon, I provide a historical account of what made “genba” a central focus for activism. Recent scholarship has either used the concept of genba as a framework for scholarly analysis of international environmental issues or hoped to provide the concept of genba to activists as a means to escape impasses within environmentalism. In a special issue of *Positions*, Lisa Onaga and Harry Yi-Jui Wu, in collaboration with other Asian Studies scholars, put forth “genba” as an analytical framework for looking at the intersection of different forms of environmental knowledge and actors across Asia. In particular, these scholars are interested in citizen scientists and scientific activity that occurs at the margins of professional scientific activity—such as the farmer-turned-pollution-investigator encountering a scientist with a biology Ph.D. at a genba affected by industrial pollution. Onaga and Wu explore how interactions at genba reveal the instability of categories like “science,” and they find positive political possibility in the spontaneous mixing of people from different scientific and political practices that occurs at these sites.²⁵

²⁵ Lisa Onaga and Harry Yi-Jui Wu, “Articulating Genba: Particularities of Exposure and Its Study in Asia,” *positions* 26, no. 2 (May 2018): 203-204.

While I am interested in the positive possibilities Onaga and Wu’s analysis of genba present, in this dissertation I am concerned with how genba environmentalism developed out of particular historical conditions and how the economic and political instabilities of the 1970s presented for environmentalists of the time an opportunity to push for fundamental social change. It is this moment of possibility that I believe scholars are now attempting to recuperate. My analysis of *Technology and Humans* looks back to the early environmentalists who adopted the concept of genba in the 1970s, which laid the groundwork for the late 2010s reintegration of genba into scholarship on environmental degradation in the Asia. In fact, Onaga and Wu use the term “genba” in a similar fashion to *Technology and Humans*’s use of the term fifty years prior. *Technology and Humans*’ writers, for instance, understood genba as sites where meta-narratives, such as those behind economic developmentalism and scientific progress, and narrow definitions of fields of knowledge, like science, broke down in the muck and mire of toxicity and activism. I show how the environmentalist focus on genba emerged historically from a reaction against economic development paradigms and the way science was practiced in Japan.

In the same issue of *Positions*, Robert Stolz analyzed how the concept of genba functioned in Japanese environmentalism. Stolz, however, is interested in how over the last few decades Japanese scholarship on the Minamata Pollution Case, called “Minamata Studies” (*Minamatagaku*), has shifted the object of environmental analysis from pollution victims to the town of Minamata as a specific site or “genba.” The virtue of this shift, according to Stolz, is that it moves away from a simplistic and inadequate narrative of bodies victimized by factories to a more comprehensive view environmental degradation. He argues that this change in focus foregrounds the relationship between “national development”—that is, state-led economic

development policies—and “toxicity” and reframes pollution as caused by postwar industrial expansion and the capitalist logic behind it.²⁶

Based on my analysis of *Technology and Humans*, I believe that recent work in the field of Minamata Studies, analyzed by Stolz, represents a revival of the genba-focus of environmental writer-activists in the 1970s and a return to their fundamental critique of state developmentalism and capitalism. Lisa Onaga and Harry Yi-Jui Wu’s scholarship also indicates a return to the same scientific questions and criticisms that genba environmentalists of the 1970s raised. The fact that we are revisiting genba fifty years later is prompted by the unresolved nature of *Technology and Humans*’ inquiry. What the magazine’s writers attempted to do was overcome the system of economic developmentalism and break down the beliefs and forms of knowledge, scientific and otherwise, that supported it. If ‘70s environmentalists aimed to displace economic growth and progress, especially scientific progress, as the driving forces of global society in order to instead build a more organic and sustainable way of life derived from the perspective of genba, then their failure to accomplish this goal explains the current interest in revisiting their methods. This is especially true as human society faces unprecedented climate change today.

V. Outline of Chapters

In the dissertation, I follow the elements of genba-based environmentalism by beginning with their perspective on science and engineering, then evaluating the environmental critique of economic development to emerge at last at the rural communities that animated many urban writer-activists into action. Chapter One begins with the story of *Technology and Humans* and the engineers and scientists who stepped out of their professional boundaries to become activists.

²⁶ Robert Stolz, “Money and Mercury: Environmental Pollution and the Limits of Japanese Postwar Democracy,” *positions* 26, no. 2 (May 2018): 246-247

In that chapter, I focus on how *Technology and Humans* contributors reimagined science as a discipline and what a scientist should be. Chapter Two continues that story by exploring how environmentalism prompted a revolt among ecologically conscious scientists and engineers against both industrial science—or “Big Science”—as well as the role played by the state in promoting large-scale technological development in the service of private profit.

Chapter Three discusses how Big Science “giantized” (*kyodaika*) industrial production and gave birth to toxic monsters in the form of polluting petrochemical complexes known as “combines” (*konbinaato*). In that chapter I unfold the environmental critique laid out in *Technology and Humans* of economic developmentalism and industrial expansion as a contestation over geography and how the state imagined space. Environmentalists deployed the perspective of *genba*—of valuing the particular characteristics of communities and geographic spaces—against the mindset of government planners and politicians who imagined restructuring geography and society to fit their visions of economic growth.

In Chapter Four, I examine *Technology and Humans* documentary-style reports on rural *genba*, in order to show how the tension between local autonomy and national movements against developmentalism played out on the pages of the magazine as the writers considered *genba* across Japan. The contributors believed that urban life had been degraded by new technologies and systems of control derived from new forms of labor and consumption, which in turn made urban residents and workers less and less likely to organize for social change. This belief prompted environmental writer-activists to seek out a possibility for resistance among rural activist movements. I explore how a nostalgia for rural communalism played into the development of *genba* environmentalism among the magazine’s writers as a particular historical response to the problems of economic developmentalism and scientific modernization. By way

of conclusion, I look at the second half of the decade to explain how the 1973 Oil Crisis prompted a shift in public attention away from environmental issues, allowing the state to move in and co-opt environmental rhetoric, which would ultimately green-wash Japan.

Chapter One

Genba Environmentalism: Reimagining Science at the Margins of the Scientific Wasteland

I. Introduction

In the early 1970s, the newly minted environmentalists who collaborated in the magazine *Technology and Humans* (*Gijutsu to ningen*, 1972-2005) challenged the vision of “scientific modernization” that had dominated Japan’s postwar economic recovery. That vision held that scientific and technological progress, achieved through extensive government and private investment in industrial science, would provide an unproblematic pathway to sustained economic growth and improved social well-being. Moreover, it held, technological progress would be married to an equally “scientific” and “objective” governance based on technocratic planning. In the 1950s and ‘60s, the architects of Japan’s postwar industrial expansion had attempted to implement such a vision in order to rebuild the economy. They legitimated their project to modernize society and economy by asserting that their governance was scientifically objective, akin to what scientists did to uncover the laws of nature.¹ Government planners, scientists, academics, and politicians were animated by the dream of unlimited progress and humanity’s final scientific mastery of nature.² It was a dream shared by many of the so-called developed

¹ Vic Koschmann argues that the dominant view of modernization, held by “influential people throughout Japanese academia, government, and even private industry,” was influenced in part by the prewar school of Kōzaha Marxism. Kōzaha Marxists understood modernization to be both a human project and a scientifically objective process. The former meant that modernization would improve people’s daily lives by reducing poverty and increasing social wellbeing. But it was also scientifically objective in that the progress of humanity to more advanced levels of civilization operated like a law of nature. I think this combination of scientific objectivity and humanism is key to understanding the postwar vision of modernization. Vic Koschmann, “Modernization and Democratic Values: The ‘Japanese Model’ in the 1960s” in Nils Gilman ed., *Staging Growth: Modernization, Development, and the Global Cold War* (Amherst: University of Massachusetts Press, 2003), 237-245.

² A number of scholars have written on the postwar Japanese development state and its basis in rational planning. A few important examples include: Chalmers Johnson, *MITI and the Japanese Miracle: The Growth of Industrial Policy, 1925-1975* (Palo Alto: Stanford University Press, 1982); Laura Hein, *Fueling Growth: The Energy Revolution and Economic Policy in Postwar Japan* (Cambridge: Council on East Asian Studies, 1990); and Scott O’Byrne, *The Growth Idea: Purpose and Prosperity in Postwar Japan* (Honolulu: University of Hawai’i Press, 2009).

countries in the decades after World War II when humanity's scientific achievements appeared to herald the fruition of human progress and modernity.

In Japan the dream of scientific modernization appealed to a country reeling from the irrationality of fascism and postwar starvation, to which *scientific* rationality offered an attractive solution. The scientist became the redemptive figure of Japan's postwar democratization because scientific modernization was at the heart of the postwar definition of democracy. It was the scientist that was supposed to rescue Japan from wartime starvation and destruction by leading the way to a modern, high-technology society, or so many hoped. Biologist Nakamura Teiri wrote that in the immediate postwar period, "[Japanese society] venerated the rationality of science and technology as the antithesis of wartime nationalism and Emperorism, which had been poisoned by romanticism."³

The embrace of science as a cure for violent authoritarianism in turn made the shock of industrial pollution all the more earth-shattering, for it revealed the human and ecological sacrifices that a techno-scientific utopia required. Rather than scientific utopia, scientific modernization had rendered Japan a scientific wasteland (*kōhai*).

In this chapter I track the emergence of "*genba* environmentalism" by examining the writings of Japanese scientists and engineers who participated in environmental activism. While *genba* environmentalism was not tied to any particular profession, group, or institution, scientists played a central role the environmentalist movement and in the magazine *Technology and Humans*. The pollution crisis destabilized the worldview of scientific modernization and forced scientists and the Japanese public alike to question the utopian vision attached to science—many

³ Nakamura Teiri, "Sengo kagakugijutsushaundō rokujūnendai no kagakusha undo," *Gijutsu to ningen* (September 1977): 145.

for the first time in the postwar period. The worldview based on scientific modernization had justified the industrial expansion that created widespread environmental devastation. To resolve pollution, the magazine's scientists believed that they and their colleagues would have to become political activists in solidarity with communities affected by pollution to protect these communities and the future of the global environment. This meant that scientific practice and technological development would also have to change, and scientists wrote extensively about the "corrupted" status quo of science and its role in environmental disruption.

At the intersection of activist scientists and Japan's new environmentalist movements, scientists and activists together created a new vision for Japanese society that was not based on scientific modernization. If the overarching vision of techno-scientific modernization had failed, as environmentalists believed it had, then scientists and activists responded in the 1970s by going in the opposite direction of grandiose visions: toward the granular, the concrete, the "*local*." *Technology and Humans*' environmentalists disputed the promises of scientific modernization by reimagining Japanese society from what they called, in Japanese, the "*genba*:" the communities, workplaces, and natural sites affected by industrial pollution. "*Genba*" means "the site" and "the local place," but, within environmentalist thought, activists used it as a term of art for "the site of *real* activity," or, more precisely, "the place where things were *happening*." Through "*genba*," ecological activists developed an environmentalism centered on the ecological spaces and communities that had been systemically sacrificed to or marginalized by economic progress and scientific modernization. According to *genba* environmentalists' ethos, in order to understand the ecological disaster of the present, one had to confront the crisis at the poor fishing communities, in the toxic factory floors, in the experience of victims, and in any place affected by pollution.

Why was the concept of “*genba*” indispensable for scientists who aimed to reimagine scientific practice as a response to the pollution crisis? The epistemology and worldview of scientific modernization understood reality as a mechanical system in which different *genba* were fundamentally interchangeable and, therefore, unimportant. *Technology and Humans*’ scientists aimed to transform that worldview, to shift the dominant perspective of society and nature. They believed the world was defined by a chaotic interdependency between human activity and nature. Adopting an early ecological perspective, *Technology and Humans* understood reality as a dynamic web of interrelated events rather than a mechanical structure.⁴ It was through *genba* that *Technology and Humans*’ contributors believed they could shift the dominant worldview from a mechanistic one to a dynamic ecological one by bringing together the work of heterogeneous groups at different *genba* into a collective movement. *Genba* were the locus of those events and humanity’s interdependency with nature. This meant that each *genba* was unique and particular. Comprehending a dynamic world built on human-nature interactions would require attending to each *genba*. While historians and other scholars have often framed environmental degradation as a consequence of humanity’s effort to separate itself from nature and therefore dominate it, for *Technology and Humans*’ environmentalists, ecological violence resulted from being disengaged from *genba*.⁵

⁴ Physicist Fritjof Capra, building on Thomas Kuhn’s theory of “scientific paradigm shifts,” argues for a “social paradigm shift” from a general worldview based in the mechanistic view of nature and society to an ecological paradigm that sees all organisms (and societies) as a part of an independent network or networks. I argue that *Technology and Humans* aimed to create such a shift in both science and in Japanese society’s overall worldview, in part by transforming dominant scientific paradigms. However, unlike Capra, *Technology and Humans* remained committed to an anthropogenic worldview. Fritjof Capra, “Systems Theory and The New Paradigm,” in Carolyn Merchant ed., *Ecology* (Amherst: Humanity Books, 2008), 366-372 and Fritjof Capra, *The Web of Life: A New Scientific Understanding of Living Systems* (New York: Anchor Books, 1996), 3-13.

⁵ Robert Stolz and Brett Walker make this argument in their analyses of the history of pollution in Japan in *Bad Water* and *Toxic Archipelago*, respectively. See Robert Stolz, *Bad Water: Nature, Pollutions, and Politics in Japan, 1870-1950* (Durham: Duke University Press, 2014) and Brett Walker, *Toxic Archipelago: A History of Industrial Disease in Japan* (Seattle: University of Washington Press, 2010). See also David Grierson, “The Shift from a

I historicize *Technology and Humans'* *genba*-based environmentalism as a particular claim about how knowledge of society and nature ought to be produced, on the one hand, and about how environmental activism ought to be based in the communities and spaces affected by pollution, on the other hand. If scientific modernization and the perspectives of the Japanese government were “abstract,” then *genba* purportedly offered environmentalists a perspective that was tangible, concrete, and, indeed, empirical. *Genba* offered the total picture; scientific modernization offered an incomplete one. Within Japanese environmentalism, there was a turn toward localized settings and the communities based there, but, as I argue in this dissertation, Japanese environmentalists understood environmental issues as more than simply localized problems. *Technology and Humans'* environmentalists framed scientific modernization as a mystification of Japanese society, a false or partial knowledge of the complexities of nature, humanity, and their interconnectedness. The method of scientific modernization, they argued, produced knowledge by “disengaged” experts in narrowly defined fields, such as government planners, academics, or scientists. These technocratic experts claimed to be neutral and objective in order to assert their authority to create “accurate” knowledge of human society and to plan future socio-economic development. Environmentalists, however, were convinced that one could produce an accurate and holistic knowledge of society only by engaging with particular *genba* and through the accumulated knowledge and experience connected to these places.

The pollution crisis and the resulting conflict over science were deeply personal for *Technology and Humans'* scientists. The 1970s pollution crisis precipitated a personal and professional crisis for scientists who would contribute to the magazine and many others who

Mechanistic to an Ecological Paradigm,” *International Journal of Environmental, Cultural, Economic, and Social Sustainability* 5, no. 5 (2009): 197-206.

became environmentally conscious as a result of it. *Technology and Humans*' scientists had begun their careers in the heyday of scientific modernism in the 1950s and '60s. Biologist Nakamura Teiri recalled in *Technology and Humans* how public and scientists alike had expected scientists to bring "scientific enlightenment" to Japan in order to support its postwar democratization. The underlying assumption was that science was "an absolute good" (*zettai zen*) and any further consideration of social impacts would be unnecessary because, after all, science could only be progressive.⁶ Scientists were driven by an unrelenting optimism in scientific progress, only to have it shattered when forced to confront how the technologies that they had helped create produced widespread toxicity and innumerable human casualties. It was this personal narrative of "rupture" in the ideology of scientific progress that animated the drive to reimagine and reinvent what engineers and scientists did.

The scientists and engineers who wrote in *Technology and Humans* responded to the pollution crisis by turning inward, investigating the status of science and technology and the part played by scientists and engineers in producing toxic waste.⁷ They challenged the image of the scientist as a neutral, objective figure of authority who was "disengaged" from everyday life. Indeed, this image had supported the idea that science was omnipotent. *Technology and Humans*' scientists argued that it was this definition of the scientist that kept actual scientists from engaging with environmental and social issues. The magazine's writers sought a means to transform the scientist/engineer, what one *Technology and Humans* writer called the "technocratic animal," into a socially conscious being who could help wrest control of science

⁶ Nakamura Teiri, "Sengo kagakugijutsushaundō rokujūnendai no kagakusha undo," *Gijutsu to ningen* (September 1977): 145.

⁷ The contributors to the magazine that I analyze in this chapter self-identified as engineers, scientists, former engineers, educators with a science background, or theorists of science-technology. I also use "contributors" and "writers" to refer to them for stylistic reasons.

and technology from the corporate enterprises that misused them and produced the pollution crisis.⁸ They aimed to regain control by linking scientists to the *genba* that had been made toxic by industrial pollution. Scientists reimagined science by going out of the domain of state and private industry and into the chaotic, subjective, and now toxic world of everyday life and nature. *Technology and Humans* envisioned the scientist/engineer-as-a-figure-of-political-activism as one stratum in solidarity with different environmental activist groups. In effect, they wished to flip the narrative from rural exploitation for the sake of urban prosperity to that of a powerful alliance between the rural anti-pollution activists and politically active urban engineers and scientists.

As this chapter is dedicated to the scientific participants in *genba* environmentalism, I begin with the history of *Technology and Humans* as scientists and engineers stepping out of their conventional roles to tackle the pollution crisis and the role of science in creating it. Through their personal narratives, I detail how these scientists used *genba* as the basis for a “totalizing” and “concrete” knowledge of society in order to contest the “false” forms of knowledge against which they argued. From their critique of the “myth of scientific modernization,” scientists attempted to reshape the beliefs and values behind scientific practice in order to create a more accurate public understanding of science—to make it serve “human” interests rather than private profit and state power. In the final section of this chapter, I show how the scientific and political problems encountered in evaluating and resolving pollution prompted scientists to deploy *genba* in the very methodology of science.

II. Heavier Metals: The History of “Technology and Humans” and Genba

⁸ Okuno Takeo use the phrase “technocratic animal” as a play on the popular foreign media designation of Japan as an “economic animal,” praising its economic success while criticizing the narrowness and inhuman nature of its singular focus on economic development. Okuno’s remark implied that it was Japan’s singular focus on technological development without regard for its consequences that determined its current historical predicament. Okuno Takeo, “Gijutsusha nanatsu no daizai,” *Gijutsu to ningen* 1, no. 1 (Spring 1972): 75.

Technology and Humans (*Gijutsu to ningen*, 1972-2005) grew out of the trade publication, *Metals* (*Kinzoku*, 1931-), a magazine edited by engineers working in the various metals industries, including steel, iron, and nonferrous metals. *Metals* was a quotidian industry magazine that primarily covered technological developments and only rarely stepped into controversial subjects or political commentary.⁹ There were economic reasons for this. The publisher, Agune, depended on revenue from companies in the metals industries, and content that slid into controversial or critical themes threatened advertisement revenue. More important, the magazine's engineers and scientists tended to separate scientific topics from the big political issues of the day and spent little time discussing the political aspects of science. Like most scientific experts in Japan at the time, *Metals'* contributors thoroughly embraced the idea of scientific progress (*kagaku shinpo*) as an absolute good that would improve society regardless of how much one philosophized over it. This meant that the political questions related to science and technology had already been settled and that there was no need to worry over the impacts of new industrial and commercial applications for science.

Nonetheless, faced with the complicity of engineers and scientists in creating the horrors of Minamata, the infamous methylmercury pollution case at the forefront of the '60s environmental crisis, and other pollution-related diseases at the end of the 1960s, *Metals'* editor-in-chief and an engineer himself, Takahashi Noboru, decided that engineers could no longer remain silent on environmental issues. Takahashi began working on what would become the magazine *Technology and Humans* in 1970 (first published fall 1972) under a simple provocation: he and his collaborators believed that scientists and engineers could no longer narrowly focus on research and technology. Instead, having witnessed the harms they had

⁹ Proper credit and thanks go to Professor William Marotti for suggesting the title "Heavier Metals."

created, they must think of the social and environmental impact of their work and, by doing so, transform science and engineering.¹⁰ *Technology and Humans* would provide an important space for scientists and engineers to advocate for political causes and discuss pressing problems related to technology, science, and pollution with individuals and organizations outside of the scientific community.

The origin story of *Technology and Humans* and its *genba* environmentalism begins with the rupture that a subset of scientists and engineers experienced in their faith in scientific modernization and the apoliticality of science and technology. The history of *genba* environmentalism was intimately linked to scientists and engineers stepping out of their traditional roles in order to inject social and political issues into science and bring science back down to the muddy terrain of everyday life. Indeed, having witnessed industrial pollutants harm Japanese citizens, scientists contributing to the magazine felt that they had to break with a scientific practice that could only address the question of “what is” and instead ask the question “what ought to be done” and “based on what values?”¹¹ These scientists and engineers stepped out of the accepted postwar role for the scientist-as-expert, who carried out scientific research in isolation from social and political considerations, and instead began writing critical commentary on social issues that combined environmental, political, economic, and scientific perspectives. But the point was not to shift the weight of scientists’ authority to social commentary. These scientists confronted what historian Steven Shapin identifies as the historical “oddity” that

¹⁰ The first issue of the journal appeared in April 1972, but the editors had begun work on it in 1971. According to the magazine’s primary editor, Takahashi Noboru, it was generally received as a magazine covering pollution-related issues. The first issue sold 10,000 copies. Takahashi Noboru, “Hajime ni,” in *Gijutsu to ningen’ ronbunshu: toitsuduketa genshiryoku 1972-2005*, eds Takahashi Noboru, Amagasa Keisuke, and Nishio Baku (Tokyo: Otsuki Shoten, 2012), 7-8. Takahashi Noboru, “Atogaki,” *Gijutsu to ningen* 1, no. 1 (Spring 1975): 144.

¹¹ Steven Shapin, *The Scientific Life: The Moral History of a Late Modern Vocation* (Chicago: University of Chicago Press, 2008), 1-12.

scientific authority should be derived from the supposed “impersonal” nature of scientific work—that scientists’ work is about objectively unearthing the mysteries of the universe and therefore utterly disconnected from not only the personal characteristics of the scientists but also his or her time and place, the political and social context in which scientific knowledge is made.¹² Shapin writes about the depersonalization of scientists in the United States and Europe and the concerns expressed by scientists and non-scientists about this trend. In the 1970s, Japanese scientists participated in this international critique of scientific practice. *Technology and Humans*’ scientists and engineers questioned where that scientific authority came from and why the scientist was supposed to be aloft from ordinary citizens and ordinary perspectives, especially rural and urban residents who had been victimized by pollution. Thus, they believed that their magazine had to include the perspectives of “ordinary people” and the experts, scientific or otherwise, had to visit the *genba* that techno-scientific progress had polluted.

The first experiments with political and environmental commentary began on the pages of *Metals*. In 1970 and 1971 Takahashi Noboru spearheaded two special issues that addressed environmental and technological topics from a critical perspective. After witnessing the horrors of pollution cases and reflecting that the metals industry was a major culprit (*genkyō*) of pollution, Takahashi believed he and other engineers had a responsibility to address the problem. The two experimental issues, entitled “Japan’s Engineering Dominance” and “Reinvestigating the Era of Science and Technology,” sold well but concerned *Metal’s* advertisers, who were generally the same heavy industries critiqued therein.¹³ Takahashi had hoped that these special

¹² Steven Shapin, *The Scientific Life: The Moral History of a Late Modern Vocation* (Chicago: University of Chicago Press, 2008), 1-6.

¹³ “Nihon no gijutsuryoku,” *Kinzoku* 40, rinzō (October 1970): 1-199 and “Kagaku gijutsu jidai no saikentō,” *Kinzoku* 41, rinzō (June 1971): 1-180.

issues would help to shift the focus of *Metals* from scientific content and industry news to tackling the major social problems, but *Metals* proved “too closely tied to industry” (*kigyō bettari*).¹⁴

Although *Metals* proved too brittle to be welded into a new form, its publisher, Agune, was surprisingly willing to test the waters with a new magazine. The publisher’s main ambition for the magazine that would become *Technology and Humans*, beyond attaining higher sales than *Metals*, was to create a space for engineers to explore what changes Japan’s major industries could make in order to resolve the problems that pollution posed for industrial viability, thus expanding the lifespan of said industries.¹⁵ Agune, unlike Takahashi and *Technology and Humans*’ contributors, still viewed heavy industries as a force for modernization and positive social change and was primarily interested in preserving the future of Japan’s industrial sector while expressing concern for environmental disruption. In many ways reflective of the Japanese government’s environmental policies, the publisher was interested in how to address environmental concerns without negatively affecting industrial growth. Takahashi did not share this ambition. Nonetheless, the publisher gave him full control over editorial content and even approved of the magazine’s test “Issue Zero,” which would later become Issue One of *Technology and Humans*, an issue that was highly critical of the Japanese government and leading industrial corporations. The issue sold well enough to satisfy Agune.¹⁶

Technology and Humans launched in the spring of 1972 as a quarterly magazine.

¹⁴ Sugioka Sekio, Tanaka Kimio, and Tanno Kiyoshi, “50 gōkinen zadankai: *gijutsu to ningen* 50 gō no kiseki,” *Gijutsu to ningen* (September 1977): 47.

¹⁵ Sugioka Sekio, Tanaka Kimio, and Tanno Kiyoshi, “50 gōkinen zadankai: *gijutsu to ningen* 50 gō no kiseki,” *Gijutsu to ningen* (September 1977): 50.

¹⁶ Sugioka Sekio, Tanaka Kimio, and Tanno Kiyoshi, “50 gōkinen zadankai: *gijutsu to ningen* 50 gō no kiseki,” *Gijutsu to ningen* (September 1977): 49.

Fukazawa Takeo, an independent writer who collaborated with the magazine, recalled that the first issue took two and a half years from conception to initial publication as a result of Takahashi Noboru's perfectionism.¹⁷ His excessive diligence proved worth it in the end. Because it was published by technology-focused Agune, booksellers regulated it to the physics or technology aisles, the first issue nonetheless sold ten thousand copies, a resounding success for all involved. From eighth issue (Winter 1974) onward, sales stabilized at around 6,000 copies per issue.¹⁸

Takahashi Noboru and the other founding editors, Katai Takeo and Amagasa Keisuke, feared that including advertisements from large, industrial companies, as Agune required, would blunt their critical content and put the magazine on precarious financial footing. Nonetheless, the first eight issues of the magazine contained corporate advertisements as a compromise with the publisher. Readers, for their part, did not fail to notice the incongruity. The second issue published letters from readers who complained about seeing excellent critical content next to advertisements for some of Japan's biggest polluters.

The relationship with Agune proved short-lived, and the magazine's break with the company reflected broader concerns that environmentalists had over the media landscape. Takahashi and the other editors desired to publish *Technology and Humans* on a monthly basis and break free of its corporate advertisers, but, due to Agune's resistance, they faced either shutting down or spinning off into their own publishing company. In November 1974, the editors settled on the latter and created a new publishing company named after the magazine, which

¹⁷ Sugioka Sekio, Tanaka Kimio, and Tanno Kiyoshi, "50 gōkinen zadankai: *gijutsu to ningen* 50 gō no kiseki," *Gijutsu to ningen* (September 1977): 50.

¹⁸ Takahashi Noboru, Nishio Baku, and Amagasa Keisuke, *Gijutsu to ningen ronbunshū: toitsuduketa genshiryoku, 1972-2005* (Tokyo: Ōtsuki shoten, 2012), 9-11.

would publish *Technology and Humans* and numerous monographs and edited volumes related to environmental and technological issues.¹⁹ Beginning with the April 1974 issue of *Technology and Humans*, the magazine stopped taking advertisements from big polluters or corporate sponsors and switched over to its new monthly format. According to Takahashi Noboru, even though Agune supported the publication, the publisher's staff were sure the new publishing company would fail within three months and openly mocked it and Takahashi.²⁰ In fact, *Technology and Humans*—both the magazine and publisher— would continue publishing for over thirty years.

The spat over advertisers went beyond the question of integrity. The magazine's contributors fought to preserve *Technology and Humans* as an open, critical space for a diverse group of authors—including workers, scientists, journalists, and pollution victims—to tell their part of the environmental story because its editors and contributors viewed the news media landscape as incapable of adopting a truly critical perspective or adequately addressing environmental issues. The writers who collaborated in *Technology and Humans* believed that it filled a large lacuna in print magazines, arguing that most critical outlets focused on sales and thought little of the “impact” of their work or how their work could contribute to addressing major political and social problems in Japan. Contributor Hoshino Yoshirō, among others, articulated the problem in terms of the centralization of radio, television, and print journalism into a few major companies and the close and often favorable relationship between journalists and the private and public sectors.²¹ Other contributors argued that *Technology and Humans*

¹⁹ Sugioka Sekio, Tanaka Kimio, and Tanno Kiyoshi, “50 gōkinen zadankai: *gijutsu to ningen* 50 gō no kiseki,” *Gijutsu to ningen* (September 1977): 56.

²⁰ Takahashi Noboru, “*Gijutsu to ningen* ga mezashita mono,” *Gijutsu to ningen* (July 2002): 9-11.

²¹ Hoshino Yoshirō, “Kankyō o sen no kongen: sore ha gōrika dearu,” *Gijutsu to ningen* 1, no. 2 (Summer 1972): 36.

provided a space for leftwing, progressive journalists who had been excluded from the more conservative mainstream media.²² Economist Sugioka Sekio, participating in a roundtable for *Technology and Humans*' fiftieth issue, argued that most popular magazines were superficial, pretending to be progressive on the surface while primarily interested in sales, lacking "enthusiasm for changing the world" and merely following whatever is "popular" or whatever the government says.²³ For Takahashi Noboru, the magazine provided "space for amazing writers to write the things they wanted to write" and to cover issues that mainstream media avoided, such as the dangers of nuclear power, or issues that they failed to cover in adequate depth, including many under-the-radar pollution cases.²⁴ Indeed, photographer Tanno Kiyoshi, who published photo spreads and photo essays in most of the magazine's issues in the 1970s, remarked that, unlike the majority of Japanese magazines, the editors were not heavy-handed in forcing writers to follow a particular direction or viewpoint in order to make their content fit within a narrow framework.²⁵

When *Technology and Humans*' first issue appeared in 1972, environmental magazines were, in the words of editor Amagasa Keisuke, "popping up like bamboo shoots after the rain" in response to the large numbers of pollution cases and to dissatisfaction with mainstream media coverage of pollution. *Technology and Humans*' editors, however, were adamant that the

²² Sugioka Sekio, Tanaka Kimio, and Tanno Kiyoshi, "50 gōkinen zadankai: *gijutsu to ningen* 50 gō no kiseki," *Gijutsu to ningen* (September 1977): 60.

²³ Sugioka Sekio, Tanaka Kimio, and Tanno Kiyoshi, "50 gōkinen zadankai: *gijutsu to ningen* 50 gō no kiseki," *Gijutsu to ningen* (September 1977): 56.

²⁴ Sugioka Sekio, Tanaka Kimio, and Tanno Kiyoshi, "50 gōkinen zadankai: *gijutsu to ningen* 50 gō no kiseki," *Gijutsu to ningen* (September 1977): 54.

²⁵ Sugioka Sekio, Tanaka Kimio, and Tanno Kiyoshi, "50 gōkinen zadankai: *gijutsu to ningen* 50 gō no kiseki," *Gijutsu to ningen* (September 1977): 52.

magazine should not be narrowly identified as “another pollution publication” (*kōgai zasshi*). Instead, they envisioned using the magazine to show the public that environmental and technology-related topics were at the heart of social and political issues. To that end they positioned their magazine in the genre of *Sōgō zasshi* or “general criticism,” providing commentary on economic, political, cultural, social, and, of course, environmental and scientific issues.²⁶ The magazine’s content blended complex scientific articles (*katai*) with free form critical essays from social scientists, journalists, literary writers, and scientists, as well as historical essays and reports on international environmental issues. To their commentary, the magazine’s writers and editors added frequent documentary-style reports on pollution victims and sites, as well as interviews, roundtable discussions, and articles from activists, victims, and workers at pollution *genba*.

The early 1970s was, as Takahashi Noboru put it, “the era when pollution sold [magazines] and when people were receptive” to environmental issues. However, by the time of the magazine’s fiftieth issue in 1977, the public’s interest in environmental issues had waned considerably, and most “pollution magazines” had folded.²⁷ Nonetheless, *Technology and Humans* continued to boast strong sales throughout the 1970s and maintained an audience that mirrored its contributors: scientists, engineers, journalists, anti-pollution activists, university academics, and industrial union activists. The magazine remained an important forum for technology and environment-related commentary, and in the second half of the 1970s and the 1980s, its writers focused heavily on three issues at the intersection of politics, environment, and

²⁶ Sugioka Sekio, Tanaka Kimio, and Tanno Kiyoshi, “50 gōkinen zadankai: *gijutsu to ningen* 50 gō no kiseki,” *Gijutsu to ningen* (September 1977): 51.

²⁷ Sugioka Sekio, Tanaka Kimio, and Tanno Kiyoshi, “50 gōkinen zadankai: *gijutsu to ningen* 50 gō no kiseki,” *Gijutsu to ningen* (September 1977): 50.

technology in Japan: nuclear energy, computers—or rather, their effect on society and work, and biotechnology.²⁸ *Technology and Humans* published its final issue on October 10, 2005. The magazine ended partially as a result of the exhaustion of its longtime editor-in-chief, Takahashi Noboru, who was then in his seventies, and partially out of financial considerations. The magazine had long survived due to a strong subscription base and bookstore sales, but its readership had dwindled to 3,000 readers by the early 2000s and the magazine and publishing company were no longer sustainable at that level.²⁹ Indeed, Takahashi spent a good portion of his speech at the magazine’s thirtieth anniversary symposium in 2002, three years before the end of the magazine, entreating listeners to subscribe to the magazine. If they could just increase their subscriber base by one hundred subscribers, he told them, then they could stay afloat.³⁰

The pollution crisis forced *Technology and Humans*’ scientists and engineers to come to terms with the dark side of scientific progress. They chose to take on the herculean task of challenging the entrenched institutions and practices that defined science in postwar Japan. The scientists’ personal narrative of idealism ruptured by industrial toxicity provided a starting point for a new environmental activism premised on the reinvention of science. But to take on the challenge in its entirety, scientists had to wrestle with the image of science that had made it possible for everything to go so horribly wrong: the image of science as an objectively neutral force for modernization.

III. Genba Environmentalism and “The Ruins of Scientific Modernization”

²⁸ Takahashi Noboru, Nishio Baku, and Amagasa Keisuke, *Gijutsu to ningen ronbunsen: toitsuduketa genshiryoku, 1972-2005* (Tokyo: Ōtsuki shoten, 2012), 9-11.

²⁹ Hoshno Yoshirō, “*Gijutsu to ningen wo hokori to suru*,” *Gijutsu to ningen* (July 2002): 6-8; Takahashi Noboru, “*Gijutsu to ningen ga mezashita mono*,” *Gijutsu to ningen* (July 2002): 9-11.

³⁰ Hoshno Yoshirō, “*Gijutsu to ningen wo hokori to suru*,” *Gijutsu to ningen* (July 2002): 6-8; Takahashi Noboru, “*Gijutsu to ningen ga mezashita mono*,” *Gijutsu to ningen* (July 2002): 9-11.

The ethical failures that precipitated Japan's pollution crisis provided a clear rationale and motivation for *Technology and Humans'* scientists and engineers to participate in environmental activism. However, understanding the political, economic, and scientific conditions that produced environmental disruption was a daunting task. In search of a method for comprehending environmental disruption, scientists turned outward and inward. They reached out to the people of *genba* that had been simultaneously neglected and harmed by the scientific community. Simultaneously, scientists turned inward to question the institutional and social conditions under which scientists worked in order to ascertain how pollution-related harms had proliferated under their noses. As Takahashi Noboru's story demonstrated, the scientists who collaborated with *Technology and Humans* at its inception were animated by their belief that it was the "disconnected" nature of scientific research and technological development—disconnected from social issues in general and the specific *genba* that suffered from pollution in particular—that was one of primary causes of the environmental crisis. *Genba* environmentalism sought to knock science from its lofty heights of neutrality and objectivity and treat it as embedded in and determined by the vulgar socio-political contexts from which it was supposed to be free. *Technology and Humans'* editors and contributors developed their *genba* environmentalism in the first half of the 1970s, and it would remain the backbone of *Technology and Humans'* critical stance throughout its existence.

Here I will analyze how scientists framed environmental disruption as produced by the "corrupted" science behind Japan's postwar heavy industries boom and why *genba* environmentalism provided an attractive solution to corrupted science for *Technology and Humans'* contributors. At the heart of the contributors' critique was a belief that the public, government, heavy industries, and scientists themselves had profoundly misunderstood what

science and technology could do and, based on that misunderstanding, produced a “false” understanding of how human civilization could progress by means of a reckless and unregulated scientific development—the perspective that they called “scientific modernization,” which the magazine’s contributors believed had become deeply ingrained in Japanese society. *Technology and Humans*’ scientists were highly critical of the idealistic belief that science would always be a progressive force for modernization. This fundamental misinterpretation of science, as they saw it, provided a cover for the exploitation of science by private business interests and the Japanese government and an excuse for ignoring potential safety concerns, of which environmental disruption was perhaps the gravest consequence. It was up to scientists to correct those false views under the belief that changing how the public understood science would spur scientists and ordinary citizens to advocate for utilizing science and technology in a less destructive and more “humane” manner.

At the 2002 symposium celebrating the thirtieth anniversary of *Technology and Humans*, sociologist Furihata Setsuo, whom the magazine invited to give a paper, commented on the magazine’s legacy and its *genba*-based approach. Furihata both praised and critiqued *Technology and Humans* for “thoroughly adhering to the principles of *genba*” (*tetteiteki ni genbashugi ni rikkyaku shite*) in its work. However, Furihata argued that the magazine’s writers went too far in their attention to environmental and social problems at the microscopic level, producing knowledge of “these issues in a fragmented” manner and failing to produce a holistic criticism or macro perspective. *Technology and Humans*, Furihata argued, was a product of activist politics in the 1970s, which focused on local autonomy and gathering intensive empirical information at the site (*genba*) while staying attuned to the experiences of those who lived or worked at

pollution *genba*.³¹

Furihata's critique identified two important problematics for early 1970s environmentalism. First, *Technology and Humans* made an argument about what constituted proper knowledge of "concrete reality" (*gutai teki genjitsu*)—what is really happening at particular places of environmental concern, which had to be based on an empirical engagement with the *genba*. Second, however, was the question of the object and scale of that knowledge—was it simply understanding the micro-level pollution that permeated local *genba*, or did the magazine's writers aim to compile a more a complete understanding of society and environment? In Furihata's mind *Technology and Humans* had produced excellent analysis of particular problems and places but had failed to connect the dots.

Furihata's critique spoke to the inherent tensions between microscopic and macroscopic perspectives encountered in the practice of *genba* environmentalism. *Technology and Humans'* environmentalists, I argue, did have the goal of producing a holistic knowledge of society and environment from their version of *genba* activism. However, the magazine's vision for that total knowledge was not one that could be captured in a singular narrative, a social-science theory, or even a scientific interpretation. Instead, totalizing knowledge was meant to be a collage of hard, empirical facts and localized (*genba*) experience stitched together with systemic critiques of science, economy, and state power. Furihata was both correct and incorrect. There was no neatly arranged narrative in *Technology and Humans*, and the point of "*genba*-ism," as Furihata called it, was to develop analytical strategies that did not depend on overarching interpretative or political narratives. Nonetheless, the magazine's contributors aimed to create a "complete" knowledge of society and environment through the format of the magazine itself, as a constantly

³¹ Furihata Setsuo, "*Gijutsu to ningen to Shakaikagaku*," *Gijutsu to ningen* (July 2002): 45-46, 56.

changing written space where one could witness a dialectical relationship between particular *genba*-based analyses.

The desire for a complete knowledge of socio-political and environmental issues was plastered across the magazine's cover: "A holistic magazine that tackles the most important issues of our time" (*gendai ga tou mono ni idomu sōgō zasshi*). This slogan, which appeared on the cover of every *Technology and Humans* issue from 1974 onward, was a simple declaration of the magazine's intention to be a "generalist magazine" (*sōgō zasshi*) that provided critical analysis of the most pressing issues "of [its] time" from a *holistic* perspective. Although created by individuals with extensive scientific backgrounds, the magazine's founders and many of its contributors were animated by the belief that to comprehensively resolve the environmental and societal problems of the present one had to have a holistic approach and holistic knowledge. No problem was purely technical or environmental; all pressing societal issues were cultural, economic, social, scientific, political, and environmental. Good understanding and good solutions required engaging all of those elements. Science and the scientist were brought into this integrative and critical perspective.

Technology and Humans' emphasis on holistic knowledge had certain parallels with the contemporary journal *Research on Environmental Disruption (Kōgai kenkyū)*, founded in 1970 by Tsuru Shigeto, Miyamoto Ken'ichi, and others in order to tackle environmental issues. What distinguished the two was their specific approaches to holistic knowledge. *Research on Environmental Disruption*'s editors were committed to interdisciplinary research as the best means to understand and resolve environmental problems.³² *Technology and Humans*' version of

³² See the roundtable discussion "Environmental Problems and Interdisciplinary Cooperation" from *Kōgai kenkyū* no. 1 (Summer 1971): 7-16.

holistic knowledge, however, exceeded the parameters of expertise and scholarly disciplines. Rather than integrating research findings from different fields, *Technology and Humans* sought to combine a variety of perspectives from not only academics and researchers but also activists, residents of polluted areas, industrial workers, frontline industrial engineers, and others. They imagined all these groups to be connected to particular *genba*, able to imbue the magazine's "holistic" approach with their *experiential* knowledge.

Take for example the magazine's very first issue. The editors published two special features that blended diverse perspectives on environmental degradation with a deep analysis of the industrial engineering profession and the politics of engineers. The first feature, entitled "The Dying Seto Inland Sea" (*hinshi no seto naikai*), aimed to provide a comprehensive analysis of the environmental collapse of Japan's largest inland sea, one of its most remarkable natural treasures. The articles in the Seto feature covered a wide range of perspectives. They included a report on fish pollution from a local activist from northern Kyushu, an interview with members of rural fishing community on their pollution-related medical conditions near Mizushima, a scientific and political analysis of the causes of the Seto's environmental deterioration, and a documentary-style report on industrial pollution and local resistance. The latter two articles were written by scientists.³³ The second feature was entitled "Investigating the Way of Life of Industrial Engineers" (*kigyōnai gijutsusha no ikikata wo tou*). The feature included an engineer's critique of "Engineer's Ethics"; an historical analysis of engineers' daily lives in the late nineteenth century; and a discussion among engineers who had graduated from technical high schools, rather than universities, concerning the discrimination they faced.³⁴ The magazine's

³³ "Hinshi no seto naikai," *Gijutsu to ningen* 1, no. 1 (Spring 1972): 6-37.

³⁴ "Kigyōnai gijutsusha no ikikata wo tou," *Gijutsu to ningen* 1, no. 1 (Spring 1972): 70-97.

second issue added another special feature on the environmental degradation and economic inequality created by Japan's centralized economic development planning (*sōgō kaihatsu*).

In each issue *Technology and Humans* launched a multi-pronged attack against the immediate societal crises—such as pollution in the Seto Inland Sea—and their deeper causes. The format of the magazine itself replicated its contributors' belief that all of these issues were interconnected and had to be handled using a holistic approach that engaged a diversity of perspectives. The three early special features, for example, addressed different but interrelated topics that included the environment, economics, politics, science and engineering, and labor, among others. Many of the articles drew on the direct experiences of their authors. *Technology and Humans* remained committed to this approach throughout its existence.³⁵

Technology and Humans' environmentalism was a part of the global moment of the early 1970s, when political activists as well as scholars around the world questioned or outright rejected the ability of overarching narratives—whether they were drawn from Western-centric narratives of modernization or Marxist interpretations of historical materialism—to explain historical change and social conflict. In the era of feminist and postcolonial criticism, there was a concerted effort among activists and academics alike to turn to a localized politics based in particular places and groups marginalized by big narratives. Environmentalism in many parts of the globe fit within this genealogy. Indeed, environmentalists in the 1960s and '70s often embraced an ethic of returning to the land and nature or “going local” in order to reestablish humanity's connection to nature and spur urban and suburban residents to embrace an environmental consciousness.³⁶ In *Technology and Humans*, “going local,” however, meant

³⁵ “Desukuwaaku no bōryoku,” *Gijutsu to ningen* 1, no. 2 (Summer 1972): 16-56.

³⁶ Ursula K. Heise, among others, has discussed this historical trend in environmentalism in the United States. See Chapter One in Ursula K. Heise, *Sense of Place and Sense of Planet* (Oxford: Oxford University Press, 2008).

engaging the localized instances of the nationwide pollution crisis and developing strategic forms of activism to contest environmental disruption at local, national, and global levels. *Genba* represented a call to political action at the very sites where the harmful effects of pollution played out.

The Problem with Science

In part, *Technology and Humans'* holistic approach—and how its contributors imagined the linkages between specific *genba*—was based on transforming scientific perspectives and the societal worldviews that emerged from them. In *Technology and Humans'* *genba* environmentalism, the turn to localism was a reaction to the progressive optimism in the modernizing potential of science, technology, and advanced industries that permeated so-called “developed countries” and that had a particularly firm grip on the Japanese public, bureaucrats, business leaders, and scientists in the 1950s and ‘60s. It was that belief in the potential for good science and rational technological development to lift all boats that justified and, according to *Technology and Humans*, drove toxic industrial expansion. The magazine referred to this faith in scientific progress as the “myth of scientific modernization” (*kagaku gijutsu shinwa*), arguing that it had produced a corrupted science that was monopolized by the Japanese state and Japan’s large conglomerations for the expansion of state power and private profit. The magazine’s scientists believed that it was now the responsibility of Japan’s scientists and engineers to obliterate the myth and to imagine a new foundational role for science and technology within modern society.

At the heart of *Technology and Humans'* challenge to scientific modernization—and this is where scientists played a particularly important part—was a fundamental shift away from a

mechanical view of the world to a dynamic ecological one. By calling attention to *genba*, scientists in *Technology and Humans* asserted an ecological worldview that nature and humanity were interdependent and that that interdependency was chaotic, unpredictable, and varied from place to place. One had to understand *genba* because in each place society was dynamically embedded in an ecosystem. Understanding the totality of humanity's interconnection with nature would require attending to the many different versions of that relationship that existed in each place. This was the new ecological perspective that simultaneously emphasized interconnectivity and localism. The perspective of scientific modernization, magazine contributors argued, was uninterested in *genba* because no place in particular mattered. Although different sites may contain different conditions and resources, all places were interchangeable in that they could be refashioned through technology and engineering. Scientific modernization was supported by the early twentieth-century scientific paradigm that through science, and physics in particular, humans could fully describe reality.³⁷ Seeing the world and human bodies as machines authorized humanity's unrestrained manipulation, exploitation, and restructuring of nature.³⁸

In the December 1974 issue of *Technology and Humans*, several scientists dissected the rationale behind scientific modernization, analyzing its history and proposing pathways to challenge its continued dominance of public perceptions and government policy in a special collection of articles entitled "Among the Ruins of Scientific Modernization." In the issue, Isono Naohide, a biologist at Tokyo Metropolitan University, provided a clear articulation of scientific modernization and its problematic definition of science. He defined scientific modernization as a

³⁷ Fritjof Capra, "Systems Theory and The New Paradigm," in Carolyn Merchan ed., *Ecology* (Amherst: Humanity Books, 2008): 366-368.

³⁸ Daniel B. Botkin, *Discordant Harmonies: A New Ecology for the Twenty-First Century* (Oxford: Oxford University Press, 1992).

naïve faith in human progress that authorized excessive economic expansion. Isono wrote, “until very recently no one would have doubted that the belief that ‘once humanity has mastered science (*kagaku wo te ni shita jinrui*) it will be rewarded with a utopian future of limitless progress.” Isono went on: “Humanity willfully ignored the truth about science, believing it to be omnipotent (*bannō*) and using it as a pretext to run wild” with industrial and economic development until the environmental crisis “shook that belief [in an idealistic future] to its core.”³⁹ For Isono, a willfully misguided view of science as all powerful allowed humans to justify excessive economic growth—and what would turn out to be a toxic regime of industrial expansion. Science and the scientist had achieved a “god-like” status in postwar Japan, and the overwhelming optimism in scientific progress’s ability to build a utopian future was integral to economic growth policies that tied the nation’s welfare to industrial technologies.

Technology and Humans argued that the history of modern science, including cultural and professional perceptions of it, had developed around certain “mythical” convictions that scientific achievements were generally safe, objective, and omnipotent. In his contribution to the issue entitled “Among the Ruins of Scientific Modernization,” Isono Naohide broke the “scientific modernization myth” into three component “superstitious beliefs” (*meishin*) at the core of the public’s misconception of science. The first was that “science is omnipotent” (*kagaku wa bannō da*). Isono explained:

Since the birth of modern science, physics and chemistry have continued to reliably disclose the secrets of nature. The application of that expert knowledge—in the form of science and technology—has produced numerous positive accomplishments and carved out modern civilization. What those miraculous achievements has wrought before our eyes has then nurtured the myth of science’s omnipotence.⁴⁰

³⁹ Isono Naohide, “Kagaku no genkai to kagaku kenkyū no tachiba,” *Gijutsu to ningen* (December 1974): 34-35.

⁴⁰ Isono Naohide, “Kagaku no genkai to kagaku kenkyū no tachiba,” *Gijutsu to ningen* (December 1974): 34-35.

The second myth was that “there existed forms of science and technology that provide humans with only desirable outcomes and create no harmful effects.” The division of technology into good science-technology and bad science-technology allowed people to imagine that certain forms of technology, such as medical and pollution prevention, could be produced with little risk. According to Isono, this perspective fatally misrecognized the truth that all technology has “a destructive potential” (*hakaisei*) and “incredible power” (*kyodai chikara*). Instead, he argued that it was inconceivable that any technology could be produced that did not require adequate precaution and attention to its dangers. Categorizing certain technologies as “safe” simply allowed manufacturers to ignore the question of safety.

Isono’s third superstition was linked to “disengaged” science. The superstitious belief was that science was endowed with “an absolute objectivity and absolute neutrality” (*zettai teki na kyakkansei to zettai teki na chūritsusei*) and that “science progresses by eliminating subjective elements, attaining an expertise that transcends time period and point of view and produces a universal truth.”⁴¹ It was this third point that was tied most directly to how scientists were perceived by the public. The belief that science was transcendental shaped scientists’ work. In this interpretation of science, scientists were said to participate in the natural unfolding of human development, where human society slowly reveals the universal scientific truths as if they were following a course syllabus that set out a particular direction for students to follow. According to this perspective, the personal life of the scientist was unimportant and unrelated to scientific discovery. Indeed, good science required eliminating any “personal” and “contingent” elements from scientific research. What mattered was that the scientist was suitably disengaged from worldly concerns so that that he or she could adequately pursue transcendental truths. Ideally, the

⁴¹ Isono Naohide, “Kagaku no genkai to kagaku kenkyū no tachiba,” *Gijutsu to ningen* (December 1974): 34-35.

scientist would simply be a conduit for uncovering and transmitting such truth. Underneath that purported neutrality lay dangerous consequences for scientific development that were masked by the widespread belief in science as inherently a force for good.

The stakes for environmentally conscious scientists were high. As Isono's analysis pointed to, science was a crucial field of contestation over the future of the Japanese economy, as well as the future of its society and the global environment. Indeed, particular interpretations of science and scientific progress provided powerful justifications for the policies and governmental visions that defined Japan's economic development. Although the pollution crisis had made many citizens and scientists question these views of science and progress, Japan's heavy industries and government policymakers remained committed to the scientific status quo and the utopian promise of large-scale, industrial science directed toward private profit in the 1970s. Indeed, even as the Japanese Diet implemented new pollution regulations and the Liberal Democratic Party's government began discussing economic policies that focused on "social welfare" (*fukushi*) and not just growth, the tenets of scientific modernization nonetheless pervaded economic policy and the decision-making behind technological development and industrial expansion.⁴² Both the government and private corporations bet the future of Japan's environment on the ability of scientists and engineers to come up with technological solutions to industrial pollutants under the assumption that they would be able to develop new technologies to limit the production of pollutants, manage industrial waste, and clean up existing environmental damage. In 1975 alone, state and private funding for "pollution prevention technologies" (*kōgai bōshi gijutsu*) amounted to 1.18 trillion yen, about 3.9 billion in 1975 U.S.

⁴² Tsuru Shigeto, among others, has emphasized that pollution policies in Japan focus primarily on immediate technical solutions to pollution-related issues. Tsuru Shigeto, "History of Pollution Control Policy," in *Environmental Policy in Japan*, eds. Shigeto Tsuru and Helmut Weidner (Berlin: Edition Sigma, 1989).

dollars.⁴³ The postwar edifice of corporatized and state-funded scientific research would continue to grow and serve its mission of modernizing Japanese society—but with an addendum that environmental protection should become one of its goals, if an often undefined or nebulous one. State and industry were committed to the belief that if they simply left it up to Japan’s collective scientific genius, then its scientists would engineer a perfect solution to environmental disruption, even if the route to the solution was entirely unclear.

Isono Naohide’s third “superstition” of science and technology—that science is universal, objectively neutral, and unaffected by the biases of particular societal contexts—was central to scientific modernization and to state and industry’s response to pollution as a purely technical problem. In postwar Japan and most industrial countries, scientific knowledge was not supposed to be a product of particular circumstances, much less have political content. *Technology and Humans*’ scientists criticized this “depersonalization” and “depoliticization” of science and the scientist for being key legitimizing forces for scientific modernization. This is why the concept of *genba* was crucial to the magazine’s environmentalist reimagining of science. Science, as they saw it, was on a path toward “purifying” itself of all pretense to having a connection to lived experience.

Yuasa Yoshichika, a professor of civil engineering, wrote in the same December 1974 issue in which Isono’s article appeared that science was dominated by an obsession with “modernization” and “purification.” Modernization involved not only a relentless progress in technology and science but also the isolation of science from political and social concerns, what Yuasa called the “purification” (*junka*) of science. Here Yuasa shifted his focus to the individual scientist. Yuasa argued that scientists “placed their faith in objectivity and regularity

⁴³ Sugimoto Akira, “Kōgai bōshi gijutsu no genkai,” *Gijutsu to ningen* (January 1976): 36-38.

(*hōzokusei*)” as they aimed to achieve a “pure” science detached from everyday life and dependent on forms of scientific reason, including quantitative reasoning and modeling, that were abstracted from real conditions.⁴⁴ Yuasa framed the depersonalization of science as the advancement of forms of reasoning that were supposed to be “objective” and “disconnected” from subjective human concerns, and he placed a particular emphasis on quantitative reasoning and the growth of computer technologies associated with it. His argument, I believe, suggested that science was becoming a purely technical operation where the fact that humans, especially particular idiosyncratic individuals, carried out scientific work was incidental to its results. This demonstrated a fear that human activity was being replaced by a system of technical reasoning that may as well have been done by a machine.

The flaws of scientific modernization were closely tied to the scientist as a social being. From its inception, the magazine looked at the lives and work of scientists and engineers to probe the problems of science and technology. In their first issue (Spring 1972), the editors published a collection of articles entitled “Investigating How Industrial Engineers Live” (*kigyō gijutsusha no ikikata wo tou*). In those articles, several engineers and journalists probed the educational, profession, and personal conditions of industrial engineers in order to understand how they could have allowed industrial pollution to become so severe. Their conclusions were not optimistic. Murata Tomijirō, an engineer for Japanese Gas Co., concluded that, “as members of society, engineers have a poor grasp on the basic [social] knowledge (*kiso chishiki*) that one is required to have.” He continued,

because engineers are required to utilize their knowledge for societal issues (*shakai mondai*) and, therefore, need to have a big-picture perspective (*taikyokukan*), it is a tragic mistake that they adopt “an attitude of being aloof from society” (*seken ni chōzen*) and

⁴⁴ Yuasa Yoshichika and Miyamura Tadashi, “Saigai kara mita gijutsu no honshitsu,” *Technology and Humans* (December 1974): 22-23.

“spread superficial knowledge” (*namahanka no chishiki*).

Indeed, Murata remarked that “despite this, engineers’ public statements on topics related to their specializations” had an incredible weight with “the average person,” becoming “omnipotent (*bannō*) over time.” Engineers were ill-equipped to understand society, and yet they were authoritative figures within Japanese society.⁴⁵

Murata Tomijirō’s comments focused on the contradiction between the profound social impact science had and the narrowness of engineers’ “disengaged” (*chōzen*) knowledge and the poverty of their social experience. In the 1974 issue titled “Among the Ruins of Scientific Modernization,” research scientists dissected false public perceptions of science and the problems within scientific practice that created those perception. Contra scientific modernization, Isono Naohide, Yuasa Yoshichika, and other environmentally conscious scientists took the position that science was always embedded in particular contexts and that the work of the scientist was unavoidably personal.

Representative of the magazine’s environmental critique of scientific practice, Isono argued that it was imperative that scientists and the Japanese public recognize that science has “limits” (*genkai*) and that it always contains a particular socio-political “standpoint” (*tachiba*). In conducting scientific research and producing scientific knowledge, Isono asserted that the ways in which scientists formulate hypotheses, make observations, choose objects to study, and organize data “are significantly determined by the researcher’s subjectivity and reflect (*hanei*) not only the era and society but also the individual scientist’s personality.” For Isono, “There is no ‘fact’ or ‘theory’ that can be absolutely objective, nor can there be any ‘truth’ that transcends time (*jidai*) and perspective (*tachiba*).” “Absolute objectivity” (*zettaitek na kyakkansei*) is

⁴⁵ Murata Tomijirō, “Gijutsusha no rinri: watashi no taiken kara” *Gijutsu to ningen* 1, no. 1 (Spring 1972): 78.

nothing more than a “phantom objectivity” (*maboroshi*).⁴⁶ Indeed, Isono went so far as to redefine objectivity as socially constituted. He asserted that science, like language, was the product of humans’ effort to live effectively in a social setting and develop a shared communality or common way of living together that is mutually intelligible, and objectivity, as a socially agreed upon criteria, served as the basis for science’s intelligibility. In other words, objectivity existed only by social convention:

When humans use technology to work on nature, we always need some common understanding of nature (*kyōtsū no shizen ninshiki*). Science is none other than the means for creating that [common] understanding. Objectivity is a “convention” (*yakusokugoto*) that serves as the foundation for the common understanding [of nature]. That is to say, scientific objectivity is not an absolute thing handed down from the heavens. Rather, scientific objectivity always exists only within a limited spectrum (*genteisareta hanni*) and is a product of human creation (*ningen ga unda sanbutsu*).⁴⁷

Instead of a field of universal knowledge that humans access through scientific inquiry, science, for Isono, was the product of humanity’s active engagement with nature, and its validity was derived from being embedded in a particular time and socio-cultural context.

Yuasa Yoshichika took the argument a step further, claiming that it was the personalization and everydayness of science that provided a check on the harms it inflicted on humans. Like Isono, Yuasa argued that all scientists must “derive their approach to scientific practice from their everyday lives (*sonohito no ikikata*).” Instead of a singular scientific method, scientists followed a scientific methodology derived from their daily experiences as much as from their training. In their work scientists could never escape the personal nature of their scientific work. Nonetheless, the situatedness of scientific practice was more than a fact that had been denied. Yuasa believed the connection between science and everyday life, a connection that

⁴⁶ Isono Naohide, “Kagaku no genkai to kagaku kenkyū no tachiba,” *Gijutsu to ningen* (December 1974): 36.

⁴⁷ Isono Naohide, “Kagaku no genkai to kagaku kenkyū no tachiba,” *Gijutsu to ningen* (December 1974): 36-37.

guaranteed that “the purification of science must be incomplete (*junka ga mizen*),” prevented science and technology from becoming “hostile to the everyday lives” of ordinary citizens.⁴⁸ In Yuasa’s argument, “purifying” science by depersonalizing it systemically increased the dangers and potential risks associated with new technologies and scientific advancements.

At the heart of *Technology and Humans*’ perspective, then, was the conviction that science was both an act of human creativity and inseparable from the personal and social aspects of scientists’ work. Isono Naohide and Yuasa Yoshichika feared that scientific modernization would turn science into a system of pure, technical reasoning that eliminated as much as possible the human elements of scientific practice—what might be called the subjective aspects of science, which in turn allowed corporate and government interests to corrupt science. Writing in the same issue as Isono and Yuasa, Fujiwara Kunisato, who worked in Kyoto Prefecture’s Public Health Research Bureau, would call this the “dehumanization” (*ningen fuzai*) of science. Fujiwara focused his criticism on the depersonalized nature of science and the distance between scientists and the *genba* that were harmed by scientific work. “Dehumanization,” in Fujiwara’s argument, involved, on the one hand, denying that scientists should and do bring their everyday experience into scientific work and, on the other hand, eliminating necessary consideration for the “humans” who would be affected by the results of scientific research and technological development. This dehumanization was a systemic result of political and economic interest that governed scientists’ decision-making:

[One of the defining characteristics of science at present] is that scientists and engineers are increasingly subordinated to the dominant socio-economic system [in Japan]. As a consequence, it has become difficult for scientists and engineers to comprehend “what and whom” science is meant to serve. This means that scientists and engineers are now merely employed as professional experts, and by raising the flag of “pursuing universal

⁴⁸ Yuasa Yoshichika and Miyamura Tadashi, “Saigai kara mita gijutsu no honshitsu,” *Technology and Humans* (December 1974): 22-23.

truth” (*shinri tsuikyū*) or claiming to work for humanity’s wellbeing, any techno-scientific development can easily be justified.⁴⁹

For Fujiwara, the defining problem for science in Japan was how corporate and state-led scientific research professionalized the scientist, turning him (they were mostly men) into a depersonalized worker who provides technical expertise that served private profit and state interests. In his view, rather than the scientist acting as a fully creative human, socio-economic systems worked through the scientist. Like other scientists writing in *Technology and Humans*, Fujiwara’s perspective was decidedly humanistic. He believed that the professionalization of the scientist was harmful because it made scientists unable to pursue scientific work for the sake of human wellbeing or to consider the human consequences of their work. Instead, the original purpose of science—pursuing truth and bettering humankind—became empty justifications that masked private economic interests and state power.

Fujiwara Kunisato’s demand for a science that served humanity was an attempt to reclaim the mission that scientific modernization had usurped—that is, the perspective that all scientific progress inherently serves humans interests. As environmentalists defined it, scientific modernization was premised on the belief that human society should simply let scientists do what they do so that science could advance human civilization. According to this view, society was best governed by blind faith in technical systems.

Isono, Yuasa, and Fujiwara believed that there was a divide between, on the one hand, a growing system of technical rationality that would dominate human everyday life and, on the other, a more open and fluid social existence in which scientific practice is in fact carried out. Through for example Isono Naohide’s argument that objectivity existed as social “convention”

⁴⁹ Fujiwara Kunisato, “Shakai taisei to kagakusha no tachiba,” *Gijutsu to ningen* (December 1974): 27-28.

and Yuasa Yoshichika's emphasis on the importance of everyday life for scientists' work, *Technology and Humans*' contributors asserted that science and human activity in general was based on an open and contingent human interconnectivity. If scientific progress was not technical and rational but truly "human" (in that it was based in human interconnectivity), human civilization ought to be making conscious and determined decisions about how scientific knowledge was used. In a thoroughly humanistic fashion, these scientists reasserted the need for human control over science and technology. To create scientific progress that served "human interests" required, according to the critique, a conscious human intervention that shaped the direction of scientific developments.

Technology and Humans' scientists believed that the process of "rehumanizing" science ought to begin with the scientists. Isono Naohide asserted that "scientists themselves believed in science's omnipotence while spreading and nurturing the illusions and myths surrounding science by proclaiming the benefits of science and technology alone" and downplaying their dangers.⁵⁰ Fujiwara Kunisato argued that in order to remake science into something that genuinely served "human" interests, scientist had to connect to the *genba* where Japanese citizens were affected by environmental disruption and other consequences of scientific progress:

The most important step is for scientists do their work not in service of abstract concepts or economic growth, but for the sake of human beings above all else. In order to do that, it is imperative that scientists always work in close connection to the world of ordinary citizens and remain close enough to them where they can, for example, experience (*taiken dekiru you na kyori*) the pain of pollution patients or the anxiety and struggle of housewives who [protest environmental disruption].⁵¹

The distinction between "abstract" and "concrete" was central to the *genba* mission. Through

⁵⁰ Isono Naohide, "Kagaku no genkai to kagaku kenkyū no tachiba," *Gijutsu to ningen* (December 1974): 37.

⁵¹ Fujiwara Kunisato, "Shakai taisei to kagakusha no tachiba," *Gijutsu to ningen* (December 1974): 32.

that distinction, *genba* environmentalists argued that the centralized institutions of scientific development and its ideologies, as well as the industries and governments that supported them, were predicated on a claim to universality that was unreal or “abstract” and embodied in the depersonalized scientist and undergirded the belief in scientific omnipotence. *Abstraction* was inhuman and ecologically destructive. *Concreteness* was real and led the way to tangible solutions.

Isono Naohide, Fujiwara Kunisato, and Yuasa Yoshichika moved from a corrupted science predicated on a false neutrality and a false omnipotence to what they believed was a more concrete and correct understanding of science produced from particular standpoints that accounted for the personal and sociopolitical contexts of the scientist. Moreover, they were convinced that this definition of science would prompt scientists and the public to take a more cautious approach to its technological applications. Science was, according to Isono and other scientific contributors to *Technology and Humans*, corrupted not because it was entangled in non-scientific, worldly issues but because its entanglement was denied and masked in order to occlude the role that science and scientists played in serving industrial profit and the expansion of state power. Indeed, these scientists attempted to demonstrate that disengaged science was not simply a problem for the scientific community but one that had a profound structuring effect on Japanese society.

Correcting False Scientific Narratives: Toward a Total Knowledge of Society

The problem of science that *Technology and Humans* outlined boiled down to the opposition between what they considered “partial” and “total/holistic” knowledge. *Genba* environmentalism was based on the belief that a true, totalizing knowledge of human society was possible, but only if humanity based its scientific and social knowledge in the perspectives of

particular *genba*, that is to say, only through “engaged knowledge.” Environmentalists were animated by the belief that scientific modernization was one part of a fundamental misapprehension of how human societies functioned. The problematic perspectives on science, which I discussed in the previous section, were symptoms of a broader failure of academic, government, and corporate “experts” to produce accurate knowledge of Japanese society as a totality, including its social, economic, political, and environmental conditions.

Environmentalists believed that inaccurate social and scientific knowledge was a product of the “disengaged” or “disconnected” scientist and expert. In postwar Japan, the objective expert was supposed to operate from a neutral, rational standpoint that allowed him to scientifically plan social and economic development. *Technology and Humans*’ environmentalists flipped that narrative on its head by arguing that these experts represented only a “partial” and “incomplete” perspective on society. To *Technology and Humans*’ contributors, scientific modernization was born of that “incomplete” or “partial” knowledge of society, where scientific progress served as a metonymy: a partial, narrowly defined perspective of scientific progress that claimed to explain societal development in Japan.

Technology and Humans’ claims about incomplete knowledge were tied to the ideological assumptions behind industrial policy in Japan. The partial perspective of government and business was based on the “rationalization policies” of the state and private companies, which promoted a quantitative logic for developing technology.⁵² Under the quantitative reasoning of rationalization, technology’s primary purpose was to reduce costs by saving time and labor and increase profits by producing at greater scales. Hoshino Yoshirō, writing in

⁵² Laura Hein, *Fueling Growth: The Energy Revolution and Economic Policy in Postwar Japan* (Cambridge: Harvard University Press, 1990): 160-170.

Technology and Humans, described rationalization as the process of continually “raising profits, efficiency, and productivity” as if their endless increase were “an unavoidable, natural law” (*shizen hōsoku*).⁵³ From the 1950s onward, the Japanese government had implemented a host of policy initiatives designed to support the rationalization of major industries, and private companies regularly developed new and more intensive rationalization programs. On the factory floor these plans translated into reducing human labor by mechanizing production processes, simplifying and accelerated the work, and centralizing control of the assembly line and general production processes.⁵⁴ Indeed, the concept of rationalization originated in observations of the factory floor, where technological advancement seemed to raise productivity and profits. What the magazine’s contributors took issue with was how government planners and corporate managers had extrapolated from this “narrow” view of factory management to explain how Japanese society ought to be governed based on incorporating new technologies into all aspects of everyday life, a view that the general public seemingly accepted. Japanese citizens’ daily lives could be improved by making them more efficient. The magazine’s writers argued that most Japanese citizens—*Technology and Humans*’ scientists included among them—had fallen victim to the false metonymy of scientific modernization and rationalization before the pollution crisis and mistook its vision of society as one that represented reality.

In their own story of political awakening, the magazine’s scientists and engineers argued that beyond recognizing that their former perspective on scientific modernization was incorrect,

⁵³ Hoshino Yoshirō, “Kankyō osen no kongen—sore wa gōrika derau,” *Gijutsu to ningen*, no. 2 (Summer 1972): 30-31.

⁵⁴ Early in the postwar period, Japan’s government began promoting rationalization to foster the growth of mass production. According to Tessa Morris-Suzuki, The Ministry of International Trade and Industry set up an Industry Rationalization Committee as early as 1949 for that purpose. Tessa Morris-Suzuki, *The Technological Transformation of Japan: From the Seventeenth to the Twenty-First Century* (Cambridge: Cambridge University Press, 1994), 172-174.

they had also come to believe that Japanese society as a whole was systemically dominated by this false perspective such that it shaped how Japanese citizens understood reality. The magazine's writers critiqued what David Harvey calls "the fetish of technology," a misrecognition that technology and technological development are the driving force behind economic growth and societal improvement. Harvey describes how an obsession with technological innovation spread to all areas of business in the mid-twentieth century, which, when combined with rapid global economic growth and the expansion of industrial science, created a fetishized view that technological change guarantees unlimited "economic progress" and solutions to societal problems. In Harvey's argument the fetish of technology was endemic to "monopoly capitalism," the term also used by *Technology and Humans* and many other commentators in Japan at the time to describe a global economic system dominated by "giant," multi-national corporations that relied on state intervention and financing to guarantee private profit, as well as technical rationality and "Big Science."⁵⁵ In Japan the public's faith in scientific progress was part of a global scientific optimism, but it was also a response to the wartime devastation, where science emerged from the ashes as an "absolute good" (*zettai zen*) that would rescue the nation from starvation and material deprivation and cure Japanese society of the irrationality of fascism. In the 1960s, after the expansion of "giant" industrial corporations and after state funding had "giantized" (*kyogakuka*) scientific research, scientific modernization

⁵⁵ The "fetish of technology" is originally Karl Marx's term, and Harvey builds on Marx's analysis. David Harvey, *Marx, Capital, and the Madness of Economic Reason* (Oxford: Oxford University Press, 2017), 109, 120. Lenin developed the original argument concerning "Monopoly Capitalism," but Paul Sweezy and Paul A. Baran's 1966 essay, *Monopoly Capital*, provided an updated critique of monopoly capitalism in the mid-twentieth century based on the rise of large multi-national conglomerates (or "giant corporations") that monopolize one or more industries, controlling prices, investment, the volume production, and so on. Although rarely citing Sweezy and Baran, *Technology and Humans'* contributors often levied a similar critique of the interaction between the state and "giant" (*kyodai*) industrial companies. For example, see Hani Gōrō, "Kōgai no honshitsu to kaikyū tōsō," *Gijutsu to ningen* (January 1975): 6-20. Paul A. Baran and Paul Sweezy, *Monopoly Capital: An Essay on the American Economic and Social Order* (New York: Monthly Review Press, 1966), 14-51.

brought about the “futurism boom” (*mirairon buumu*) premised on the belief “that science would engineer a rose-colored (*bara iro no mirai*) future.”⁵⁶ In the magazine’s narrative, the mistaken, “rose-colored” view of science led Japan into a reckless period of industrial expansion in the 1950s and ‘60s that in turn created a horrific pollution crisis.

Technology and Humans’ critique of metonymy and misrecognition drew upon arguments made decades earlier by the Marxist intellectual György Lukács. In 1970s Japan, leftists, activists, and intellectuals were rediscovering the work of the 1930s Hungarian Marxist and applying his analysis of what he called “reification” to the rapid urbanization and technologization of Japanese society in the postwar. Although only rarely cited in *Technology and Humans*, it is clear from the writings of its contributors that they were reading Lukács’s work and/or contemporaneous Japanese Marxists who drew on his work. Lukács’s argument centered on what he saw as a disjunction between the surface reality and the processes that actually structured capitalist societies. Lukács argued that most individuals and institutions in capitalist societies were duped by the surface-level reality of economic rationality—the same belief in rationalization that Hoshino described—and mistakenly understood the tenets of that rationality, including privileging competition, efficiency, and productivity, to be the basis for how societies naturally operated. In Lukács’s reasoning, societies mistook the narrow field of economic liberalism to explain all aspects of society, but this represented a partial, incomplete, and abstract form of knowledge.⁵⁷

While Lukács believed “concrete reality” could be explained through an analysis of capitalist production and the commodity form in particular, environmentalists in Japan sought

⁵⁶ Nakamura Teiri, “60 nendai no kagakusha undo,” *Gijutsu to ningen* (September 1977): 148.

⁵⁷ György Lukács, *History and Class Consciousness* (Cambridge: The MIT Press, 1971) 102-110.

that reality out in the *genba*. *Genba* offered environmentalists access to what was *real* and *concrete*. In that sense it could be the starting point, so their logic went, for a total understanding of Japanese society. As one editor explained in the afterword to *Technology and Humans*' first issue, they had to seek out a raw, unbiased truth at the *genba*:

How far can we go in incorporating the truth (*shinjitsu*) [in our reporting]? That was one issue for us because a dramatized truth holds no meaning. In particular this was the problem we faced in our first issue. We carried out investigations (*chōsha*). We did out reportage-style (*rupō*) reporting. We recorded the raw words (*nama no kotoba*) [of victims and activists]. And yet, if we youths adorn rose-colored glasses, then that truth cannot even begin to tell its own story (*shinjitsu wa toutseshinjitsu wo kataranai*).⁵⁸

Genba environmentalism and its campaign against technological fetishism were also the products of *Technology and Humans*' scientists' critical reflection on postwar democracy in Japan. The magazine contributors believed that the postwar ideal of democracy that they and their fellow citizens embraced was not the establishment of the "sovereignty of the people" but rather scientific modernization that ceded control of Japanese society to scientific and technocratic experts. As Steven Shapin reminds us, it was a historical oddity that science should be considered an "impersonal" profession, and, indeed, the push toward a *genba* environmentalism was, for *Technology and Humans*' scientists, closely linked to their own personal histories as a part of the generation that embraced democratization after the defeat of Japanese fascism. Writing in the June 1975 issue of *Technology and Humans*, science writer and educator Suga Ryūichi, who was born in 1933 and was part of the generation that survived World War II and the desolation of its aftermath, described his experience of postwar democracy:⁵⁹

⁵⁸ Nagai Shige, "Atogaki," *Gijutsu to ningen* 1, no. 1 (Spring 1972): 144.

⁵⁹ In 1955 he would have been one of only 2,500 college students graduating with a degree in physics and one of under 25,000 college students total graduating with a degree related to science or engineering (*1958 Ministry of Science and Technology White Paper*. "Gakkō kyōiku ni yoru kagaku gijutsusha no ikusei" from Kagaku Gijyutsuchō, 1953, "Shōwa sanjūsan nenpan kagaku gijutsu hakusho," Kagaku gijyutsuchō hakusho.

The formative experience of our generation's youth was poverty and hunger, and, besides that, our education in democracy. . . . *We, the generation of poverty and hunger, understood democracy to mean having faith in science, technology, and industrial production* (emphasis mine). This was personified in David Lilienthal's [history of the Tennessee Valley Authority], *TVA: Democracy on the March*.⁶⁰ It was that same Tennessee Valley Authority that gathered the top scientists and engineers from each field to turn the wasteland of the Tennessee Valley into prosperous farmland and the center for a large electrical engineering and industrial production complex. It was precisely that kind of science and technology that was going to liberate us from hunger and poverty.

[In the early 1960s], . . . even though the excessive rationalization and expansion of large-scale production was beginning to reveal technology's contradictions, [engineers'] faith was still pure. What ruptured that faith was the onset of pollution symbolized by the "Minamata Disease." [In that pollution case], the technology that was supposed to liberate us from hunger and poverty drove the even more impoverished fishermen to their deaths. . . . Once that kind of self-negation (*jikō hitei*) begins to happen, isn't that something capable of forcing humans to put themselves in the margins (*henkyō*, transliterated in furigana as "*maajinaru*")⁶¹?

For Suga Ryūichi and other scientists who wrote in *Technology and Humans*, the environmental crisis was a consequence of Japan's techno-scientific vision of democracy, a vision that ceded control of the nation's future to technocratic experts who could help bring about the economic prosperity that science and technology offered. Democracy was not defined as government by the consent of the people. It was defined as the establishment of scientific and economic progress. Indeed, Japan's future had been reduced to the processes of scientific modernization, what Lukács would call the "reification" of scientific progress. As biologist Nakamura Teiri argued, the Japanese public viewed scientific rationality as the antithesis of wartime irrationality and devastation.⁶² Establishing democracy in postwar Japan would, according to this reading,

⁶⁰ David Lilienthal was the head of the Tennessee Valley Authority, an American public works project of the 1920s and 1930s. Lilienthal's book on the project was published in Japan in 1949, translated by Wada Koroku, father-in-law of famous pro-development economist and later anti-pollution advocate Tsuru Shigeto. Suga here emphasized that the project was seen by many as the chance to use the best aspects of the most advanced technology available to bring prosperity and benefits of modern technology to poor, rural populations. For a detailed account of the project, see chapter eight in Thomas P. Hughes, *American Genesis: A Century of Invention and Technological Enthusiasm 1870-1970* (New York: Viking, 1989).

⁶¹ Suga Ryūichi, "Atarashii gijutsuzō e no kitai," *Gijutsu to ningen* (June 1975): 38.

⁶² Nakamura Teiri, "60 nendai no kagakusha undo." *Gijutsu to ningen* (September 1977): 145.

require allowing scientists, engineers, and government technocrats to engineer a future where all Japanese citizens would be free from poverty.

The Tennessee Valley Authority (TVA) symbolized the techno-scientific version of democracy. After World War II, influential Japanese economic thinkers, such as Arisawa Hiromi and Tsuru Shigeto, and U.S. Occupation planners espoused the TVA as a model for Japan's infrastructure projects, and, as with the original TVA, saw it as a pathway for social engineering through the modernization of the Japanese countryside. David Lilienthal's book on the TVA was popular in Japan in the 1950s, and its message of combining engineering, bureaucratic planning, and grassroots democracy was heralded by public and economists alike as a viable road to postwar reconstruction. Moreover, the enthusiasm for the TVA among economists and government planners inspired Japan's "Comprehensive Rational Planning" policies that dominated the government's approach to managing and developing land for industry and infrastructure from the 1950s onward, which was instrumental in realizing the vision of scientific modernization and spreading pollution throughout the country.⁶³ The optimistic interpretation of the TVA that Suga referenced, the same interpretation that inspired Japan's land-use policies (*kokudokeihaku*), told a tale of state planners and scientific experts rescuing a poor backwater and turning it into a modern agricultural and industrial region. Japan embraced the power of technology and well-thought-out plans to engineer a better future.

To overcome the failures of scientific modernization, environmentally conscious

⁶³ Tsuru Shigeto, who was previously a member of the Economic Stabilization Board (ESB), had a pivotal role in popularizing the TVA among economists, policymakers, and the public at large. Supported by the Occupation, the Japanese government also sent a number of observational missions to the TVA. Moreover, the image of the TVA model as a modernizing force was pervasive in late 1940s Japan. Eric Dinmore writes about its proliferation in public discourse (it even becoming the subject of children's books) in Eric Dinmore, "Concrete Results? The TVA and the Appeal of Large Dams in Occupation-Era Japan," *The Journal of Japanese Studies* 39, no. 1 (Winter 2013): 7-9, 17-25.

scientists and engineers believed they had to escape the well-funded research laboratories and head out into the dirty, toxified landscape and join with those who had been “marginalized” in the postwar economy. The point of departure for *Technology and Humans*’ brand of environmentalism was to build on scientists’ experience of rupture by, as Suga Ryūichi argued, “putting themselves in the margins (literally, ‘corner the self into the margins’)” where poor Japanese citizens suffered toxic conditions for the sake of the nation’s scientific modernity. These were citizens who had been marginalized by high economic growth and left to fend for themselves against large-scale development projects that inundated their communities with industrial pollution. It was in the toxic *genba* that they hoped to build not only an environmentalism but a practice of science that would serve the interests of the poor and overcome the fetish of technology.

Suga, in his essay, offered two definitions of the “margins” that existed beyond the mainstream of Japanese society.⁶⁴ The first “marginal” location was where farming and fishermen carried out what he called “natural production,” and its marginality was tied to their unique experience outside of what he considered to be the mainstream society of scientific modernization.⁶⁵ The second location was at the “margins” of industrial production, where “revolutionary engineers” escaped “the main current of industry” and instead worked toward “creating a new system of values for technology.” These engineers understood that technological development was fundamentally broken and tried to revolutionize it. They operated within the field of industrial technology but were not dominated by its tendency to develop at a breakneck

⁶⁴ Suga and Nakaoka both opposed “marginal humans” to “mainstream humans” (*nagaremono ningen*). “Nagaremono” in this context very clearly reads as “mainstream humans,” denoting those who are caught up in the dominant direction of society and economic development.

⁶⁵ Suga Ryūichi, “Atarashii gijutsuzō e no kitai,” *Gijutsu to ningen* (June 1975): 36-38.

speed without regard to the consequences.⁶⁶

Suga Ryūichi titled the essay “Expectations for a New Kind of Engineer,” and he argued that the “new engineer” had to place himself in both margins simultaneously.⁶⁷ Suga’s “marginalization” of scientists and engineers further recalled *Technology and Humans*’ various investigations into anti-pollution movements by rural citizens, farmers, and residents. In those accounts *Technology and Humans*’ writers continually upheld the political activism and self-consciousness of those who lived at the *genba* and fought pollution as the only check on further environmental destruction. In other words, the self-conscious rural activist and the self-conscious engineer had to be brought together. As Suga was careful to point out, this was not some return to a “pure faith in agricultural production” or a simplistic return to an agrarian-based society.⁶⁸ What drew these two places together for these writers was that each was inhabited by individuals who were conscious of the need to return control of both science and society to the public.⁶⁹ In other words, Suga called for a linkage between the rural populations that stood on the frontier/margin of urban-industrial Japanese society and the self-conscious engineer or scientist who fought the current system of industrial production from within and who stood at the other

⁶⁶ See Chapters Two and Three.

⁶⁷ Suga Ryūichi, “Atarashii gijutsuzō e no kitai,” *Gijutsu to ningen* (June 1975): 38.

⁶⁸ Suga Ryūichi, “Atarashii gijutsuzō e no kitai,” *Gijutsu to ningen* (June 1975): 38.

⁶⁹ Suga views himself as an example of a scientist becoming “self-conscious” and also being connected to agricultural production. He grew up in a rural “mountain town” and, according to his own account, he had no sense of any distinction between categories such as nature, science, and culture. When he attended Kyoto University and chose physics as his major, he was shocked to find out that his science courses would not include any literature or philosophy components. After the disruptive experience of Minamata Disease, Suga claimed both an understanding of the need to revolutionize modern science and an identification with those who lived at the rural “margins.” However, Suga saw Ui Jun as the quintessential example of the politically conscious scientist. Ui, a professor of applied chemistry, had little interest in the effects of technology on life until he was asked to help investigate the Minamata pollution case. Upon realizing the horrors caused by the Chisso Corporation, Ui became an adamant anti-pollution activist and began a series of public lectures about pollution and its causes. This culminated in the creation of an organization that was intended to link and support the various localized anti-pollution struggles. Suga Ryūichi, “Atarashii gijutsuzō e no kitai,” *Gijutsu to ningen* (June 1975): 35-37.

margin modern society—the place of the rogue, liberated scientist.

The problem of science began with an epistemological flaw and ended at a global environmental crisis. *Technology and Humans*' contributors believed that scientific knowledge to that point was flawed because it was produced by starting with the part and extrapolating the whole from it. They argued that government bureaucrats and social scientists had adopted that scientific epistemology to produce an incomplete, even corrupted knowledge of society, knowledge that would form a bedrock for policymaking. The epistemology was tied to the disengaged scientist and the predominant world view of unlimited scientific and material progress. Disengaged knowledge and the worldview it produced, in turn, unleashed an unprecedented level of environmental exploitation.

The ecological violence of the postwar period created a fundamental epistemological shift for the subset of scientists and engineers who would go on to contest the culprits behind environmental deterioration. They sought to change the dominant worldview—the central vision for modern society—by starting instead from the “total picture,” what they believed was a good and complete knowledge that encapsulated the dynamic interdependency of nature and human activity. In order to produce a totalizing knowledge, scientists would have to investigate the dynamic interrelation of humanity with nature and the systemic environmental injustices modern society creates in the field, at the *genba* where ecological violence revealed the contradictions of society and nature's interdependence. Nonetheless, the quest for a better knowledge of society and nature would be incomplete without reimagining scientific methodology.

IV. Genba Environmentalism as Scientific Method

In October 1973 *Technology and Humans* published a map that showed all known industrial facilities that then used the mercury cell electrolysis method to produce chlorine, as

well as the estimated contamination rates. Mercury was, as the magazine's editors hoped to impress on its readership, everywhere, haunting the Japanese public through its invisible contamination of seabeds, fish, and human bodies.⁷⁰ However, mercury was just one among a myriad of toxins and particulates that polluted much of the Japanese archipelago. The extent of pollution and the multiplicity of pollutants presented an incredible challenge for activists and for the scientists who sought to understand how pollutants invaded human bodies.⁷¹ For contributors to *Technology and Humans*, the complexity of pollution brought to light limitations in scientific practice and required rethinking scientific methodology. The limitations of scientific inquiry were also linked to an ethical problem. The public and private institutions at which most scientists worked were closely tied to government bodies and corporations that had a vested interest in denying corporate responsibility for pollution. Government and industry mobilized scientific experts and scientific authority as a weapon against pollution claims, and the difficulties in scientifically establishing a relationship of causality between industrial pollutants and pollution-related diseases aided the cover up.

On the lower end of that scientific power dynamic were Japanese citizens who lived in what Suga Ryūichi called the “margins”—communities and individuals who were systemically excluded from Japan's high growth economy and put on unfavorable terrain when they attempted to call for environmental clean-up and monetary redress from private companies and local governments. It was at these “marginalized” *genba* that the difficulties of pollution science intersected political with socio-economic inequity. If science was to serve the people and stand

⁷⁰ Henshūbu, “Osen hasseigen to osenryō: suigin,” *Gijutsu to ningen*, no. 7 (Fall 1973): 41-44.

⁷¹ “Shiryō Shinzensō: Kokudo sōgō kaihatsu keikaku no ‘tatemae’ to ‘honno,’” *Gijutsu to ningen* 1, no. 2 (Summer 1972): 40.

on the side of the oppressed, then environmentally conscious scientists would need a method that addressed environmental problems accurately and engaged the political issues at the heart of environmental disruption.

In response to the problems of pollution science, *Technology and Humans*' environmentalists deployed "*genba*" in a different register, in the very methodology of science, in order to produce what they considered to be a more accurate form of science in contrast to what they identified as corrupted "laboratory" and "factory" science produced by scientific experts who colluded with government and private industry. Scientists in *Technology and Humans* posed the problems of environmental science as a question of accuracy—how science could adequately represent "reality"—and of populism—how science could be a science of and for the people, especially Japanese citizens marginalized by economic growth. The magazine's scientists argued that scientific methodology required an "engaged" form of science at particular *genba*. In light of scientists' role in perpetrating and then covering up pollution, *Technology and Humans*' scientists were convinced that a "disengaged" form of scientific method was incapable of producing "true" scientific knowledge. Scientists and ordinary citizens used a *genba*-based scientific methodology to frame the scientific expertise that state and industry deployed as abstract, unscientific, and politically and ethically corrupted. *Genba* became a means to assert what accurate science was, but it also demanded political activism from scientists and citizens on behalf of marginalized groups. *Genba* environmentalism aimed to integrate scientific methodology into political activism, in turn merging claims about "true" scientific knowledge with an ethical responsibility that asked scientists to take a political stand.

The effort to integrate scientific practice into *genba* environmentalism was a response to the complexities of the environmental crisis. In the late 1960s, as the problems related to the

environment unfolded publicly, Japanese citizens had to reckon with the sheer number of different forms of pollution. The most famous of the four pollution court cases that took place during that period was the so-called “Minamata Disease” case that occurred in the town of Minamata in Kumamoto Prefecture. The case would become the symbol of Japan’s pollution crisis and was often cited as the moment of rupture for those who became active in the anti-pollution struggle. The Chisso Corporation operated a plant in Minamata that produced industrial chemicals such as acetylene and vinyl chloride. The plant had been dumping methylmercury into the local bay since the 1930s, and its accumulation in fish caused thousands of local residents to suffer from a debilitating neurological disorder, symptoms of which began garnering attention in the 1950s. Minamata Disease varied in its effects but generally caused numbness, loss of motor functions, cognitive degradation, paralysis, loss of vision, and, if advanced far enough, death. Many children suffered from a congenital form of Minamata Disease that left them needing constant care. Despite the fact that Chisso management was aware of methylmercury’s effects on the local population at least by 1959, the company continued to dump harmful substances into the bay until 1968, despite protests by Minamata patients and activists. Moreover, Chisso worked with local government to conceal the cause of pollution and to suppress or buy off victims for two decades. The public was incensed that managers and engineers at the corporation knowingly inflicted harm and tried to conceal that fact.⁷²

It was a challenge for biologists, chemists, and other experts to understand the complex network of causalities through which methylmercury pollution deposited by Chisso traveled

⁷² Margaret A. McKean, *Environmental Protest and Citizen Politics in Japan* (Berkeley: University of California Press, 1981), Chapter 2. Timothy George, *Minamata: Pollution and the Struggle for Democracy in Postwar Japan* (Cambridge: Harvard University Press, 2001). Kurihara Akira, *Shōgen Minamatabyō* (Tokyo: Iwanami Shoten, 2000), 4-7.

from seafloor through fish, octopi, and other sea life to human bodies to cause debilitating harms.⁷³ It was not until 1973 that Japanese courts found Chisso to be fully responsible for the disease, although, as with all pollution cases in Japan, the government took partial responsibility for covering the cost of medical care and reparations for victims, in effect forcing taxpayers to foot the bill for industrial polluters. Yet, the Minamata Disease case involved only a single pollutant in a relatively contained area. Many other pollution cases involved a more complicated mixture of pollutants than those found near Minamata. In the early 1970s, newspaper articles began to warn of a third incident of Minamata Disease in the town of Ōmuta, just a hundred kilometers north of Minamata. High levels of methylmercury had been discovered in the adjacent bay.⁷⁴ However, a report published in the September 1974 issue of *Technology and Humans* revealed a much more complex picture. The Mitsui petrochemical plant there had been dumping a number of substances into the water and air. Local activist Takematsu Teruo, who wrote the report, revealed that local residents and workers were showing symptoms of a combination of different pollution-related diseases, such as methylmercury poisoning and cadmium poisoning, which was the metallic culprit in another of Japan's famous pollution cases, the "Itai-Itai" Disease of Toyama Prefecture.⁷⁵ The mixture of several different forms of pollution was common in Japan's industrial zones. Many areas in the "dying" Seto Inland Sea, Japan's largest inland sea around which much of Japan's industrial manufacturing was concentrated, involved a complex mixture of air and water pollution that caused outbreaks of asthma, the withering of local crops

⁷³ Brett Walker discusses the "multiple causalities" of Minamata Disease in his monograph, *Toxic Archipelago*.

⁷⁴ The so-called "Second Minamata" or Niigata "Minamata" referred to a methylmercury poisoning incident caused by the Showa Electrical Company, which ran a chemical plant in the town of Kanose in Niigata Prefecture. It was one of four major pollution cases that garnered widespread public attention. Ui Jun, "Minamata Disease," in *Industrial Pollution in Japan*, ed. Ui Jun (Tokyo: United Nations University Press, 1992): 115-117.

⁷⁵ Takematsu Teruo, "Gendai ni okeru saigai kōgai no taikai," *Gijutsu to ningen* (September 1974): 30-37.

and vegetation, mutation or death of fish, and neurological disorders among fishermen.⁷⁶

Japanese industries were so geographically concentrated and urban populations so close to industrial production sites that pollution more often than not took on several different forms in one area.

Contributors to *Technology and Humans* argued that in order to develop a science of pollution, they and other scientists had to overcome the limitations of how scientific inquiry was conducted. This had two meanings. First, the strong institutional relationships between scientists and both state and corporate entities made scientists reluctant to validate the claims of pollution victims against companies like Chisso. Indeed, scientists often spoke on the behalf of local governments and business against pollution victims and activists.⁷⁷ Companies used scientific expertise as a weapon against anti-pollution movements. Rather than aiding the struggle against pollution, the principles of scientific analysis appeared to serve only the interests of industrial polluters. Second, *Technology and Humans* critiqued how scientists analyzed the processes of pollutants as they interacted with ever-changing natural environments. The magazine's writers believed that the same flawed approach to science defined not only corrupted pollution investigations but also corporate secrecy surrounding industrial production processes that generated toxic byproducts.⁷⁸ According to *Technology and Humans*, the same version of science that failed to properly understand how pollution harmed the environment had been the basis for the prior two decades of technological advancements in industrial production, which had been

⁷⁶ Takahashi Noboru, "Gendai no kaijū konbinaato wo ou: mizushima kōgyōchitai wo yuku," *Gijutsu to ningen* 1, no. 1 (Spring 1972): 20.

⁷⁷ Kondō Kan'ichi, "Aruhatsugen," *Gijutsu to ningen*, no. 5 (Spring 1973): 5.

⁷⁸ "Gendai gijutsu no genkai: Sekiyūjo ni okeru kōgai no subete," *Gijutsu to ningen*, no. 3 (Fall 1972): 99-107.

premised on producing polluting byproducts and waste without paying for their cleanup.⁷⁹

Technology and Humans' own scientists argued that inquiries into particular cases of pollution were too reliant on the type of scientific investigation carried out in the laboratory. "Laboratory science," they believed, did not correspond with real environmental conditions. *Technology and Humans* used the terms "laboratory science" and "factory science" to denote the processes of analyzing scientific objects and taking precise measurements in a carefully controlled environment such as the laboratory or assembly-line.⁸⁰ Those terms further indicated the division of scientific phenomena into fragments that were to be studied in isolation.⁸¹ The magazine's writers claimed that the complexity of how pollutants interacted with environment, combined with the concentration of different types of pollution, made it impossible to produce the precise measurements or to divide the scientific object into component parts.⁸²

Abstracted and fragmented "laboratory science" was a defining element of scientific modernization, but it was the precarity and contingency associated with pollution and industrial accidents that revealed it as a failed methodology. Isono Naohide, Fujiwara Kunisato, and Yausa Yoshichika characterized scientists as willing to promote a scientific methodology that relied on simplifying scientific problems, abstractly modeling them, and fragmenting scientific objects into component elements to be studied individually. For example, Yuasa, who was trained in civil

⁷⁹ Henshūbu, "Ankeeto repooto: Ima, kōjō de—gendai nihon no gijutsusha zō," *Gijutsu to ningen*, no. 8 (Winter 1974): 57.

⁸⁰ Hoshino Yoshirō, "Setonaikai ni miru shizen to ningen no hakai: atarashii rekishi wo hiraku genten wa nanika," *Gijutsu to ningen* 1, no. 1 (Spring 1972): 17-18.

⁸¹ Umebayashi Hiromichi, "Kagaku gijutsusha—sono ninshiki to sonzai ichi," *Gijutsu to ningen* (January 1975): 94-96.

⁸² Hoshino Yoshirō, "Setonaikai ni miru shizen to ningen no hakai: atarashii rekishi wo hiraku genten wa nanika," *Gijutsu to ningen* 1, no. 1 (Spring 1972): 12-16.

engineering, argued that flooding incidents, levee breaks, and other accidents within Japan's water infrastructure demonstrated the inadequacy of laboratory science for understanding dynamic environmental conditions and that this inadequacy was revealed in pollution, accidents, and natural disasters:

Science and technology have absolutely no method (*shuhō*) for adequately coping with accidents (*jiko*). It is the problem of average value (*heikinchi*). It is the logic of making calculations and using simplified models, which are premised on the reproducibility of experiments and mechanisms. However, accidents are the exact opposite. Accidents lack universality. They exist as idiosyncrasies—as a part of a particular time, place, and occasion (*taimu, preesu, okejon ni sonnzaishi katachi*). [Scientists] lack a methodology to analyze [accidents].⁸³

In Yuasa's critique "laboratory science" depended on regularity and invariance. It took its scientific objects to be static and unchanging. However, the singularity of accidents demonstrated the impossibility of a science based on mechanical regularity because the natural environment simply did not operate in that manner. Frequent accidents and flooding along Japan's engineered canals and waterways, including a recent levee break on the Tamagawa River in Tokyo, belabored that point. Yuasa criticized engineers who "put their faith in technology" to prevent accidents and did not develop science that could adequately cope with nature. The consequence of this was that, just as with pollution, local residents were left to manage the physical and health consequences. On the receiving end of scientific modernization's disasters were, as always, communities and individuals who were excluded from scientific practice.

Within this scientific discourse, the "corrupted" scientific method based in simplification and abstraction reflected the depersonalization of the scientist. Yuasa's assertion that scientists treated scientific objects as isolated from "time, place, and occasion" recalls Isono Naohide's

⁸³ Yuasa Yoshichika and Miyamura Tadashi, "Saigai kara mita gijutsu no honshitsu," *Technology and Humans* (December 1974): 24.

argument that the myths of scientific modernization denied the connection between scientific work and particular times and places. Both believed that scientists' practices decontextualized and depoliticized methods. Corrupted science was moreover inexorably linked to a blind faith in technological development to solve all problems, including safety issues. There was, therefore, a powerful short circuit beginning with faith in scientific progress and running through the depersonalization of the scientist before ending with a "purified" scientific method. The results were disastrous for many Japanese citizens.

Pollution, like accidents and disasters, provided a powerful impetus for scientists to rethink scientific methodology. In the first issue of *Technology and Humans*, Hoshino Yoshirō, a technology critic who held a degree in electrochemistry, articulated the difficulties of researching pollution in the ocean. As a part of a collaborative investigation by the independent Seto Inland Sea Pollution Research Group into water pollution caused by industrial runoff from paper, pulp, steel, petrochemical, and oil refining factories near Tokuyama, Fukuyama, and Mizushima in the Seto Inland Sea, Hoshino took a number of measurements to determine the "mechanisms of ocean pollution."⁸⁴ Hoshino and his collaborators measured the amount of organic matter near discharge pipes from various factories, tracked the total fish population, examined sea organisms for deformities, measured the concentration of various metals in sediments, examined the state of the seabed environment (the benthos), and calculated the concentration of harmful chemicals in the water at different depths and in different locations. What he and his fellow investigators found were clear cases of pollution. And yet they also kept encountering incongruities in the evidence itself. While Hoshino and his team, for example, found higher than normal cases of

⁸⁴ Hoshino Yoshirō, "Setonaikai ni miru shizen to ningen no hakai: atarashii rekishi wo hiraku genten wa nanika," *Gijutsu to ningen* 1, no. 1 (Spring 1972): 13.

mutations in sea urchin populations, other indices of the same area, such as the size of the fish population or the concentration of toxic chemicals, proved to be normal. Measurements of harmful chemicals in the water varied, depending on the location, the time of day, and the movement of the tides.⁸⁵ What this showed, Hoshino affirmed, was that environmental pollution could not be analyzed as one would analyze it in a laboratory where the parts of the scientific object would be isolated and precise, quantitative measurements could be taken.

The logic of the “factory” and the “laboratory,” as Hoshino called this type of science, only functioned within an artificially stable environment. Thus, government and industrial use of these methods were insufficient for reality on the ground, especially when it came to investigating pollution:

The conditions of nature are completely alien to this condition of regularity [in the research laboratory and in the industrial production process]. Here, the air, water, and fish are always moving, and the seabed’s topography and the conditions of ocean vegetation are infinitely variable. When living organisms and human bodies sustain damage from environmental pollution, it is the result of many different factors that are reciprocally, complexly, and simultaneously intertwined. Modern science and modern technology do not possess a method for analyzing these kinds of objects on a quantitative, micro-level. For modern science and technology, it as if that [kind of phenomenon] is the problem with which it is most incapable of contending.⁸⁶

Hoshino argued that the complex nature of environmental pollution repudiated this so-called “laboratory” or “factory” science. Such science created a powerful barrier to understanding how pollution worked and to determining legal responsibility. This mode of scientific inquiry was, moreover, the basis for the Ministry of International Trade and Technology’s 1.6-billion-yen investment in simulating the conditions of pollution in the Seto Inland Sea in a laboratory in

⁸⁵ Hoshino Yoshirō, “Setonaikai ni miru shizen to ningen no hakai: atarashii rekishi wo hiraku genten wa nanika,” *Gijutsu to ningen* 1, no. 1 (Spring 1972): 12-17.

⁸⁶ Hoshino Yoshirō, “Setonaikai ni miru shizen to ningen no hakai: atarashii rekishi wo hiraku genten wa nanika,” *Gijutsu to ningen* 1, no. 1 (Spring 1972): 14.

order to determine how pollutants spread in the ocean. Hoshino argued that this was a doomed enterprise.⁸⁷

The biologist Isono Naohide, writing about the limits of science, argued like Hoshino that the dominant approach to science was defined by physics and chemistry, both fields that involved isolating aspects of complex processes in a laboratory environment. Indeed, Japanese scientists testified that biology was problematically dominated by scientific insights drawn from physical sciences and mathematics.⁸⁸ Beginning around this time, scientists around the world would reflect on how the physical sciences had created a problematic legacy for environmental science and for biology. As American environmental scientist Daniel Botkin writes, as late as the 1970s and 1980s, scientific analyses of environment and ecology relied on the mistaken view of nature as a well-ordered mechanical system, a machine that could be modified and transformed by human ingenuity. Botkin argues that this obscured environmental variability and unpredictability—a point to which Hoshino attested—that made engineering and human manipulation difficult.⁸⁹ Viewing nature as a machine allowed scientists to analyze it by dividing it into its component parts under the assumption that elements of the machinic whole could be modified and rearranged like gears and rods. Living organisms, however, exposed the limits of this method.⁹⁰

⁸⁷ Hoshino Yoshirō, “Setonaikai ni miru shizen to ningen no hakai: atarashii rekishi wo hiraku genten wa nanika,” *Gijutsu to ningen* 1, no. 1 (Spring 1972): 18.

⁸⁸ Watanabe Itaru and Kawai Takeshi, “Fukuzatsu na kadai wo ou seimeikagaku,” *Gijutsu to ningen* (May 1975): 8.

⁸⁹ Daniel B. Botkin, *Discordant Harmonies: A New Ecology for the Twenty-First Century* (Oxford: Oxford University Press, 1992).

⁹⁰ Isono Naohide, “Kagaku no genkai to kagaku kenkyū no tachiba,” *Gijutsu to ningen* (December 1974): 34-35; Hoshino Yoshirō, “Setonaikai ni miru shizen to ningen no hakai: atarashii rekishi wo hiraku genten wa nanika,” *Gijutsu to ningen* 1, no. 1 (Spring 1972): 17.

Technology and Humans' critique of scientific practice was also bound up with the question of ethics. Many contributors to *Technology and Humans* chided the "experts" who were called to investigate pollution for having too much faith in the "precision" (*genmitsusei*) of their methods and data. Despite the obvious problems presented by pollution, the average scientist remained confident that data would allow them to precisely adjudicate claims of environmental harm. As evidenced by the long struggle over Minamata Disease, the "laboratory logic" of scientific inquiry made it difficult to prove pollution victims' claims.⁹¹ It was often at odds with the experience of pollution victims and local residents, which presented a fundamental problem for the magazine's writers.⁹² The scientists and engineers in *Technology and Humans* who opposed those methods argued that scientists' supreme confidence in their own methods led them too often to "stand on the side of power and capital [read: government and business]" when citizens fought against polluting companies.⁹³ The methods used by most scientists, *Technology and Humans* contended, were more suited to casting doubt on pollution claims or dismissing them outright, a convenient expertise that was in great demand by corporations.⁹⁴

In contradistinction to "fragmentary" science, Hoshino Yoshirō proposed working from a new "starting point for researching nature (*shizen kenkyū*)."⁹⁵ He proposed started from the experience of fishermen and farmers who worked directly with the environment and intimately

⁹¹ Takahashi Noboru, "Gendai no kajū konbinaato wo ou: mizushima kōgyōchitai wo yuku," *Gijutsu to ningen* 1, no. 1 (Spring 1972): 22.

⁹² "Mangankō wo oraserumonoha dareka! Mizushima no takashima chiiku no gyomin ha uttaeru," *Gijutsu to ningen* 1, no. 1 (Spring 1972): 24-28.

⁹³ "Aruhatsugen," *Gijutsu to ningen* (May 1974): 5.

⁹⁴ Kondō Kan'ichi, "Aruhatsugen," *Gijutsu to ningen*, no. 5 (Spring 1973): 5; Isono Naohide, "Kagaku no genkai to kagaku kenkyū no tachiba," *Gijutsu to ningen* (December 1974): 33, 38.

⁹⁵ Hoshino Yoshirō, "Setonaikai ni miru shizen to ningen no hakai: atarashii rekishi wo hiraku genten wa nanika," *Gijutsu to ningen* 1, no. 1 (Spring 1972): 17.

knew the sites that were polluted. Through experience, locals could identify the location and effects of environmental damage, which in turn provided a guide for scientific inquiry. Hoshino argued that the polluted fisheries of the Seto Inland Sea attested to the necessity of beginning with experience: “As outsiders we can conceive of the [severe decline] of the Seto Inland Sea fishing industries at the level of statistics. However, to those fishermen who actually work on the sea, that existence is cruel.” Hoshino then went on to recount the testimony of an “old timer fisherman” from Kure City who was able to provide the investigators with information on the decline of the fish population. Not only did the fisherman know what harm pollution had caused—before the scientists would “discover” the effects through investigation—but he could also tell them what that pollution meant: in the fisherman’s youth, the bay was like a paradise, but now it was “pitiable,” with “no chance for recovery.”⁹⁶

In *genba* environmentalism, the claims about proper methodologies for environmental science were inexorably bound to an ethical imperative to locate scientific knowledge and practice in particular places. It was through *genba* environmentalism that *Technology and Humans*’ scientists felt they could overcome the fragmentary nature of scientific knowledge and the institutionalization of science. Scientists and engineers who contributed to *Technology and Humans* believed that the experience of those who lived and worked at sites of pollution should form the foundation for a science of pollution because their practical activity provided them with a concrete relationship with the environment, especially since their lives depended on it.⁹⁷ It was

⁹⁶ Hoshino Yoshirō, “Setonaikai ni miru shizen no hakai: atarashii rekishi wo hiraku genten wa nanika,” *Gijutsu to ningen* 1, no. 1 (Spring 1972): 13.

⁹⁷ The *Technology and Humans* editorial staff published in a separate volume a report on pollution of the Seto Inland Sea drawn up by the Seto Inland Sea Fishermen’s Association and the Seto Inland Sea Pollution Comprehensive Research Group. The report also argued for the necessity of using fishermen’s “latent knowledge” in scientific research on pollution and for “the long-term unity of fishermen and researchers” as a fusion of experiential and scientific knowledge. Setonaikai gyomin kaigi and Setonaikai osen sōgō chōsa dan, eds., *Setonaikai jūyu Rosen sōgō chōsa dan hōkokusho* (Tokyo: Gijutsu to ningen, 1975), 202.

this sustained contact with the local environment that allowed fishermen, farmers, and rural citizens to produce knowledge about the situation that was adequate for “grasping the essence” of what was happening. Conversely, “laboratory science” deployed an epistemology that was foreign to and incapable of knowing the complexities of the environment.⁹⁸

In *Technology and Humans*’ critique of scientific method, two critical positions intersect. The magazine’ scientists rejected a mechanistic view of nature and embraced an ecological vision of nature and human society as dynamically interdependent. This was the first position. The second position was that understanding nature and society as dynamic required engaging with local experience at the *genba*, the place where the dynamic interaction took place. This second position was rooted in a passion for environmental justice. The scientists focused on the *genba* where ecological violence met economic inequality and aimed to rectify both ecological violence and the power imbalance that produced it.

V. Conclusion

In this chapter, I analyzed the conceptual and strategic framework behind *genba* environmentalism by looking at the rupture in science produced by Japan’s environmental crisis. Ecological violence occasioned a profound reimagining of the dominant scientific worldview based in neutrality/objectivity and unrestrained scientific development in service of growth. Scientists participating in or aligned with *genba* environmentalism argued that science and the world it described were in fact chaotic and contingent, full of idiosyncrasies and complex interconnections that were unpredictable. Humanity had to cope with nature and its rhizomatic qualities rather than control it. This epistemological shift was meaningless without the political

⁹⁸ Hoshino Yoshirō, “Kankyō osen no kongen—sore wa gōrika derau,” *Gijutsu to ningen*, no. 2 (Summer 1972): 36-37.

activism it demanded. Scientists reimagined the scientist as an activist imparted with the ethical mission to serve pollution victims, marginalized groups, and the “people,” rather than state and industrial interests.

In critique of science I have outlined here, an ecological worldview, based in environmental activism, emerged to counter a dominant mechanistic, physical worldview. It was in the concept of *genba* that the political and epistemological strands met. *Genba* was a call to a form of activism that took seriously the problems of local places that had been ignored by government and mass political movements alike. *Genba* was also the basis for a new form of scientific and social knowledge, one that started from localized perspectives in order to stitch together a holistic understanding of nature and society. One could not produce good scientific knowledge without attending to the political responsibilities that science necessitated. One could not be a scientist without also being an activist.

The turn to *genba* was born out of fear of dehumanization and technical domination. As I explored here, that fear was closely tied to the disengaged figure of the scientist and the ideological power attached to science. The vision of scientific modernization began with the belief that the human and natural worlds could be controlled and ultimately engineered into something better—something more rational and more efficient. Attending to *genba*, in contrast, called for attacking the supposed neutral and objective nature of this vision. Nonetheless, the deeper animating force behind *genba* environmentalism was its practitioners’ fear that humanity’s attempt to control society and nature through technical rationality had produced its opposite—the domination of society by technological systems. It was at *genba* that scientists could contest the points of friction and ruptures produced by technical domination. As I will explore in the next chapter, the fear of technical domination was driven by the rapid growth of

industrial science and closely linked in the minds of environmentalists to growth in rank and file engineers who provided the technical expertise.

Chapter Two

Ecological Violence and Scientific Dystopias: The Activist Engineer and Big Science

I. Introduction

The belief that science would modernize a Japan ravaged by war by bringing it enlightenment, rationality, and (eventually) permanent prosperity was bolstered by large-scale institutional expansion of scientific research and technological development in the 1950s and '60s. Private capital and government funds poured into private, public, and semi-public laboratories as new research institutes were founded and Japan's big firms expanded their engineering departments. This was the maturation of "Big Science" (*kyodai kagaku gijutsu, biggu saiensu*), large-scale industrial science supported by national techno-scientific projects, such as the space program, and by the growth of engineering divisions in large conglomerates. Exciting new scientific discoveries yielded new potential avenues for increasing profit for private industries and for fulfilling the government's goals of increasing Japan's economic power, establishing resource security, and improving its standard of living. Japan's economic development in the immediate postwar period was defined by the expansion of a large-scale and highly systemized industrial science. In the 1950 and '60s, petrochemicals enlivened the scientists' imaginations and corporations' lust for profit. In the 1970s, state and private industry eagerly dipped their hands into a diverse range of burgeoning scientific fields such as nuclear energy and life sciences, setting up institutions to probe their profitable and social applications. Indeed, reeling from the pollution crisis, the Japanese government announced at the beginning of the 1970s that it would shift its science policies away from heavy industries toward a number of thriving "high-technology" fields that appeared to herald Japan's economic future, including aerospace, computers, and automobiles fields.

While the Japanese public envisioned the scientist as a figure of enlightenment and democracy, the industrial engineer (*gijutsusha*) was the one responsible for actually designing the products, production lines, and distribution systems that transformed the nation's economic fortunes and its citizens' daily lives. Japan's postwar recovery demanded a dramatic increase in white-collar workers who could turn scientific discoveries into applied technologies. In the 1950s and 1960s tens of thousands of young, mostly men of the generation that came of age after the war, entered university engineering programs and technical high schools in droves. Upon graduating, they were hired by industrial powerhouses like Mitsubishi, Nippon Steel, Mitsui, and other giant corporations, as well as small and medium-sized firms. They provided the technical labor that made Japan an economic behemoth. By the mid-1970s, there were over two hundred thousand engineers employed in Japan—lynchpins of a system of industrial science that kept the engines of economic growth running at full tilt.

Both industrial science—"Big Science"—and industrial engineers were the technical perpetrators of environmental degradation in Japan, and environmentalists understandably focused on investigating industrial technology and the psychology of its engineers. However, environmentalists' concerns over industrial science reached far beyond its environmental impact. For environmentalists, the ecological violence perpetuated by major industries and facilitated by the state precipitated a dystopian anxiety over the domination of society by technological systems and processes. In environmentalists' writings, environmental degradation in the material, exterior world corresponded to a technological domination within Japanese society and to individual dehumanization—and the engineer represented the epitome of the dehumanized, submissive Japanese subject. This was the broader vision of the pollution crisis that *Technology and Humans'* genba environmentalism captured. In their view ecological destruction coincided

with the technological destruction of the human subject. As Japan's high-speed economy destroyed nature and harmed the health of its citizens, by technologizing daily life, it also dismantled the ability of its citizenry to resist.

In Chapter One I analyzed the environmental critique of disengaged science and the scientific and societal worldview attached to it. In this chapter my concern is the material infrastructure of scientific research and development—the edifice of industrial science and the technical workers (engineers) who maintained it. The problem environmentalists confronted was how to understand and then challenge the powerful, entrenched science and technology infrastructure. After a brief discussion of science and technology in Japan after World War II, the first part of this chapter explores *Technology and Humans'* anxiety over the large-scale industrial science and the state's decisive intervention into scientific development through “national projects.” In their critique of Big Science, environmentalists faulted the state and industrial science for creating a “system” of scientific industrial development that was spinning out of human control. The systemic decoupling of scientific and technological development from what environmentalists called “human control” became the motor of environmental degradation.

As fear of technological domination animated environmentalists, they turned to the figure of the engineer to understand how industrial technology had become dehumanized and seek a means to reestablish human control over Big Science. In the final section of this chapter I look at how magazine contributors understood the psychology of engineers. That project was equal parts investigation and self-reflection, as environmentally conscious engineers expressed their own anxieties over corporatized science in the pages of the journal. Apropos of the magazine's name, its contributors sought a resolution to environmental degradation by transforming the relationship between technology and humanity. From their perspective, it was the engineer that

offered the strategic possibility of transforming Big Science from the inside.

Extending their critique of “disengaged science,” environmentalists identified reestablishing connections to *genba* as the best pathway to rehumanizing the engineer. Modeled after the travels and research contributors did for the magazine, this would involve connecting engineers to the *genba* of polluted factory floors, which they had designed themselves, and to polluted communities. This is the point where *genba* environmentalism became a discourse on technological dystopia. The dehumanized urban space of white-collar engineers could be redeemed only if the engineers gave themselves over to the marginalized spaces harmed by the corporatization of science and technology. Japanese society had become a scientific wasteland in the minds of these environmentalists, and they imagined that by establishing connections to particular *genba*, they might break through the homogenization and technological domination of human society.

Technology and Humans' critique of science and technology was part of a debate about the best scientific response to pollution, as the magazine contributors sought to task engineers of Big Science with the goal of solving the problems they had created. On one side, government and corporate leaders of Big Science argued that environmental disruption was a technical problem. The solution was for engineers to design technologies that would reduce toxic waste in production, control the output of pollutants, and clean up damaged ecosystems, just as they had designed the technologies that caused the original problem. They were expected to make Japan's high-growth economy green. On the other side, environmentally conscious scientists and engineers believed that the best solution was to implode Big Science entirely, along with the growth-dependent economy, and start from scratch. This debate continues apace today, in the

twenty-first century.¹ Is it better to leave our future to economic expansion sustainable through technological fixes or to move away from a society based on permanent growth? In 1970s Japan's government and private industry chose to double down on technological solutions to environmental degradation. The scientists and engineers I analyze here advocated for the other path, the one that required decoupling society from economic growth and making tough, conscious decisions about sustainability that included transforming the engineer into a figure of political activism.

II. The Technology Boom: The Era of Big Science

Technology and Humans' scientists and engineers began their professional careers in an era when Japan's bureaucracy and private industries flooded its science and technology sectors with funding for scientific research aimed at profitable, applied technologies. After World War II, industrial engineering became the focal point for Japan's economic recovery. Institutions of large-scale technological development as well as the engineering profession exploded to fulfill Japan's technical aspirations. The Japanese future and its economic security were wedded to the growing technical monster. Indeed, it was not uncommon for leading experts in government, business, and the academy to interpret Japan's defeat in the war as one caused in part by technological disadvantages and the rise of fascism as a failure to be scientific, rational, or properly modern in the prewar period. Technological development appeared to offer a surefire

¹ The incompatibility of our global economic system, which is structurally dependent on growth, with the reality of resource and sink (the capacity of the earth to absorb pollution) scarcity is the glaring contradiction looming over efforts to make the current iteration of human civilization environmentally sustainable. I believe that a lingering version of the mid-century faith in science's omnipotence informs our tendency to hope or tacitly assume that technology will fix the contradiction. A number of influential works have attempted to shift the focus away from growth, including Donella Meadows, et. al., *Limits to Growth: The 30 Year Update* (White River Junction: Chelsea Green Publishing, 2004); Kenneth Boulding, "The Coming of the Spaceship Earth" (paper delivered in 1966); and Tim Jackson, *Prosperity Without Growth? The Transition to a Sustainable Society* (Sustainable Development Commission, 2009).

pathway not only to economic recovery but also to the restoration of Japan as an international power through economic might.² Unsurprisingly, at the institutional level there was a powerful association between technological development and economic growth.

Losing both its domestic industrial infrastructure and access to vast colonial resources, the Japanese state, along with leading business conglomerates, many of whom had been intimately involved in colonial exploits, turned to intensive technological development to build the postwar economy. Nicknamed the “Central Research Boom,” government and major industrial producers poured investment funds into research and development from the 1950s onward as part of the government’s efforts to “promote the sciences,” especially in fields with potential industrial application.³ The total amount invested in science and technology-related research nationwide rose from just under 200 billion yen in 1960 to 930 billion yen by 1969.⁴ Government policy on science favored concentrating research investment in major universities—Tokyo University and Tokyo Engineering University became top targets for investment—along with national research laboratories run by the Ministry of Health and Welfare, the Ministry of Agriculture and Forestry, and the Science and Technology Agency; and semi-private, semi-public research facilities connected to major industries, such as petrochemicals and later nuclear energy.⁵ The increase in investment, education, and infrastructure rapidly expanded scientific and

² Laura Hein, *Fueling Growth: The Energy Revolution and Economic Policy in Postwar Japan* (Cambridge: Council on East Asian Studies, 1990), 14-15.

³ Okuno Takeo, “Sugao no gijutsusha—sono kako-genzai-mirai,” *Gijutsu to ningen* (June 1975): 20-21; 1964 Ministry of Science and Technology White Paper, Kagaku Gijitsuchō, *Shōwa sanjūkyū nenpan kagaku gijutsu hakusho: Chūō kenkyūsho buumu* (1964).

⁴ Introduction from Kagaku Gijitsuchō, 1970, “Shōwa yonjūgo nenpan kagaku gijutsu hakusho,” Kagaku gijitsuchō hakusho.

⁵ Nakamura Teiri, “60 nendai no kagakusha undo.” *Gijutsu to ningen* (September 1977): 146-148.

engineering-related careers, an expansion that provided the impetus for the careers of most of the engineers who contributed to *Technology and Humans*. In 1961 there were 225,000 individuals across Japan employed in “research-related” positions, 86,763 of which were laboratory researchers, 45,000 of which were engineers.⁶ By 1975, the total number of individuals employed in positions related to scientific research—researchers, research assistants, engineers, office workers—had doubled to 491,000.⁷

Although industrial technology was rapidly expanding at the time, *Technology and Humans* argued (and most government officials and industries seemingly agreed) that the 1960s was an era when no countries were making any significant new technological innovations—a situation they termed “technological stagnation.” Most industries, they suggested, were confined to the fine-tuning of existing production technologies. By “technological innovation,” commentators in that time period generally meant the creation of revolutionary, fundamentally new scientific processes, such as splitting the atom, achieving mechanical flight, or exploiting the many properties of petrochemicals/plastics. Since Japan had access to existing technological innovations through technology transfers from the U.S. and Europe, state and industry believed they could achieve a competitive edge internationally by improving production processes and devising new technological applications. If the scientific playing field had been leveled internationally, then squeezing as much out of labor as possible while fine tuning existing technologies became Japan’s road map to economic dominance.⁸ Foreign commentators have

⁶ “Kenkyū kankei jinzai” from Kagaku Gijitsuchō, 1969, “Shōwa yonjūyon nenpan kagaku gijutsu hakusho,” Kagaku gijitsuchō hakusho.

⁷ “Kenkyū kankei jinzai” from Kagaku Gijitsuchō, 1976, “Shōwa gojūichi nenpan kagaku gijutsu hakusho,” Kagaku gijitsuchō hakusho.

⁸ Hoshino Yoshirō, *Kōdō gijutsu shakai e no teikō* (Tokyo: Jitsugyō no nihon sha, 1970).

often evaluated Japan's heavy industrial and high technology sectors as poor innovators but excellent modifiers. Some go so far as to make racialized claims that the "Japanese" as a people are not naturally inclined toward innovation and creativity but are adept at using their learned technical skills to improve others' innovative achievements. But Japanese engineers in the 1960s, as well as government officials and industry leaders, emphasized that no country was making any dramatic leaps in technologic innovation during that time. Instead, Japan was well positioned to turn existing technologies into profitable products because of the country's large supply of well-trained engineers, large private and public investments into these areas, and the government's support for rapid technological upgrades to factories of all sizes.⁹ What I emphasize here is that, regardless of how one defines "technological innovation," there was a strong belief among industries, engineers, and government officials from the 1950s to the 1970s that no new innovations were being achieved. That time period corresponded to the era of high-economic growth in Japan.

Industrial recovery in Japan was heavily indebted to the availability of new technological developments from foreign companies and the United States' willingness to support Japanese economic recovery through technology transfers. In the 1950s and '60s, Japanese companies were able to cheaply license a large number of foreign patents, and many Japanese researchers and engineers visited production facilities in the United States and Europe to learn about new

⁹ Tessa Morris-Suzuki emphasizes that the structural network of various research organizations and apparatuses developed from the prewar period onward was as important as technological importation and government policy to the ability of Japanese industries to develop and deploy new technologies for production that drove economic growth. Her point echoes the contentions of many in *Gijutsu to ningen*: the conjuncture of technical knowledge, industrial investment, eager engineers, and the government's willingness to ignore social and environmental consequences put Japan in a prime position to become an industrial superpower. Tessa Morris-Suzuki, *The Technological Transformation of Japan: From the Seventeenth to the Twenty-First Century* (Cambridge: Cambridge University Press, 1994), 166.

technologies and production processes.¹⁰ This provided an important injection of technological know-how into major Japanese industries such as iron and steel, paper and pulp, shipbuilding, chemical engineering, electronics, and automobiles, all of which were central to postwar economic revival—and to creating the pollution crisis.¹¹

While advances in major research supposedly stagnated globally, government research labs and private corporations in Japan concentrated on maximizing the profitable industrial applications of existing technologies through low labor costs and reckless economies of scale. During the decades of “technological stagnation,” Japan’s industries produced economic growth by increasing the scale of production and output.¹² Industry and government were united in their goal to raise Japan’s international competitiveness in major markets ranging from petrochemicals and steel to automobiles and electronic goods. The scientists and engineers of *Technology and Humans* continually reiterated the fact that Japan succeeded in reaching new economic heights because its industries were willing to go further than anywhere else’s in increasing the scale and efficiency of industrial production. Many of the journal’s articles tracked the quick turnover in industrial equipment and the rapid construction of new factories with increased capacities.¹³

¹⁰ From 1951 to 1959, Japan had 100 to 150 “first rate technology imports” per year, meaning licensing agreements (generally for patents) to use technologies developed by foreign firms for at least one year. In 1960, that number shot up to 327. By 1964 it reached 564. Kagaku Gijyutsuchō, 1965, “Shōwa sanjūkyū nenpan kagaku gijyutsu hakusho,” Kagaku gijyutsuchō hakusho; Okuno Takeo, “Sugao no gijyutsusha—sono kako-genzai-mirai,” *Gijyutsu to ningen* (June 1975): 23.

¹¹ Nakaoka Tetsurō, “Sangyō gijyutsu to sono rekishi,” in *Sangyō gijyutsushi*, eds. Nakaoka Tetsurō et al (Tokyo: Yamakawa Shuppansha, 2001), 30; Tessa Morris-Suzuki, *The Technological Transformation of Japan: From the Seventeenth to the Twenty-First Century* (Cambridge: Cambridge University Press, 1994), 172-174; Daniel I. Okimoto, *Between MITI and the Market: Japanese Industrial for High Technology* (Stanford: Stanford University Press, 1989), 66-67.

¹² See the section on “giantization” in Chapter Three.

¹³ Hoshino Yoshirō discussed the rapid growth at the Mizushima Combine in 1972, which at the time was the largest such industrial combine the world. For example, it initially had an ethylene plant with a productive capacity of 60,000 tons, but in the late ‘60s a second plant with 100,000-ton capacity was added. For a report on the rapid turnover in steel production, see: “Tsukaisute no gijyutsu take: Kyodaika to shigen rōhi no kongen,” *Gijyutsu to ningen*, no. 6 (Summer 1973): 12-13.

Technology and Humans' contributors and many other environmental activists linked the intensity of environmental degradation in Japan to private industry's response to industrial stagnation. Environmentalists such as Ui Jun attributed the severity of pollution in Japan to the excessive and reckless push to increase the scale and efficiency of industrial production.¹⁴

Engineers (*gijutsusha*) who developed technological applications instead of conducting basic research were responsible for cost efficiency and for developing new products for corporations. Engineers who contributed to *Technology and Humans* lamented the narrow focus of their work, emphasizing that professional advancement was exclusively tied to metrics related to reducing costs on the assembly line, often by reducing necessary labor, and to developing new products that had an immediate and high rate of profit.¹⁵ They felt that working in industrial science stamped out creativity and limited opportunities for conscious intervention in their work. Industrial engineering reduced inquisitive minds to following the dictates of corporate goals. Of course, engineers did not naively expect a job in industrial science to give them free reign to pursue "pure" scientific questions. Nonetheless, Japanese engineers believed that management reduced the purview of its engineering departments merely to finding technical ways to raise profits. This, they argued, was the meaning of "rationalization."

The problems of Big Science were global. The corporatization of science, the effects of corporate culture on scientific work, and the psyche of engineers especially were also major topics of concern for industrial engineers in Europe and the United States. In the United States

¹⁴ Hoshino Yoshirō, *Kōdō gijutsu shakai e no teikō* (Tokyo: Jitsugyō no nihon sha, 1970), 15-16. Ui Jun and Kondō Kan'ichi, "Gendai gijutsu no rikkyakuten to kōgai no honshitsu," *Gijutsu to ningen* (November 1974).

¹⁵ Nakamura Teiri, "60 nendai no kagakusha undo." *Gijutsu to ningen* (September 1977): 156-157. Engineers responded to Nakamura's article in a Q&A and expressed this view, which was repeated in nearly every article written by or roundtable discussion involving engineers in *Technology and Humans*.

from the 1950s to the '70s, social scientists and university scientists critiqued industrial laboratories as spaces where “pure” science, intellectual freedom, and scientific curiosity were stamped out by corporate demands that scientists research only what the company dictated.¹⁶ In Japan, corporate engineers (*genba genjitsusha*) who contributed to *Technology and Humans* uniformly depicted industry labs as hierarchical spaces where individual initiatives were suppressed in favor of efficiency and profitability. Big Science was a source of intense personal dissatisfaction for these engineers.

In the *Technology and Humans*' articles on engineers, writers depicted a growing bifurcation between “basic scientific research” and industrial engineering. Basic scientific research was, according to the magazine's experts, the more desirable field. Basic researchers could be creative, follow their curiosity, and explore the questions and unknowns that defined the pursuit of pure science. In engineering, however, creativity, curiosity, and scientific questions were suppressed and subordinated to the dictates of management and pursuit of profit. The engineer was reduced to a vessel for inputting technical knowledge into the corporatized systems of technology and product development.

III. Big Science: The Technologization of Science

The term “Big Science” became a part of common critical parlance in the U.S. and Europe in the 1960s and was later adopted by Japanese scientists and engineers. In the mid-1970s, *Technology and Humans* published a number of articles on what they perceived to be its growing threat. Written primarily by scientists, these articles examined the institutional

¹⁶ Steven Shapin has shown that although this was the prevailing view, scientists in fact often encountered more freedom in corporate research laboratories because of better funding for research and because research managers often took the stance that the most profitable breakthrough occurred when scientists were left to follow their interests. See Steven Shapin, *Never Pure* (Baltimore: John Hopkins University Press, 2010), 212-233.

development and goals of Big Science. Their critique of the concept focused primarily on what they described as the “reckless technologization of science” in service of private industry. The core concern for these environmentally conscious scientists was the risks posed by tying unrestrained scientific development to private profits and the fear that technologizing science resulted in technologies that threatened to control humanity. This covered the general trajectory of industrial science, moving from one profitable scientific field to the next, in turn exhausting the profitability of each field and exposing the public to numerous harms.

In the middle of the 1970s, unrestrained industrial science aimed to exploit the untapped realm of biological processes through the field of life science, and environmentalists interpreted this as an effort to develop the means to control biological life that might eventually lead to a means to control human bodies as well. The fear that humanity could develop technologies to control life encapsulated the horror that surrounded the pollution crisis. Humanity, in its effort to control nature, in fact develop technological systems that controlled humanity as civilization’s industrial achievements turned horrifically back on humanity in the form of pollution. In environmental narratives detailed in *Technology and Humans*, the specter of technological domination was the logical extension of humanity’s reckless and corrupted use of science and technology in the service of private profit and state power. Fear of toxicity and environmental degradation became fear of the cold rationality of technological systems that threatened to dominate everyday life. *Technology and Humans’* contributors described scientific and technological development as a self-perpetuating system unto itself, recklessly moving from industrial application to industrial application without any conscious direction or adequate controls.

In the 1950s and 1960s, the economic and human resources of “Big Science” were

concentrated in chemicals and petrochemicals (plastics and oil, among others). The staggering expansion and profitability of chemical industries bore out the optimism that went into scientific investment. By the early 1970s, however, the returns of industries based primarily in chemistry and physical sciences—chief among them, petrochemicals and steel—were reaching their economic limits.¹⁷ Despite concerns over pollution, corporate stakeholders and government agencies actively sought out a new field of scientific research that could produce another, more enduring economic boom. And they hoped to find a field that would placate public concerns surrounding pollution.¹⁸

To that end, Japan's Science and Technology Agency and major engineering companies, such as Mitsubishi Chemicals, looked to unleash and monetize the cellular and genetic processes that made biological life possible. In 1972, Nakasone Yasuhiro, then the head of the government's Science and Technology Agency (and future Prime Minister), released a statement announcing the new field of life sciences (*seimei kagaku* or *raifusaiensu*) as a new avenue for scientific and industrial research. The agency quickly set up a colloquium to clarify its definition. Life Science was designated as the next "Big Science" (*biggu saiensu*) following nuclear energy and the space program and the next big "national project" for state-supported scientific research.¹⁹ According to biologist Watanabe Itaru, scientists and private corporations embraced the field out of "optimism surrounding" the "productive" potential of biology and the miraculous nature of animals and biologic life in general, as well as the possibilities new computer technologies offered for modeling neurological processes and, perhaps, even developing artificial

¹⁷ Watanabe Itaru and Kawai Takeshi, "Fukuzatsu na kadai wo ou seimeikagaku," *Gijutsu to ningen* (May 1975): 7.

¹⁸ Hoshino Yoshirō, *Kōdō gijutsu shakai e no teikō* (Tokyo: Jitsugyō no nihon sha, 1970), 18-19.

¹⁹ Henshūbu, "Raifusaiensu kigyōka no nerai," *Gijutsu to ningen* (May 1975): 38.

intelligence.²⁰ Nakasone's statement generated a boom in research and industrial interest in life sciences and pushed it to the "forefront of science and technology policies." Already, by the mid-1970s, Mitsubishi Chemicals, one of the giants of the chemicals industry, had set up a life sciences research division that contained eleven research units employing over one hundred researchers, including sixty doctorate-level researchers.²¹

Proponents of life sciences, such as Nakasone, used the pollution crisis to justify large investments and high optimism. Advocates for the field invested life sciences with utopian visions that it would deploy biological processes to sustain industrial expansion while resolving environmental degradation and improving public health and social wellbeing. As a result, "life sciences" was the kitchen sink version of biological sciences. Its definition varied greatly from scientist to scientist and could include engineering, health and medicine, electronics, chemical, engineering, food production, environmental science, physical sciences, and other fields.²²

According to Nakasone's own statement, the field aimed to "understand the structure of life, help protect the environment, preserve the health [of Japanese citizens] . . . and [create] industrial applications for biological life forms (*seibutsu*) and their functions (*kinō*)."²³ Proponents used pollution to justify the new field, claiming that it could offer cures to individuals who suffered chromosomal damage from pollution. They also argued that life sciences could make industrial production more sustainable by replacing chemical processes with yet-to-be-harnessed biological

²⁰ Watanabe Itaru and Kawai Takeshi, "Fukuzatsu na kadai wo ou seimeikagaku," *Gijutsu to ningen* (May 1975): 8.

²¹ Henshūbu, "Raifusaiensu kigyōka no nerai," *Gijutsu to ningen* (May 1975): 39.

²² Government officials and scientists used the term "seimeikagaku" to differentiate "life sciences" from biology or "seimeigaku." Watanabe Itaru and Kawai Takeshi, "Fukuzatsu na kadai wo ou seimeikagaku," *Gijutsu to ningen* (May 1975): 8.

²³ Henshūbu, "Raifusaiensu kigyōka no nerai," *Gijutsu to ningen* (May 1975): 38.

ones that were less energy intensive and produced less toxic waste.²⁴ Like the naïve optimism behind scientific modernization, life sciences was presented as a cure-all for Japan's social, economic, and environmental ills.

While the muddled rhetoric of life sciences appeared to promise that Japan's industrial giants were incorporating environmentalist values into scientific research, Nakasone Yasuhiro and other supporters made it clear that its primary purpose was to support “the development of industrial technology” (*kōgyō gijutsu kaihatsu*).²⁵ This made life sciences a source of anxiety for environmentalists. *Technology and Humans* dedicated the May 1975 issue to the environmental and social dangers of life sciences. Instead of changing the nature of scientific research and technological development for the better, they argued, the pollution crisis became another avenue for profit and economic exploitation. Even the most basic genetic harm caused by pollution—chromosomal deficiencies—opened up a new space for potential industrial profit.

At the institutional and policy level, life sciences would further what *Technology and Humans* called the “technologization of science.” The technologization of science expressed environmentalists' fundamental fears about the fetish of technology: that the large-scale industrialization of scientific research had to keep seeking out new and never-ending sources of technological innovation and new markets in which to sell them, lest economic growth cease.²⁶ According to the magazine, life sciences was an extension of the logic behind nuclear energy in Japan: the large-scale application of scientific research in the form technologies that were aimed

²⁴ Henshūbu, “Raifusaiensu kigyōka no nerai,” *Gijutsu to ningen* (May 1975): 40-41. Watanabe Itaru and Kawai Takeshi, “Fukuzatsu na kadai wo ou seimeikagaku,” *Gijutsu to ningen* (May 1975): 17-19.

²⁵ Henshūbu, “Raifusaiensu kigyōka no nerai,” *Gijutsu to ningen* (May 1975): 39.

²⁶ David Harvey, *Marx, Capital, and the Madness of Economic Reason* (Oxford: Oxford University Press, 2017), 122.

above all at generating private profit. Because it could be quickly monetized, the Japanese government facilitated the rapid expansion of nuclear power production in the 1970s without considering its “social” and “biological” impacts, according to *Technology and Humans*. Biologists Watanabe Itaru and Kawai Takeshi warned that life sciences’ immediate focus was primarily on highly profitable medical technologies, prompting Watanabe to remark that the field should be more accurately “life technologies.”²⁷ Long term, the denizens of industrial life sciences, he suggested, hoped to produce basic research that would fuel technological development and industrial profits for the next thirty years.²⁸ Technologizing science meant stripping its achievements of everything but its most profitable findings and then railroading through rapid, and often dangerous, industrial projects based on those findings.

Watanabe Itaru, Kawai Takeshi, and *Technology and Humans*’ editors argued that the narrow focus of scientists and scientific institutions promoted the reckless and large-scale application of technology. Watanabe emphasized that scientists in general believed that the problem of how “science was applied to” (*kagaku no ōyō*) human society was beyond their consideration. They were supposed to develop technological applications, the social uses and impacts of which were to be dealt with after implementation. Watanabe went on to argue that life science researchers followed the same logic as nuclear scientists who viewed nuclear technology as merely a problem of physics that involved no question of “social application.”²⁹ Underwriting these claims was the same logic that drove scientific modernization.³⁰ As long as science and

²⁷ Watanabe Itaru and Kawai Takeshi, “Fukuzatsu na kadai wo ou seimeikagaku,” *Gijutsu to ningen* (May 1975): 17.

²⁸ Henshūbu, “Raifusaiensu kigyōka no nerai,” *Gijutsu to ningen* (May 1975): 39.

²⁹ Watanabe Itaru and Kawai Takeshi, “Fukuzatsu na kadai wo ou seimeikagaku,” *Gijutsu to ningen* (May 1975): 11.

³⁰ See Chapter One.

technology were seen as absolute goods (*zettai zen*), then scientists could simply perform scientific research without worrying about its impacts on society or “human bodies.”³¹

Life sciences, however, was not simply a continuation of industrial Big Science. It had a more insidious potential. Life sciences represented a new mutation in the dangers of technologizing science by offering the potential to “control human life itself (*ningen no seimeisonomono*).” As Watanabe outlined, one of the main purposes of life sciences was to “clarify life” by understanding “living organisms physically, chemically, and in their potential engineering applications” in order to develop “the technology necessary to control life.”³² Primarily, scientists and engineers imagined controlling and utilizing microorganisms in industrial production processes. However, where that might lead was frightening, especially in light of the blatant disregard for environmental and health impacts demonstrated by companies and engineers in the 1950s and ‘60s. It was made all the more frightening by the fact that nuclear energy development in Japan appeared to repeat the same blatant disregard for safety in favor of rapid implementation. According to Watanabe and other contributors to *Technology and Humans*, this was the major problem with Big Science. Engineers were disincentivized from considering social and environmental impacts in their work. Private industry, employing this purely technical labor, could focus on rapid technological development for immediate and long-term profit. There was nothing to prevent “the technologization of biological life” from turning into the technological control of human life.³³ If scientific modernization was supposed to free fascist

³¹ Henshūbu, “Raifusaiensu kigyōka no nerai,” *Gijutsu to ningen* (May 1975): 41.

³² Watanabe Itaru and Kawai Takeshi, “Fukuzatsu na kadai wo ou seimeikagaku,” *Gijutsu to ningen* (May 1975): 11.

³³ Watanabe Itaru and Kawai Takeshi, “Fukuzatsu na kadai wo ou seimeikagaku,” *Gijutsu to ningen* (May 1975): 9-10.

Japan by turning it into a popular democracy, now it threatened to produce its opposite by colonizing the Japanese people through mechanisms of technological control.

National Projects and Big Science on the Rampage

Big Science did not originate in private industry. It was the outgrowth of massive state intervention into scientific and technological development. In Japan, state intervention took the form of postwar “national projects” (*nashonaru purojekkuto* or *kokkakeikaku*), like large-scale infrastructure projects, such as nuclear energy and Japan’s many dam projects or other technological initiatives, such as Japan’s space program. Modeled after U.S. projects like the Manhattan Project and the Tennessee Valley Authority, the state mobilized capital, scientific resources, and administrative capacities beyond that of which private industry was capable.³⁴ Although the Japanese government justified national projects by claiming that they expanded social wellbeing, private industries often benefited the most from participating in these projects and utilizing the new technologies created through them. National projects set a strong precedent for the state to support and intervene in scientific development for the sake of private profits.

State intervention in science became a point of obsession for environmentally conscious scientists, engineers, and activists. In their environmental narratives, *Technology and Humans*’ contributors framed Big Science and its national projections, as well as state intervention into science generally, as science and technology out of control. It was this idea of science and technology “out of control”—or, as they put it, science and technology “on the rampage” (*bōsō*)—that generated both the ecological violence that was consuming the global environment and the rapid transformation of Japanese society into a dehumanized space dominated by

³⁴ Eric Dinmore, “Concrete Results? The TVA and the Appeal of Large Dams in Occupation-Era Japan,” *The Journal of Japanese Studies* 39, no. 1 (Winter 2013): 7-9, 17-25; Kenmochi Kazumi, “Nihon no uchū kaihatsu,” *Gijutsu to Ningen* (January 1976): 6-7.

technological systems. The state's large-scale mobilization of capital and resources represented the true danger of humanity's system of explosive growth that would consume the world's resources and drown it in pollution. Without national projects, there could be no environmentally corrosive industrial expansion. Moreover, environmentalists feared state control of science, which they believed threatened democracy and safety, especially since state support for Big Science was continually escalating in the 1970s. In January 1976, a little over a year after the issue on life sciences went to press, *Technology and Humans* published a selection of scientist- and engineer-authored articles titled "Is There a Future in Big Science and Big Technology?" (*kyodai kagaku gijutsu ni wa mirai aga aruka*). The four areas of Big Science that the articles addressed were nuclear energy, life sciences, pollution-prevention technologies, and the space program. The title's question was not about the future outlook of Big Science but about what kind of future Big Science would create for humanity if allowed to continue on its current trajectory. According to the writers, Big Science was a death sentence for humanity, killing human bodies through environmental degradation and destroying souls through the technological domination of everyday life.

In the leading article of the issue, Kenmochi Kazumi, an engineer from the Computer Rationalization Research Association (*konpyuuta gōrika kenkyūkai*), argued that Big Science developed around the "two pillars" of nuclear energy and the space program, both of which originated in World War II (the Manhattan Project and the V1/V2 rocket programs, respectively). Under the "guise" of "peaceful application" (*heiwaryō*), these military technology programs allowed the "the state to take over scientific development (*hikitsugu*) through a system of development centered on the state (*kokka ga kaihatsutaisei no chūshin ni suwaru*)." From this emerged "Big Science," which included burgeoning fields such as computers, cancer research,

life sciences, and others—all fields in which “the state participated in their development.”³⁵

What did Kenmochi Kazumi find so unconscionable about national projects and state intervention? Part of it was the uncomfortably close and often concealed connections between the projects and military technology—the “large looming shadow of war and the Japanese state” over national projects. For the space program, on which Kenmochi focused in his article, the military connotations were compounded by U.S. and Japan cooperation over space development, which was a part of their security treaty and general military cooperation.³⁶ Kenmochi’s main criticism, however, centered on money and democracy. The U.S. Apollo Program cost the equivalent of 20 trillion yen, and Japan’s program was not far behind in its financial impact. Japan’s Space Agency projected that space-related development would cost around 97 billion yen in 1976 alone, and each satellite that Japan sent up came with a price tag of 10 billion yen. National Projects, like the space program, represented large-scale investments of taxpayer money that “Japanese citizens could never control (*kokumin no gawa kara kontoororu dekiru mono denai*).” Big Science was fundamentally undemocratic and a waste of government funds. Shadowy military connections, violations of democracy, bureaucratic control, and the wasteful use of taxpayer capital—Kenmochi Kazumi framed the entanglement of science with state as part of a project to monopolize scientific and technological development, and, through that monopolization, to keep the Japanese people from being involved in technological decisions that were fundamental to how society would be governed or “controlled,” to use the language of environmentalists.

Indeed, Kenmochi wrote of the state monopolization of science in terms of its “take over”

³⁵ Kenmochi Kazumi, “Nihon no uchū kaihatus” *Gijutsu to Ningen* (January 1976): 6.

³⁶ Kenmochi Kazumi, “Nihon no uchū kaihatus” *Gijutsu to Ningen* (January 1976): 7.

of a “*system*” of scientific development. The problem of the “system” was key to environmentalist thought. Historian Thomas Hughes argues that the Manhattan Project, the model for Japan’s national projects, was at its core a project to build a technological system, the final outcome of which was supposed to be a “centrally controlled and coordinated production system.”³⁷ By “technological system,” I refer broadly to the systemization of scientific resources, practical administration, labor, and financial capital into tightly controlled and efficient national projects or large-scale industrial production processes. The 1970s witnessed the emergence of systems theory, which conceived of the world in terms of social, economic, or even technological systems that were too complex to be controlled by human agents. The Japanese state’s intervention into scientific development through national projects represented, in *Technology and Humans*’ critique, the establishment of complex systems of technological development, infrastructure creation, and industrial production that exceeded human governance. While for systems theorists, such a development was not inherently negative, it was for environmentalists a nightmarish scenario that would turn humanity’s technological creations into instruments of domination.³⁸

In the issue titled “Is There a Future in Big Science and Big Technology?,” Asahi journalist Makino Kenji portrayed the different projects of “state-led, Big Science” as having a “self-generated, automatic movement” (*jikō undō*) that was “running wildly” (*bōsō*) or, to give it a more vivid but accurate translation, “on a rampage.” The idea that techno-scientific development (research, engineering, product development, and so forth) was a system with an

³⁷ Thomas P. Hughes, *American Genesis: A Century of Invention and Technological Enthusiasm 1870-1970* (New York: Viking, 1989), 383.

³⁸ This was not dissimilar to the concerns expressed by Max Horkheimer and Theodore Adorno in *The Dialectic of Enlightenment* and Herbert Marcuse in *One-Dimensional Man*.

autonomous “self-[generated]-movement” that was “rampaging” (*bōsō*) represented the apex of *Technology and Humans*’ contributors’ fears about technological control. The system was out of control, but it was not rudderless—it had a purpose and direction. Its purpose, Makino argued, was “to serve economic growth and state power (*keizai to seiji wo hōshi suru*).”³⁹

To say Big Science was “on the rampage” was to argue that the kind of technological development that created the pollution crisis was not only unaltered but growing more dangerous. *Technology and Humans*’ scientists extrapolated from particular, large-scale technological systems—including industrial production systems or national projects—a general fear of technological control. They evoked a fear that humanity, dependent as it were on expanding technological systems (in production, transportation, communications, and more), would devastate the planet’s ecosystem. Ecological destruction and technological domination were entwined.

Technology and Humans expressed the interrelation of environmental destruction and technological control as an “anxiety” (*kigu*) over the different “systems of development” (*kaihatsu taisei*). Nuclear energy was the most frightening and precarious example of this. Representing an optimistic vision of unlimited energy, nuclear represented the horizon of Big Science “on the rampage.” In the same January 1976 issue cited above, the magazine’s editorial staff published an article entitled “Nuclear Fusion R&D Anxiety” that provided clarity about the problems of Big Science, technological control, and what being “on the rampage” meant. The article was prompted by a July 1975 announcement from the Japan Atomic Energy Commission (JAEC). In the announcement, JAEC outlined Phase Two of their “Plan for Research into Nuclear Fusion” to be carried out by the Japan Atomic Energy Agency as a “national project.”

³⁹ Makino Kenji, “Raifusaiensu kenkyu kaihatsu no dōkō,” *Gijutsu to ningen* (January 1976): 27.

Phase One had cost 3.3 billion yen, and Phase Two was budgeted for over 100 billion yen, a not-so-modest leap in funding.⁴⁰

The state pursued nuclear fusion as an answer to the defects of nuclear power derived from nuclear fission. Nuclear fission was limited by the availability of uranium and the difficulties in disposing of its waste. Moreover, nuclear fission was not terribly efficient. Using the thermal energy from a nuclear reaction, nuclear power plants used the resulting heat produced steam that turned a turbine. It married cutting-edge scientific technology to older steam turbine technology. Fusion promised to eliminate the resource and waste issues of fission. If scientists could develop a process for drawing energy directly from super-heated plasma, it would be a wildly more efficient power source.⁴¹

What about nuclear fusion produced “anxiety” for *Technology and Humans*? Their anxiety came down to the Japanese state’s view of the most fundamental resource: energy. The editorial staff declared that nuclear fusion was a “highly nationalistic framework for achieving energy independence.” In itself, energy independence was not necessarily a negative. With national projects, however, the problem was one of scale and vision. The editors were critical of the government’s framing of the project and the news media’s representation of it, declaring that both were awash in “unabashed optimism” for nuclear fusion’s potential to “liberate humanity from its current energy constraints (*jirinui wa jijitsujō no enerugii mondai kara kaihō sareteiru*).”⁴² In this context, “*bōsō*”—the “running wild” or “rampaging”—of Big Science took the form of a desire for unlimited energy inputs.

⁴⁰ Henshūbu, “Kakuyūgō kenkyū kaihatsu e no kigu,” *Gijutsu to ningen* (January 1976): 28-34.

⁴¹ Henshūbu, “Kakuyūgō kenkyū kaihatsu e no kigu,” *Gijutsu to ningen* (January 1976): 30-31.

⁴² Henshūbu, “Kakuyūgō kenkyū kaihatsu e no kigu,” *Gijutsu to ningen* (January 1976): 29.

To the magazine's environmentalists, the dream of liberation from energy constraints ultimately opened up humanity to disaster. *Technology and Humans*' editors argued that by "advancing the belief that humanity will achieve unlimited energy," proponents of nuclear fusion in state, private industry, and science could "bypass any investigation into the problems that might arise when nuclear fusion is implemented."⁴³ The danger lay in excessive energy outputs, that is, energy "running wild." At the time the article was written, nuclear energy relied on converting fission to heat and heat to energy, a process in which about two thirds of the heat is released into the atmosphere. According to *Technology and Humans*, "When increasing the absolute quantity of energy used, any amount of energy that exceeds the energy used will necessarily be expelled into the environment and can damage the natural ecosystem."⁴⁴ In other words, the dream of unlimited energy involved overcoming material processes in nature—liberating humanity from nature through physics and engineering, but *Technology and Humans*' editors argued that such a logic would intensify the dangerous radiation of energy back into natural ecosystems.

To environmentalists, the liberation of destructive energy flows was intimately tied to the degradation of science for national purposes that occurred by assimilating science into "development systems" (*kaihatsu taisei*). As the editors put it, "The large-scale mobilization of researchers for national purposes produces a wholesale bureaucratization of the development project. The project treats researchers and engineers as mere commodities, and, as a result, wears out their talents, eventually even harming the basic research and talent pool of scientists." The "national purposes" also "subsumed academic science in a research organization that united

⁴³ Henshūbu, "Kakuyūgō kenkyū kaihatsu e no kigu," *Gijutsu to ningen* (January 1976): 33.

⁴⁴ Henshūbu, "Kakuyūgō kenkyū kaihatsu e no kigu," *Gijutsu to ningen* (January 1976): 32.

industry, military, and the academy,” which in turn had a “profound effect on the course of technological development and scientific research within academic institutions.”⁴⁵ National projects inserted scientists, engineers, and academic science into a regularized, bureaucratic system of technological development, thus transforming scientific workers and scientific practices. In the minds of *Technology and Humans*’ environmentalists, this could be called “The System.” State intervention into science created systems of scientific development that dehumanized scientists and corrupted scientific practice, on the one hand, and that became “autonomous,” “self-developing” processes of technological development that “ran wildly” out of control, on the other. Their end results always outputted ecological destruction.

According to the logic of environmentalists, environmental destruction was the result of technological systems beyond human control as much as it was a conscious choice by industries and governments to ignore safety concerns when outputting toxins. The solution, for their perspective, was to eliminate national projects and restructure large technological systems of productions by “humanizing” them, that is, by repositioning human action and human will as driving forces behind technological development. They believed, however, that “The System” would always try to block reforming actions.

As technological systems that aimed to be highly efficient and rational, national projects and Big Science would strive to eliminate or to control chaotic and unpredictable elements: humans and nature. Hence, environmentalists focused on the commodification of scientists and engineers in large projects. Nature was also unruly, and pollution was a rupture caused by technological systems’ inability to control nature. This was evident in pollution-control technologies, another creation of Big Science. The pollution crisis of the late 1960s had

⁴⁵ Henshūbu, “Kakuyūgō kenkyū kaihatsu e no kigu,” *Gijutsu to ningen* (January 1976): 29.

convinced government and business leaders that the route to preventing further public criticism and resistance was to reduce the harm of pollution, but, according to environmentalists writing in *Technology and Humans*, these leaders merely put technological band-aids on pollution rather than rethinking the system of production that caused it.

Sugimoto Akira, a scientist studying pollution prevention technology, derisively noted that “without understanding the mechanisms by which production processes produce pollutants, factories merely create a ‘discharge room’ (*taredashi shitsu*) and a ‘wiping your ass’ (*shirfukishitsu*) room.” In this metaphor, the “discharge room” was the department in a factory responsible for discharging waste (wastewater, gases, and so on), and the “wiping your ass” room was the department of engineers tasked with trying to keep up with the flow of pollutants to make sure they were disposed of safely. Sugimoto gave the example of vinyl chloride production facilities. Used in plastic production, engineers were not entirely sure how pollutants were discharged into wastewater as part of the vinyl chloride production process, despite their intimate familiarity with it. Nonetheless, those same engineers and state regulators expected pollution prevention technologies to decontaminate the water before dumping it into the sea or local watershed even though no one was sure how contamination happened. Engineers were “wiping their asses” without knowing exactly what chemical processes they were cleaning up. Examples like vinyl chloride made pollution prevention technologies a “deception” (*mayakahshi*) according to Sugimoto.⁴⁶

While Japan’s optimistic government agencies and corporations envisioned technology systems designed to capture unlimited energy flows, environmentalists aimed to show that these systems were unstable and out of control. Instead of channeling natural processes into stable

⁴⁶ Sugimoto Akira, “Kōgai bōshi gijutsu no genkai,” *Gijutsu to ningen* (January 1976): 42.

technological applications, the systems could contain neither energy nor toxicity. Large-scale technological development and the state's role in it thus became major sources of anxiety for activists, but in order to strategize ways of attacking the out-of-control system that spewed toxicity with little restraint, environmentalists turned to the figure at the heart of the monster: the industrial engineer. Who were they, and what could they do to stop the nightmare? Moreover, what kind of person would knowingly help to create harmful technologies? Could they be redeemed through activism? Asking these questions, environmentalists came to view the engineer as a potential figure of political activism. But first, they began investigating the conditions and consciousness of the engineer to determine whether an engineer-led resistance would be effective.

IV. Liberated from Prosperity: Can Pollution Revolutionize the Engineer?

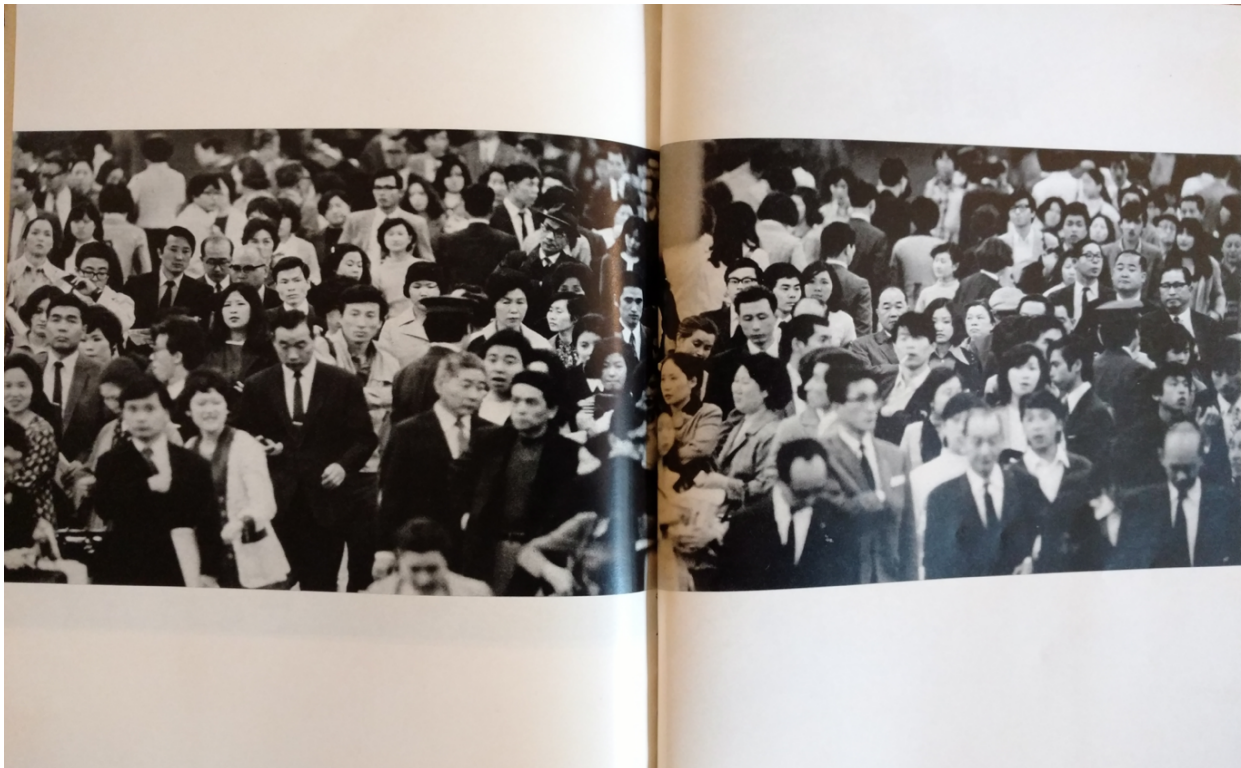


Figure 1: Untitled photograph from “Kyodatsu” (September 1974).⁴⁷

Technology and Humans’ writers interpreted the “engineer’s consciousness” in two ways. First, it was a measure of engineers’ willingness to engage political issues and participate in activism. Second, it was a psychological profile of what motivated engineers in their work and, more significantly, their willingness to remain loyal to companies that had caused incredible harms through pollution. In this section I examine the magazine’s deep dive into the engineer’s mind and soul. At the center of the magazine’s investigations was the dystopian anxiety expressed in Tanno Kiyoshi’s photographs of street scenes in Tokyo (Figure 1). Tanno’s photograph illustrated the dizzying sense of homogenization associated with Japan’s postwar prosperity and the swelling ranks of white-collar workers. The image represents a claustrophobic world where individuals have been stamped out in a mass of businessmen and women. Engineers were caught up in the crowd—just one segment of the growing white-collar class indistinguishable from any other. For engineers who wrote in *Technology and Humans*, Japan’s environmental crisis gave them the opportunity to reflect on their dissatisfaction with corporate scientific work and their feelings of alienation. Environmentally conscious engineers wanted to understand the systemic relationship between corporate alienation and environmental degradation. Indeed, Tanno Kiyoshi’s photo series depicting the streets of Tokyo was paired with another set of images depicting a rural community devastated by cadmium pollution from mining operations (Figure 2). Alienation and pollution were two sides of the same coin for Japanese environmentalists.

⁴⁷ Tanno Kiyoshi, untitled photograph, *Gijutsu to ningen* (September 1974): 74-75. Image used under fair use.

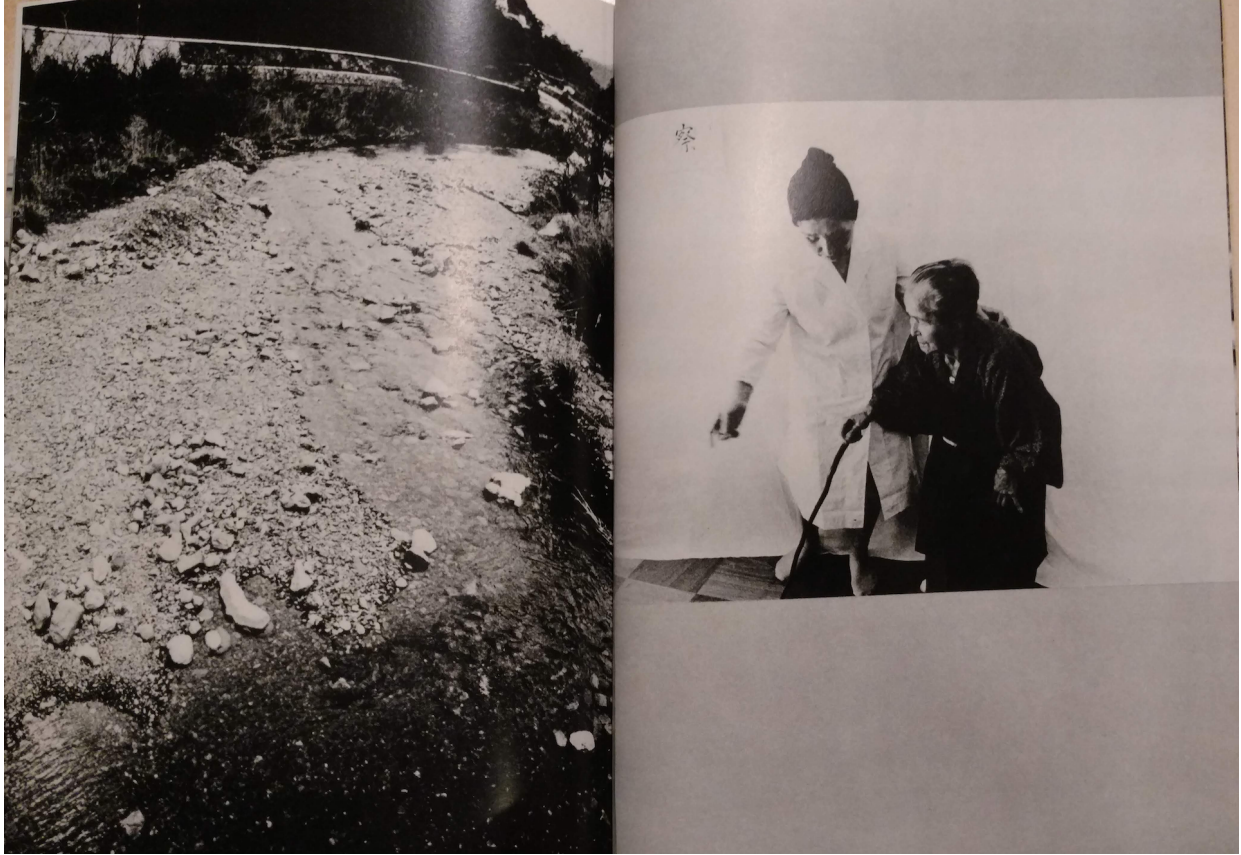


Figure 2: Cadmium pollution and its effects, Tsushima, Nagasaki Prefecture (September 1974).⁴⁸

Technology critic Hoshino Yoshirō argued in *Technology and Humans* that if you included technicians and engineers who were responsible for managing and designing production lines (individuals that most *Technology and Humans* writers did include in their definition of “engineer” [*gijutsusha*]), then the number of engineers in Japan was most likely over one million by 1975, nearly double the official government statistics.⁴⁹ The size and importance of the scientific-technical professional class made it a tantalizing target for environmentalists if its members could be convinced not only to think “politically” but to take control of technological development from within the factories and laboratories.

⁴⁸ Tanno Kiyoshi, untitled photograph, *Gijutsu to ningen* (September 1974): 68-69. Image used under fair use.

⁴⁹ Hoshino Yoshirō, “Gijutsusha no ishiki to ‘soshiki,’” *Gijutsu to ningen* (June 1975): 6.

Technology and Humans' writers asked two basic questions about engineers. First, why were engineers so willing to narrowly focus on science and technology without concern for the social import of their work? Second, what possibility was there to make these engineers politically active and turn them into agents of social change?

The end point for *genba* environmentalism was to regain “human control” over a society that had been taken over by the “false logic” of scientific modernization. According to *Technology and Humans*' environmentalists, Japanese citizens had to be convinced to become politically and socially conscious. The starting point for that consciousness was *genba*, in particular the experience of pollution victims. *Technology and Humans*' contributors believed that all scientists and engineers should come to this realization in the same way that the magazine contributors did: by experiencing the same rupture and the same turn to the margins that Suga Ryūichi and Takahashi Noboru described (see Chapter One). Suga explained the objective in an essay from June 1975: “What we need to figure out now is . . . what could animate someone to push herself into the margins and there carry out a forceful resistance and what principle of action would support that resistance.”⁵⁰ From that experience of “going to the margins,” engineers would, according to Suga’s formulation, “regain their humanity” by “standing on the side of Japanese citizens,” especially those who were vulnerable.⁵¹ The inquiry into the character of scientists and engineers was intensely personal for *Technology and Humans*' contributors. It reflected their own journeys from “disengaged,” apolitical scientists to anti-pollution scientists. It was, moreover, part of a commitment to personalize the work of scientists and engineers in order

⁵⁰ Suga Ryūichi, “Atarashii gijutsuzō e no kitai,” *Gijutsu to ningen* (June 1975): 36.

⁵¹ The demand that engineers “stand on the side” of pollution victims and Japanese citizens as opposed to standing on the side of “power” was often repeated. See for example: Okumura Seiji, “Zadankai: Kaitai suru genba—gijutsusha no tachiba: gijutsusha kara mirai wo ubatta mono,” *Gijutsu to ningen* (September 1974): 54; “Aruhatsugen,” *Gijutsu to ningen* (May 1974): 5.

to overcome distance from social and political concerns.

The engineer represented two polarized possibilities for environmentalists. On the one hand, *Technology and Humans*' writers reiterated the image of the “politically active” engineer who took seriously social implications of his or her work and sought to break the cycle of “technologizing science” for profit in order make science work for “human ends,” in the words of *Technology and Humans*' editors. On the other hand, a second image—of a growing mass of unthinking technical experts—haunted *Technology and Humans*' visions for using engineers and technology as a site of political contestation. It portended the future that the magazine's writers feared—one in which engineers were willing to allow science and technology to control society rather than taking an active political stance—in short, a repetition of the failures of the 1950s and '60s. *Technology and Humans*' contributors feared that engineers were falling prey to what György Lukács called “reification,” a condition where their thought processes—what *Technology and Humans* would call “political consciousness” (*ishiki*) or “subjectivity” (*shutaisei*)—would be fully taken over by the false logic that they believed dominated society.⁵² For *Technology and Humans*' contributors, that logic fetishicized technology and prioritized endless development for profit. Engineers, they feared, would become unthinking animals in their scientific work. *Technology and Humans*' scientists believed that bringing engineers to the *genba* and forcing them to confront the experience of pollution victims, who fell outside the fetish of technology in Lukács's formulation, was the only method capable of producing a new way of thinking, a new “political consciousness” in the engineer.

Surveying the Audience: Understanding the Average Engineer

By the time of the magazine's launch in 1972, *Technology and Humans* contributors' and

⁵² György Lukács, *History and Class Consciousness* (Cambridge: The MIT Press, 1971), 83-209.

editors' experience in engineering had taught them that the majority of engineers were mostly disinterested in political topics. Nonetheless, the magazine's writers recognized, as good engineers probably would, that their data sets were limited. They needed to collect more experiences and more data. *Technology and Humans*' first major attempt at mining data about engineers came in a 1973 survey conducted with the help of the magazine's readers.⁵³ The "image" of the engineer that the magazine's contributors constructed from the survey was of a bureaucratic, obedient, and thoughtless figure who was highly skilled and perfectly suited for a production process that demanded continuous technological advancement without concern for the consequences. It confirmed the magazine's worst fears.

In their report on the results of the survey, entitled "Now, At the Factory—The Figure of Contemporary Japan's Engineer," the editorial staff explained what their goals for the survey had been:

What do those who work in the research laboratory and those who work at the site of production think about the job, the corporate-industrial system, and pollution? How do they spend their days? What exactly does the average engineer look like today? We designed this survey to answer these questions and to reveal the raw image of the engineer.⁵⁴

The editors sent out 461 surveys and received 160 responses. 101 of the respondents were university graduates, and most were in their mid-twenties to late thirties. 146 of the respondents worked in fields related to industrial engineering. The dominant fields were metal engineering, applied chemistry, electronics/electrical engineering, and mechanical engineering.⁵⁵ They were

⁵³ The majority of respondents do not appear to have been readers of the magazine.

⁵⁴ Henshūbu, "Ankeeto repooto: Ima, kōjō de—gendai nihon no gijutsusha zō," *Gijutsu to ningen*, no. 8 (Winter 1974): 57.

⁵⁵ The average age was 32.6 years old. 18 respondents were ages 40-49, and 5 respondents were 50 or older. 43 respondents worked in mechanical engineering; 24 in Electronics/electrical engineering; 16 in applied chemistry; 26 in metal engineering; 6 in applied physics; 7 in architecture; 2 in civil engineering; and 2 in aerospace engineering. Also, 1 respondent was a production manager; 2 were production planners; and 1 was in shipbuilding. 101

asked forty-three questions, ranging from the mundanely personal—reading habits, hobbies, and family—to the intensely personal and political—why they became engineers, what their goals were, what they thought of labor unions, whether they were satisfied with work or not, and what they thought about pollution.⁵⁶ In regards to pollution, the majority of respondents (126) agreed that engineers carried responsibility for causing pollution, and nearly half of respondents (75) asserted that the origin of pollution lay in Japanese corporations’ “production (profits)-first” policy, which privileged increasing production above all other considerations. Another forty-one respondents indicated that it was the lack of government anti-pollution measures that caused the pollution crisis. Moreover, when asked if they would provide data to anti-pollution movements concerning pollution caused by their company, most answered that they would. Perhaps these were the self-conscious engineers *Technology and Humans* sought? Unfortunately, for the hopes of *Technology and Humans*’ writers, when asked about the most effective remedies to pollution, the vast majority of survey participants answered that industry-led anti-pollution measures, government policies, or some combination of the two was the best approach. They expressed little faith in the ability of citizen-led anti-pollution movements or labor movements to fight against pollution.⁵⁷ This was a red flag for *Technology and Humans*’ editors.

A roundtable discussion entitled “The Structure of the Engineer’s Consciousness: Hollow Earnestness” between Hoshino Yoshirō, chemical engineer Murata Tomijirō, and Ui Jun, a

respondents held a college degree as their highest level of education. 15 had doctorates, and 2 had master’s degrees. 21 were graduates of technical engineering high schools. Henshūbu, “Ankeeto repooto: Ima, kōjō de—gendai nihon no gijutsusha zō,” *Gijutsu to ningen*, no. 8 (Winter 1974): 57-58.

⁵⁶ Henshūbu, “Ankeeto repooto: Ima, kōjō de—gendai nihon no gijutsusha zō,” *Gijutsu to ningen*, no. 8 (Winter 1974): 59-69.

⁵⁷ Henshūbu, “Ankeeto repooto: Ima, kōjō de—gendai nihon no gijutsusha zō,” *Gijutsu to ningen*, no. 8 (Winter 1974): 66-67.

scientist who became one of Japan's most famous pollution researchers and activists, interpreted the survey data. They argued that engineers on the whole were thoroughly depoliticized and, to use Lukács' term of art, "reified" individuals suited for a "systemized" society. Hoshino, Murata, and Ui concluded that the survey results had shown engineers to be diligent but socially and politically indifferent experts who "only lived to work."⁵⁸ They were motivated and eager in their tasks but ultimately shallow in their thinking. As Murata put it, "I think engineers seem to read whatever the prevailing option is and absorb it."⁵⁹ Indeed, the three scientists, not to mention most of *Technology and Humans*' writers, believed that most mainstream magazines rarely published critical content and overwhelmingly supported government policies and Japan's corporate sector out of fear of alienating the companies that provided their ad revenue. Ui Jun added to this, "I get the sense that they're the kind of people who are certainly extremely earnest and simplemindedly accept whatever they're told."⁶⁰ That is to say, the engineers always did things in a "*kakkōi*" manner—that is, style without substance. According to the *Technology and Humans* analysis, the surveyed engineers reported that scientists and engineers held some responsibility for pollution merely because it was the fashionable thing to say. Meanwhile, they

⁵⁸ Hoshino Yoshirō, Murata Tomijirō, and Ui Jun, "Zadankai: Gijutsusha no ishiki kōzō—kyokō majimesa," *Gijutsu to ningen*, no. 8 (Winter 1974): 70.

⁵⁹ Even their magazine reading choices, which primarily included the major literary, political, and long-form journalistic publications that "most college graduate intelligentsia read," indicated that engineers were skilled at presenting an image of being culturally and politically affluent but were ultimately shallow, empty human beings according to the three discussants Hoshino Yoshirō, Murata Tomijirō, and Ui Jun, "Zadankai: Gijutsusha no ishiki kōzō—kyokō majimesa," *Gijutsu to ningen*, no. 8 (Winter 1974): 70-71.

⁶⁰ In the middle of this discussion, Murata reacted strongly to the fact that forty-one of the respondents indicated that they had no hobbies: "Isn't that extremely suspicious for a human being [not to have hobbies]?" To which Hoshino responded, "You say that, but I also don't have any hobbies." Sometimes the politically motivated critic was not exactly well rounded. Hoshino Yoshirō, Murata Tomijirō, and Ui Jun, "Zadankai: Gijutsusha no ishiki kōzō—kyokō majimesa," *Gijutsu to ningen*, no. 8 (Winter 1974): 70.

toed company line in their responses about the pollution crisis.⁶¹

Still, Ui, Hoshino, and Murata emphasized that engineers did their work “earnestly.” Engineers were not dishonest. Instead, they were victims of an “impoverished” education.⁶² Even their “stylistic” (*kakkoi*) responses to pollution were not conscious attempts to be deceitful. As they saw it, engineers were legitimately unaware of their shallow reiteration of morally acceptable pollution-related parlance. They had been trained to focus exclusively on the technical and scientific aspects of their work. Hoshino Yoshirō argued that this made them passive in their response to pollution.⁶³

Ui, Murata, and Hoshino asserted that if engineers were educated and socialized to become highly skilled but unthinking workers, then breaking free from their obedient mindset was more difficult because of the disconnected nature of their professional environment. Ui Jun, commenting on the survey respondents’ lack of optimism toward the anti-pollution movements, explained: “I think their low regard for labor activism and citizen-led anti-pollution activism is natural because from within the walls of the corporate world they cannot see the struggle.” He went on to argue not only that the corporate world kept engineers disconnected from anti-pollution activism but also that their laboratory and factory work kept them from having any connection to the natural environment or any “sense of nature.”⁶⁴ This coincided with Hoshino’s

⁶¹ Hoshino Yoshirō, Murata Tomijirō, and Ui Jun, “Zadankai: Gijutsusha no ishiki kōzō—kyokō majimesa,” *Gijutsu to ningen*, no. 8 (Winter 1974): 70-72, 77.

⁶² Hoshino Yoshirō, Murata Tomijirō, and Ui Jun, “Zadankai: Gijutsusha no ishiki kōzō—kyokō majimesa,” *Gijutsu to ningen*, no. 8 (Winter 1974): 70-73.

⁶³ Hoshino Yoshirō, Murata Tomijirō, and Ui Jun, “Zadankai: Gijutsusha no ishiki kōzō—kyokō majimesa,” *Gijutsu to ningen*, no. 8 (Winter 1974): 73.

⁶⁴ Hoshino Yoshirō, Murata Tomijirō, and Ui Jun, “Zadankai: Gijutsusha no ishiki kōzō—kyokō majimesa,” *Gijutsu to ningen*, no. 8 (Winter 1974): 75, 77.

argument that technological development reached its limit when it confronted nature, that “laboratory science” could not cope with the natural environment, and that, therefore, science had to be joined with the experience of individuals who were connected to the natural environment, like farmers and fishermen.⁶⁵

The survey of industrial engineers allowed the editors and contributors to *Technology and Humans* to construct a detailed model of “engineers’ consciousness,” which seemed to conform with what they already believed they knew about how engineers thought. However, the magazine’s writers also sought more in-depth information about the problems that occurred at the production sites of different industries. *Technology and Humans*’ editors solicited reports from engineers and invited them to participate anonymously in roundtable discussions focused on the nature of engineering work, the status of technology in industry, and the conditions on the production floor. Statements made by engineers who chose to participate seemed to confirm Ui, Hoshino, and Murata’s assessment of engineers and of the workplace in general. The anonymous engineers reiterated the image of engineers as supposedly timid, apolitical individuals.

At one roundtable, magazine contributor Okumura Seiji, three autonomous engineers, and a steel worker (“manual laborer”) discussed what they saw as the “hollow” personality of the engineer. Okumura excoriated the education system for producing “deformed” engineers: “Engineers pass through today’s university education and end up completely disconnected from things like societal concerns or human problems. . . . The university . . . is nothing more than job training.” He further argued that engineers’ science-focused education ignored the bleak history of industrialization and its victims. Okumura was blunt about the consequences: “After four years of this, the engineers become completely deformed.” The anonymous electronics engineers

⁶⁵ Hoshino Yoshirō, “Kankyō osen no kongen—sore wa gōrika derau,” *Gijutsu to ningen*, no. 2 (Summer 1972): 25.

added that, because managers and executives view engineers as mere tools for generating profits, “the more deformed engineers are, the more convenient it is” for the company.⁶⁶ Engineers, according to this account, were well trained for company needs.⁶⁷

The lone “manual laborer” involved in the aforementioned roundtable discussion argued that technical education had made engineers “forget that which is most important to human beings” by disassociating engineers from the *genba* of the factory floor. As engineers’ work became more managerial in nature, they designed production processes and technologies that failed to take into account the fact that human beings would be operating them. As he explained, the factory had become a “racecourse” where speed and dangerous conditions of production made it difficult for even the best firms to retain workers.⁶⁸ Activist and social critic Nagasaki Hiroshi, writing in another article, defined this development as the “technologization” of industrial management. Engineers were increasingly responsible for managing workers and using technology to control workers’ actions.⁶⁹ Engineers who spoke to *Technology and Humans* often emphasized the paradox that engineers spent less time on the factory floor—the *genba*—even as they were increasingly responsible for developing means to manage it.⁷⁰ The implication was

⁶⁶ Okumura Seiji, “Zadankai: Kaitai suru genba—gijutsusha no tachiba: gijutsusha kara mirai wo ubatta mono,” *Gijutsu to ningen* (September 1974): 48.

⁶⁷ Numerous other accounts of their workplace by engineers in *Gijutsu to ningen* articulated the same image of an engineer holed up in the office or research room—completely isolated from the factory floor—and buried in scientific activity without concern for the consequences of his work. See for example: “Zadankai: genba ni miru gōrika no jittai,” *Gijutsu to ningen*, no. 3 (Fall 1972): 50; Kamata Satoshi, “Zadankai: Zetsubō kōjō no rōdō,” *Gijutsu to ningen* (July 1974): 55-63; Ui Jun and Kondō Kan’ichi, “Gendai gijutsu no rikkyakuten to kōgai no honshitsu,” *Gijutsu to ningen* (November 1974): 6-17; Fujiwara Kunisato, “Shakai taisei to kagakusha no tachiba,” *Gijutsu to ningen* (December 1974): 27-38.

⁶⁸ He was a manual laborer at a steel plant. Okumura Seiji, “Zadankai: Kaitai suru genba—gijutsusha no tachiba: gijutsusha kara mirai wo ubatta mono,” *Gijutsu to ningen* (September 1974): 49-50.

⁶⁹ Nagasaki Hiroshi, “Seigyo to Nihirizumu: Kanri shakai ni okeru rōdō to gijutsu,” *Gijutsu to ningen* 1, no. 1 (Spring 1972): 99-102.

⁷⁰ For one example, see a discussion of engineers in the first issue: “Kōsotsu gijutsusha wa kokuhatsu suru: dare ga kono hatsugen ni kotaeruka,” *Gijutsu to ningen* 1, no. 1 (Spring 1972): 92-97.

that engineers were becoming more disconnected from the human effects—both on labor and the environment—of their work through what *Technology and Humans*' engineers described as the bureaucratization of technical work. For engineers who contributed to *Technology and Humans*, the white-collar work was a symbol of the technocratic order and represented an object of fear for them. In the minds of the magazine's contributors, becoming "white-collar" would involve moving further away from their image of the politically active, "fully human" agent.

In testimonials from industrial engineers, *Technology and Humans* continued to find evidence that engineers were being dehumanized and forced into the rationalizing mindset that drove the logic of scientific modernization. Returning to Okumura Seiji's roundtable, the engineer-discussants argued that they were subsumed in a corporate environment solely focused on producing and selling in mass quantities. They believed that this work blunted individual curiosity associated with scientific inquiry in favor of making the work of engineers homogenized and interchangeable. The particularity of engineers' work did not matter nor did the conditions of the factory. Okumura explained how companies now saw engineers:

Make good products, produce in mass quantities, produce cheaply—that became the only thing that mattered, and it became the engineer's job do it. Once things reach a certain point, all that will matter is selling. Right now, no one really cares about what happens in the factory and sales are given first priority. At its extreme, this logic suggests that eventually producing things will not matter, and then engineers can just not come to work.⁷¹

Okumura's roundtable discussion aligned with Hoshino Yoshirō's contention that industry

⁷¹ Okumura Seiji, "Zadankai: Kaitai suru genba—gijutsusha no tachiba: gijutsusha kara mirai wo ubatta mono," *Gijutsu to ningen* (September 1974): 49. Another engineering roundtable from the June 1975 issue of *Gijutsu to ningen* led by Okuno Takeo reiterated this basic premise. Participants confirmed that engineers simply followed the demand to keep "producing products" without thinking about the consequences. As Okuno Takeo put it, most companies did not really care about technology except to rapidly implement it in order to increase "efficiency" and "mass production," which indicated that while "[in Japan the technology to make large quantities of stuff] has certainly advanced," its leading technology companies lacked any real sense of technology and innovation. Okuno Takeo, "Sugao no gijutsusha—sono kako-genzai-mirai," *Gijutsu to ningen* (June 1975): 19.

required a large number of “timid, middle-class” engineers to support the production process.⁷² As *Technology and Humans*’ engineers saw it, the future from the perspective of big business was to simplify as much as possible the work of both laborers and engineers and to turn both into “unthinking” elements in the technological systems that produced stuff.⁷³

Engineers’ testimonies in the magazine offered a dark but (occasionally) sympathetic image of the archetypal engineer. Although Ui Jun and others excoriated engineers for their lack of political interest, they nonetheless understood them to be products of a system. Educated to focus only on the application of their technical skills, engineers, in the view of *Technology and Humans*’ contributors, were incentivized to ignore the outside world, conditions in the factory, and the impact of technology on human beings.

Company Loyalty: The Tanaka Incident

Technology and Humans and their engineer allies argued that the education system and the “isolation” of engineers produced individuals who willingly subordinated themselves to company goals. The practical course of action for *Technology and Humans* was to determine how to break this loyalty and “sense of identification with the company” (*kigyō e no kizoku ishiki*).⁷⁴ According to the magazine contributors, this would be a crucial first step to any effort to organize engineers into a political movement. *Technology and Humans*’ analysis of the response to the so-called “Tanaka Incident” crystalized many of the challenges associated with the effort to make engineers “politically active.”

In September 1973, Tanaka Kimio, an engineer and division chief at Tōyō Industries

⁷² Hoshino Yoshirō, “Gijutsusha no ishiki to ‘soshiki,’” *Gijutsu to ningen* (June 1975): 9.

⁷³ Okumura Seiji, “Zadankai: Kaitai suru genba—gijutsusha no tachiba: gijutsusha kara mirai wo ubatta mono,” *Gijutsu to ningen* (September 1974): 51.

⁷⁴ Hoshino Yoshirō, “Gijutsusha no ishiki to ‘soshiki,’” *Gijutsu to ningen* (June 1975): 6.

(now Mazda Motor Company) made an unwise career move by publishing an article in the popular weekly *Asahi Journal* that argued that the future of Japanese society should be one without automobiles. For *Technology and Humans*' engineers, Tanaka's article represented the ideal scenario where a company engineer broke with corporate secrecy in order to report the problematic state of industrial production and alert the general public to environmental, labor, and health concerns. More important for *Technology and Humans*, Tanaka went beyond merely testifying about harm by offering his vision for a society that conscientiously utilized (or ignored) technological advancements based on their impact on safety and quality of life. Tanaka was quickly forced to resign from his position at Tōyō Industries.⁷⁵

Unemployed, Tanaka Kimio joined a number of other engineers and scientists based in Hiroshima, where he had worked, to organize a research group dedicated to studying engineers. There the group conducted a survey of engineers in the city. The results of the survey were published in a three-part series in *Technology and Humans*, entitled "What do engineers think about? What do they aim for?"⁷⁶ Tanaka's actions had represented for *Technology and Humans* the ideal moment of self-conscious action, but did other engineers see it that way? The report's preface explained the motive for the survey: "Engineers are still the ones who truly realize companies' logic of increasing income, reducing costs, and raising efficiency" and therefore, "it is our duty as engineers to take a hard look at the conditions in which engineers are situated and strive to overcome the logic of industry and the workplace."⁷⁷

⁷⁵ Hoshino Yoshirō, "Gijutsusha no ishiki to 'soshiki,'" *Gijutsu to ningen* (June 1975): 6; Gijutsusha Zō Kenkyū Guru-pu, "Gijutsusha wa nani wo kangae, nani wo mezasu ka (I)," *Gijutsu to ningen* (October 1974): 73-74; Tanaka Kimio, "Tanaka Kimio jiken no watashi," *Gijutsu to ningen* (October 1975): 97-102.

⁷⁶ Gijutsusha zō kenkyū guruupu, "Gijutsusha wa nani wo kangae, nani wo mezasu ka (I)," *Gijutsu to ningen* (October 1974): 73.

⁷⁷ Gijutsusha zō kenkyū guruupu, "Gijutsusha wa nani wo kangae, nani wo mezasu ka (I)," *Gijutsu to ningen* (October 1974): 73.

158 out of 360 engineers who were solicited responded. On the question of whether or not engineers would break with company logic, the engineers showed little in the way of political daring. When asked whether Tōyō had treated Tanaka unfairly, a slim majority said the company erred in its conduct. However, among that majority that thought the decision to force Tanaka to resign was wrong, all but twelve of them thought that nonetheless he should have resigned of his own volition for violating company secrets. Not a few were incensed that he would bite the hand that fed him by criticizing the industry that for years provided him with a salary. As one might expect from the surveyed engineers' reactions to the Tanaka Incident, the engineers were also less open to breaking with company wishes and supporting the environmental movement. When asked if they would provide technical data about their companies to anti-pollution movements, the vast majority of surveyed engineers showed reluctance to do so without approval from company management.⁷⁸

Where did that leave the fight for the “consciousness” of the scientist-engineer? The report concluded:

Japan's corporations are becoming ever more powerful, on the one hand extending economic domination over South East Asia, on the other hand extending its economic, environmental, and political domination of Japan's regional communities. It is clear that within this kind of business environment, if engineers express submissive loyalty, then they will be privileged over and divided from the citizen-led political movements and labor movements.

Against this, [the engineers] have to begin walking the long, dangerous road toward making their work and their companies into something that truly functions for the sake of the engineer, and at the same time, for the sake of citizens and laborers. The first step on that long road is to join together with other engineers in order to protect the right of engineers to freely speak out in the workplace. Outside the workplace, [they must take] the step of forming an alliance among engineers and forming an engineers' political

⁷⁸ Gijutsusha zō kenkyū guruupu, “Gijutsusha wa nani wo kangae, nani wo mezasu ka (I),” *Gijutsu to ningen* (October 1974): 81-83.

movement.”⁷⁹

Here again the surveyors expressed the same criticism of engineers as disconnected from political movements, workers, and pollution victims. Contributors to *Technology and Humans* interpreted the results of the survey as an affirmation that engineers exhibited “the consciousness of a corporatized individual who privileged company profits above all else.”⁸⁰ In response to the results, the surveyors identified an immediate practical need to provide a means for engineers to speak out about what happened inside companies. The long-term problem was murkier. The surveyors believed that engineers needed to organize across company lines and produce a unified movement of scientists and engineers that could collaborate with labor and citizens’ movements. In their report on the survey, article writers couched their arguments for organizing engineers in language that aimed to reassert human control over industrial production, technological development, and the business world as a whole. The surveyors promoted *Technology and Humans*’ often-repeated image of the complete, self-conscious human being who “rationally” directs the development of human society by using technology in an ethical manner. The path to a society based on “human control” and “self-conscious” individuals was, for *Technology and Humans* contributors, through engaged political activism.⁸¹

In a June 1975 article, Hoshino Yoshirō offered a more hopeful outlook for a scientists’ and engineers’ political movement. Engineers, he argued, were thoroughly immersed in their roles, but they were honest—they wanted to do good. They simply had not yet found a way to break free from their “timid” mindsets and subordination to company interests. Hoshino

⁷⁹ Gijutsusha zō kenkyū guruupu, “Gijutsusha wa nani wo kangae, nani wo mezasu ka (III),” *Gijutsu to ningen* (February 1975): 116.

⁸⁰ Hoshino Yoshirō, “Gijutsusha no ishiki to ‘soshiki,’” *Gijutsu to ningen* (June 1975): 7.

⁸¹ Okuno Takeo, “Gijutsusha nanatsu no daizai,” *Gijutsu to ningen* 1, no. 1 (Spring 1972): 77.

contended that these engineers had to find a way to liberate themselves for the sake of a safe and healthy future.⁸² That sentiment permeated the mission of those politically conscious engineers and scientists who produced *Technology and Humans*. As Hoshino argued, the crises of the 1970s required unifying otherwise disparate groups. *Technology and Humans* argued that engineers should play a crucial role in a multi-pronged “guerrilla war” waged with the goal of transforming technology and the economic system from within.⁸³

This was the precipice over which environmentalists believed humanity dangled. The only hope of escaping an apocalyptic future, they suggested, would come through a revitalization of the human subject as a politically conscious activist. In other words, *Technology and Humans* sought to restore human control over technology. The critique of science and technology came down to a fundamental question of human control versus technological control. As the preface to *Technology and Humans*’ fifth issue declared,

It’s not that we forgot the importance of the subjectivity (*shutaisei*) of we human beings who regulated and controlled science and technology. In fact, we tried desperately to [control it]. Despite our efforts, we could not prevent our machine civilization (*kikai bunmei*) from mutating into a place of endless danger (*kiken*) for human beings. I think that what we lacked was not just insufficient awareness and alarm over the essence of science and technology. As the subjects (*shutai*) that regulated and controlled technology, we failed to recognize how our own faults—our incompleteness and our desires—mistakenly bore us down the path of materialistic civilization (*bussuitsu bunmei*).

In the magazine’s preface, the narrative of scientific modernization was explained as an attempt to control society and science that had failed miserably as a result of the incompleteness of humanity’s knowledge of science and of itself, of the human being. The solution offered by *Technology and Human* environmentalists was to develop an accurate understanding of social

⁸² Hoshino Yoshirō, “Gijutsusha no ishiki to ‘soshiki,’” *Gijutsu to ningen* (June 1975): 7-14.

⁸³ Hoshino Yoshirō, “Gijutsusha no ishiki to ‘soshiki,’” *Gijutsu to ningen* (June 1975): 14.

reality, science, and humanity, and, based on that better knowledge, make good, conscious decisions about how science and technology should be used within human society.

V. Epilogue

In 1975 photographers Tanno Kiyoshi and Yamamoto Noriyuki published a multi-part photo essay entitled “’75 City” that appeared in several issues of *Technology and Humans*. The part of the essay published in July 1975, entitled “Dislocation” (*Dansō*), depicted Tokyo (although unnamed) through a series of collages. Each collage brings together photographs that repeat different versions of the same basic image: one collage shows similar shots of different car accidents, another shows several scenes of garbage on the street.⁸⁴ Tanno and Yamamoto’s choice of collage represented what contributors to *Technology and Humans* believed was an endless repetition and intensification of the fundamental problems connected to urban life: overcrowding, alienation of white-collar work, waste, urban overcrowding, the dangers of urban life, and pollution. In fact, the final collage recalls the photograph of white-collar workers by Tanno discussed at the beginning of this chapter (Figure 3).⁸⁵ Each of the three columns shows a different commuter location photographed four different times, pointing to the replicability of the humans who pass through. The commuters are almost all office workers. In the first column all that is visible are office workers walking—there is no hint that even the city exists. Analyzed in context of *Technology and Humans*’ investigation into the conditions of engineers, the implication is clear. “Unthinking” and “politically disinterested” engineers—here disappearing into the crowd of office workers—are being endlessly replicated. Hope for revolutionizing technology is consumed by the alienating space of the city.

⁸⁴ Tanno Kiyoshi and Yamamoto Noriyuki, “’75 toshi: Sono ichi: Dansō,” *Gijutsu to ningen* (July 1975): 65-72.

⁸⁵ Tanno Kiyoshi and Yamamoto Noriyuki, “’75 toshi: Sono ichi: Dansō,” *Gijutsu to ningen* (July 1975): 72.



Figure 3: Untitled photograph from “’75 toshi: Sono ichi: Dansō” (July 1975).⁸⁶

⁸⁶ Tanno Kiyoshi, untitled photograph, *Gijutsu to ningen* (July 1975): 72. Image used under fair use.

Chapter Three

The Violence of Desk Work and the Catastrophe of Bureaucratic Rationality

I. Introduction

The Industrial Complex at Kurashiki, Okayama Prefecture, 1972: The town I remember looked like a painting, with its rows of vintage white-walled houses and a stream quietly flowing in the background. Now, once fertile farmland has been paved over with concrete. Where in the past one could see a clear view of the islands of the Seto Inland Sea, the coastline now burns ominously, overrun by red-striped smokestacks.

From atop Washū mountain, the view of the Seto Inland Sea is blocked by the smokestacks of eighty-three manufacturing plants. The factories are crowded into the twenty-two square kilometers of reclaimed earth that dominates the landscape. [As you look around], the withered pines of the surrounding hills catch your eye. Certainly no one would believe that this place was so utterly transformed in a mere ten years. This is truly a microcosm (*shukuzu*) for the high economic growth of the 1960s.¹

Takahashi Noboru, the editor-in-chief of the anti-pollution magazine *Technology and Humans*, described the concrete, dystopian landscape of the Mizushima Industrial Complex located in the town of Kurashiki on Japan's Pacific coast in the summer of 1972. He visited Kurashiki at the height of public anxiety over Japan's pollution crisis, of which this site had become a toxic center. In 1952, with the support of the national government, Okayama Prefecture created a development plan to turn Kurashiki's coast into an industrial complex. By the end of the 1960s, the complex had polluted Kurashiki's air and the surrounding sea, and local residents had organized an anti-pollution protest movement against it, demanding redress for damage done to their health and the environment.²

In his description of Kurashiki, Takahashi reacted to a landscape made barren by

¹ Takahashi Noboru, "Gendai no kaijū konbinaato wo ou: mizushima kōgyōchitai wo yuku," *Gijutsu to ningen* 1, no. 1 (Spring 1972): 20. Soft rush is used in tatami matting.

² Kawana Hideyuki, *Dokumento nihon no kōgai: Dai go kan sōgō kaihatsu* (Tokyo: Ryokufū Shuppan, 1990), 167-178.

industrialization: farmland covered with concrete, coastline overrun by smokestacks, and land consumed by seemingly endless manufacturing plants. By the time Takahashi Noboru climbed Washū Mountain, the Japanese government's "Comprehensive Development" policies (*sōgō kaihatsu*) had transformed the coastal landscape into raw materials for industrial expansion and into a sink for absorbing pollutants: in short, a "microcosm" for economic growth. Japan's high economic growth depended on transforming areas like Kurashiki for private industrial use, thus converting ecological and communal spaces into toxic industrial zones. As one pillar of the country's economic growth strategies in the 1950s and '60s, Comprehensive Development focused on acquiring land for large-scale industrial complexes known as "petrochemical combines" (*sekiyu konbinaato*) or simply "combines" (*konbinaato*). The construction and operation of the Mizushima Combine, the largest of Japan's petrochemical combines, created the devastated landscape Takahashi Noboru described.

The dystopian industrial landscape Takahashi Noboru depicted, churned out by state development policies, illustrated the ecological vision that animated environmental activists in Japan in the first half of the 1970s. In this chapter I examine the environmental vision that *Technology and Humans*' contributors articulated in response both to Comprehensive Development policies that drove private industrial expansion and to the localized environmental protest movements that fought the development plans. At the heart of environmental degradation in Japan were the geographic dimensions of development, which in turn, shaped how many Japanese activists engaged environmental issues. The target for environmental activists in Japan was the state's intervention into the Japanese landscape as the government created space for polluting factories and for infrastructure. *Technology and Humans*' environmentalism was premised on creating a counter image of environmental degradation in opposition to the state's

positive vision of restructuring Japan's landscape in service of economic growth. In 1970 there were 109,000 hectares of land devoted to industry, and the Japanese state proposed transforming an equivalent amount of agricultural land into industrial space, thus doubling the quantity of industrial land in order to capture its higher per-hectare economic output. The state, moreover, planned to reclaim another 40,000 hectares of land for industrial use from the sea between 1971 and 1975.³ In other words, the fight over the environment was a fight over land. In the following analysis, I focus on 1972 to 1975, the years *Technology and Humans'* contributors developed a structured critique of Comprehensive Development, as well as years that corresponded to the high point of environmental activism and the end of the period of intensive petrochemical expansion in Japan.⁴

Similar to their strategy to invigorate environmental consciousness in engineers, *Technology and Humans'* environmentalists flipped the positive, high-tech image of the petrochemical industry on its head, depicting the industry as a resource-devouring monster that had taken control of Japan's economy, destroying rural communities and natural landscapes in order to feed its growth. Through this imagery the magazine's environmentalists built a new ecological interpretation of industrial production. Instead of a well-engineered technological edifice contained within an artificial environment, environmentalists represented the combine as an animate thing that was fully a part of the surrounding ecological system. The combine was the undead, the unnatural life parasitically living off ecological life. Turning industry into

³ Tsuru Shigeto, *Japanese Capitalism: Creative Defeat and Beyond* (Cambridge: Cambridge University Press, 1993), 100-104.

⁴ The Ministry of International Trade and Industry led government efforts to more or less create a petrochemicals industry in Japan beginning in 1954 by "nurturing" the industry through tax breaks, financing from the Development Bank, technology transfers from abroad, and—freshly dredged up—prime real estate along the coasts. Chalmers Johnson, *MITI and the Japanese Miracle* (Palo Alto: Stanford University Press, 1982), 236-237.

monstrosity was environmentalists' method for foregrounding the ecological violence of the postwar era of large-scale extraction, production, and toxic waste as a destructive metabolism of natural life.

Environmentalists used the image of monstrosity as a counter-vision to the clean, utopian dream of the government's economic development planning framework. They aimed to demonstrate that the rational, scientific image of bureaucratic development planning both hid and unleashed ever-growing monstrosity and violence. Environmentalism thus represented a challenge to the state's authority to carry out development and restructure communities and landscape in particular. The vision of environmentalists rejected Japan's vaunted high economic growth based in policies intended to "scientifically manage" the economy and loaded with utopian visions. Instead, they described Japan as a toxic utopia or, as they termed it, the "Pollution Archipelago."

1970s environmentalism began at the local level, and the monstrous language of environmental degradation was directed at empowering and uniting localized activism. The state's Comprehensive Development shaped the terrain of environmental activism in Japan by building up industrial infrastructure, and combines in particular, near rural communities along Japan's coast in the 1950s and '60s. Exploiting economic inequities, the state generally sited rural, low income areas for industrial development. Residents of these communities rose up against polluting factories or to stop industrial projects, and their status as residents of a particular place, such as Kurashiki, provided them with political cache. In Japanese, these were "genba" ("place" or "site") anti-pollution movements, the term used by activists for local, place-based movements. Localized anti-pollution movements began in the early 1960s and reached

their peak between 1969 and 1975, with hundreds of thousands of citizens participating.⁵

However, by 1970, the dichotomy between “local” and “national” had become the strategic problem for activists from these communities, as well as for Tokyo-based environmentalists who wrote about and supported specific protest movements. While by that year the general public had recognized pollution as a truly national crisis—prompted in no small part by the heightened attention that air pollution in affluent Tokyo neighborhoods received—a number of local movements reached impasses in their struggles or lost energy after achieving short or medium-term victories.⁶ Many local activists came to believe that the local government and industry against which they fought were too well entrenched into a larger network of state and industrial capital cohesion that prevented substantial environmental gains on the local level. In 1970, over 400 local activists in environmental and non-environmental movements gathered at the first ever “Nationwide Local Struggles Symposium” to address the local-national problem. The questions many activists faced was how to ensure that their local, genba-based movements would be able to create long-lasting victories against a national crisis and how the fragmented movements could pool their resources to combat the coordinated efforts of state and private industry. Activists felt a growing need to oppose environmental degradation through a nationwide framework, a desire that prompted many individuals to develop a comprehensive vision of the environmental crisis to counter the pernicious comprehensive vision of developers.

Technology and Humans was an important center for Tokyo-based environmental activists who supported localized anti-pollution movements, and the magazine’s writers

⁵ Margaret McKean, *Environmental Protests and Citizen Politics in Japan* (Berkeley: University of California Press, 1981), 5-23; Jeffrey Broadbent, *Environmental Politics in Japan: Networks of Power and Protest* (New York: Cambridge University Press, 1998), 101-108.

⁶ Tsuru Shigeto, *Japanese Capitalism: Creative Defeat and Beyond* (Cambridge: Cambridge University Press, 1993), 129-130.

intervened on the point of contention between local and national. *Technology and Humans*' activist-contributors envisioned a movement that could defeat the systemic causes of pollution while protecting local autonomy—local *genba*—as a central pillar of their activism. In support of localized activism, one of the magazine's primary functions was to develop an analytical framework and a strategic vocabulary to understand and publicize the horrors of state economic development policies. The task was to understand how state power and private industry systemically destroyed communities and ecologies. The magazine contributors developed their understanding by directly engaging local communities, as Takahasi Noboru did at Kurashiki.

This chapter begins by looking at the shift in “local” activism at the beginning of the 1970s, as well as the Nationwide Local Struggles Symposium, and *Technology and Humans*'s role in that development. Then I analyze the magazine's depiction of industrial monsters devouring the Japanese landscape. Finally, I look at how the image of monstrosity was expressed in the magazine's critique of Comprehensive Development's bureaucratic violence, what the journal's writers termed the “Violence of Desk Work.”

II. Remaking the Nation Through Local Struggles

From August 8 to 9, 1970 in Tokyo, over seventy organizations and four hundred activists from across Japan gathered together to hold the first ever “Nationwide Local Struggles Symposium” (*Zenkoku chiiki tōsō*). The symposium was initiated by activists from the island of Awaji, which sits between Osaka and the large island of Shikoku, one of the four main islands in the Japanese archipelago.⁷ In 1966, the Japanese government applied its Comprehensive Development framework to mostly rural Awaji, siting the island for what would become disruptive and polluting infrastructure projects, including a large-scale crude oil transfer station,

⁷ “Daiiikai zenkoku chiiki tōsō shinpojiumu hōkoku,” *Gekkan chiiki tōsō* (October 1970): 1-2.

an oil pipeline, the world’s largest bridge, and a new international airport to serve Osaka and Kyoto. Residents (*jūmin*) of Awaji fought back against development as a “local struggle” (*chiiki tōsō*), one of many such battles between communities and state-supported development projects in the 1960s and ‘70s.⁸ The effort brought them in contact with other activist movements, including a similar initiative in Sanrizuka, Chiba Prefecture against what would become Narita International Airport. The shared characteristics of these movements prompted activists from Awaji to consider what might be possible if multiple movements joined forces.

The Japanese term “chiiki,” which I translate in this context as “local,” generally denotes a geographic location or area, and movements like the Awaji protests were explicitly place-based (“genba”) movements led by local residents who utilized their social and legal standing of belonging to particular communities as the basis for their struggle. At Awaji, residents asserted that they—and not the prefectural or national governments—had the right to determine what kind of development they would accept in their communities. It was this quality of being “local” and connected to place or genba that was shared by most of the seventy organizations at the symposium. This characteristic brought together a diverse array of movements, including the famous Sanrizuka struggle of farmers and allies against the Narita Airport development in Chiba Prefecture, the movement of residents of Sunagawa Village against the Tachikawa Airbase expansion, and numerous anti-pollution movements in rural and urban communities, among others.⁹

The event was part of activists’ efforts to harness the wild optimism of the moment.

⁸ Amagasa Keisuke, “Shima ni otozureta akumu no harō: Awajishima no mittsu no machi to kaihatsu keikaku,” *Gijutsu to ningen* (June 1974): 60-61.

⁹ “Daiiikai zenkoku chiiki tōsō shinpojiumu hōkoku,” *Gekkan chiiki tōsō* (October 1970): 4-20.

Local, community-based activist movements exploded in Japan at the end of the 1960s. Examples such as the successful 1964 preemptive struggle by residents of Numazu and Mishima in Shizuoka Prefecture against the construction of an oil refinery emboldened other communities to initiate their own genba-based struggles.¹⁰ Four major anti-pollution lawsuits, including the Minamata Disease and Yokkaichi Air Pollution cases, were also genba-based movements that inspired anti-pollution activism in the late 1960s and early '70s. Anti-pollution protests surged dramatically nationwide in 1969, plateauing in 1973 with thousands of protest movements, before declining again in 1975 to only a few instances per year.¹¹ Citizen-led protests in general (not just those that were directed at environmental causes) had an earlier boom that lasted from 1967 to 1971.¹² The Nationwide Local Struggles Symposium took place in the midst of the upswing.

As the impetus for the Nationwide Local Struggles Symposium suggests, one of the main loci of activism in late 1960s and early 1970s Japan was, paradoxically, the diffusion of activism into numerous site-based struggles against polluting industries, state development projects, military bases, and other infrastructure projects that were generally imposed on a community from the “outside.” In the movements that fought against pollution—and nearly every movement had an ecological component to it—environmental issues were intimately linked to the problem of local control. I call these movements “genba environmentalism.” The movements were based on asserting the value and autonomy of communities that prefectural and national governments

¹⁰ Ui Jun, “Anti-Pollution Movements and Other Grassroots Organizations,” in *Environmental Policy in Japan*, eds. Shigeto Tsuru and Helmut Weidner (Berlin: Edition Sigma, 1989), 109.

¹¹ Jeffrey Broadbent, *Environmental Politics in Japan: Networks of Power and Protest* (New York: Cambridge University Press, 1998), 101-108.

¹² Ui Jun, “Anti-Pollution Movements and Other Grassroots Organizations,” in *Environmental Policy in Japan*, eds. Shigeto Tsuru and Helmut Weidner (Berlin: Edition Sigma, 1989), 105.

had targeted for development projects or that were suffering the effects of toxic factories. In other words, these were places that had been, or were in danger of being, devalued and polluted by the Japanese government and private industry. Indeed, the movements participating in the symposium represented a nightmarish cross-section of pollution and rural dispossession permeating Japan. To give one horrific example, activists from the city of Fuji, Shizuoka Prefecture were fighting toxic sludge, air pollution, red algae blooms, and the spread of poisoned fish caused by over 130 factories that had been dumping waste into the local ecology over thirty years.¹³ In the 1960s a new terrain for political activism exploded around the conflict between an aggressive state development, on the one hand, and communities who asserted their right to self-determination against what they perceived to be a colonizing government, on the other.¹⁴

While local protests constituted a powerful and successful basis for activism, by 1970 this political terrain came to be regarded by activists broadly and environmentalists in particular as a site of contradiction and even potential stagnation. The incongruity between the scale of the problem, which was national if not global, and the scale of the response had become a glaring issue, just as activists' momentum was peaking. Indeed, activists feared that anti-pollution movements sounded a bit like NIMBY-ism.¹⁵ The thorny issue that many participants hoped to address was how to preserve the integrity of local protest movements while pushing beyond the framework of "local struggles" to transform them into a comprehensive, joint struggle (*sōgō tōsō*)

¹³ Tōdai toshikō tōsō iinkai, "Fuji kōgai no genjō to hantaitōsō," *Gekkan chiiki tōsō* (October 1970): 48-49.

¹⁴ Simon Avenell, "Regional egoism as the public good: residents' movements in Japan in the 1960s and 1970s," *Japan Forum* 18, no. 1 (August 2006): 95-96.

¹⁵ Local movements were often charged by government officials and news reports with catering to "local egoism" by putting communal interests above national ones. Activists were in the difficult position of defending their right to local autonomy and searching for a way to expand their activist framework. Taketani Mitsuo, "Gijutsu no shinpo to han shinpo shisō," *Gijutsu to ningen* 1, no. 1 (Spring 1972): 108-113.

or *zenmenteki tōsō*).¹⁶ For example, Miyaoka Masao, from the Sunagawa Base Expansion Prevention Alliance, framed local movements as fundamentally “anti-power struggles” or struggles against Japan’s “power structure” (*kenryoku kōzō*), emphasizing the domination of parliamentary politics by the Liberal-Democratic Party and their business allies.¹⁷ He and other activists began to pose their local battles as a symptomatic of a larger, systemic crisis.

The Nationwide Local Struggle Symposium embodied this tension, which permeated place-based activism in the 1970s. Activists from Awaji originally proposed the symposium because they had experienced the power of a shared struggle in their collaboration with activists who were fighting the Narita Airport project at Sanrizuka in Chiba Prefecture.¹⁸ Having experienced the benefits of a collaborative struggle, they hoped to bring together the disparate movements in order to talk about their common purposes as well as share strategies and support each other. This was expressed in the theme of the symposium: “From the fulfillment of local struggles to a nationwide synthesis [of movements] (*kobetsu tōsō no tetteika kara zenkokusōgō e*).” The idea of creating a “nationwide synthesis” intimated a counter hegemony to that of the state. While these organizations fought at the local level, they were now discussing a national transformation. Nonetheless, activists were always careful to avoid calling it a “revolutionary” struggle out of fear that their diverse movements would be viewed as a stereotypical Marxist movement rather than an authentic, grassroots movement.

Participants who embraced the collaborative ethos envisioned a true “comprehensive” struggle that brought together farmers, fishermen, industrial workers, students, scientists, and

¹⁶ “Daiiikai zenkoku chiiki tōsō shinpojiumu hōkoku,” *Gekkan chiiki tōsō* (October 1970): 20-22.

¹⁷ Miyaoka Masao, “Seikatsu ni nezashita tatakai wo,” *Gekkan chiiki tōsō* (October 1970): 29.

¹⁸ “Awajishima wo dai ni no sanrizuka ni,” *Gekkan chiiki tōsō* (October 1970): 74-79.

“residents” (*jūmin*). In other words, the synthesis was framed primarily as an alliance between autonomous movements. Activists from Awaji argued that this shift was needed because they “felt that the individual struggles had reached an impasse” (*takaienai tokoro ni kite*) created by the “isolated” (*heisasei*) nature of the movements. To overcome the impasse, activists at the symposium mulled over how to create the nationwide alliance while preserving the integrity of individual movements and ensuring that each individual movement achieve its goals.¹⁹ In the symposium, different organizations had different perspectives on the contours of a national struggle. Some demanded that local goals remain the absolute priority, and others called for an alliance with the student movement. Still others suggested the need for a class struggle, arguing that the residents (*jūmin*) had become their own oppressed class within capitalism.²⁰ But it was the question of how these movements could form a base for a national struggle that was the primary conundrum for a large number of these genba-based movements.

What activists were certain of was that the genba, where local struggles occurred, was where the real conflict played out and where corrective action would originate from grassroots activists. In the words of one activist, symposium participants were searching for a means to “use the concreteness (*gutaisei*) of local struggles to create a nationwide terrain of political activism inclusive of all citizens (*zenshiminteki seiji no fuhenteki ryōiki*).”²¹ Activists framed the tension between local goals and national structures of power as a divide between concrete activity and

¹⁹ “Daiiikai zenkoku chiiki tōsō shinpojiumu hōkoku,” *Gekkan chiiki tōsō* (October 1970): 4-5.

²⁰ To say that every organization agreed with the need for a broader framework for activism would obscure the diverse perspectives at the conference. There were activists like Miyazaki Shogō, who argued that his fight against the construction of a Japan Railway freight line through his neighborhood had no connection to other movements or any problem larger than the freight line itself. Nonetheless, most participants recognized that there was a need to develop a shared struggle. Simon Avenell has written extensively about Miyazaki. See Chapter 4 of Simon Avenell, *Making Japanese Citizens* (Berkeley: University of California Press, 2010).

²¹ “Daiiikai zenkoku chiiki tōsō shinpojiumu hōkoku,” *Gekkan chiiki tōsō* (October 1970): 22-23.

abstract: real versus unreal. They argued that the solution lay in reconfiguring the “nationwide terrain” into something defined by the synthesis of concrete struggles. These activists embraced a Gramscian vision of a counter-hegemony that would emerge organically from the diverse struggles over autonomy.²² Here we encounter again the language of “landscape” and “terrain” and a desire to oppose the industrialized landscape with an activist-produced one.

Technology and Humans: Framing a Nationwide Fight

Through the second half of the 1960s, industrial engineer Takahashi Noboru, had been editing the engineering trade publication *Metals (Kinzoku)* as the growing pollution crisis garnered increased attention. Well aware that mechanical engineers had been complicit in some of the most egregious pollution incidents, including the famous cadmium poisoning case, or “Itai-itai” Disease, in Toyama Prefecture, Takahashi decided that it was time for scientists and engineers like himself to stop thinking only about science. As perpetrators of pollution, fellow scientist-engineers who would go on to collaborate with Takahashi felt it was their responsibility to become political activists in order to stop Japan’s monstrous economic growth that threatened to devastate the environment.²³

Takahashi Noboru began his activism with the resources he had. Beginning in 1969, he attempted to turn *Metals* into a politicized magazine. He envisioned using the resources and skills of engineers by combining scientific analysis with political and economic commentary in order to provide the best possible systemic critique of the pollution crisis. More to the point, the magazine’s perspective would be based in detailed knowledge of the “genba”—the polluted sites

²² Antonio Gramsci, *Selections from the Prison Notebooks* (New York: International Publishers, 1971), 325-366.

²³ Sugioka Sekio, Tanaka Kimio, and Tanno Kiyoshi, “50 gōkinen zadankai: *gijutsu to ningen* 50 gō no kiseki,” *Gijutsu to ningen* (September 1977): 47-50.

of activism—and the experience of locals. On this point, Takahashi shared the perspective of activists involved in the Nationwide Local Struggles Symposium that resistance should be rooted in local experience and activity.

The experiment with *Metals* was a failure, but *Metals*' publisher, Agune, worked with Takahashi Noboru to launch *Technology and Humans* in spring 1972. The first issues sold around 10,000 copies. In *Technology and Humans* Takahashi had free reign to create a space for a wide range of environmentally conscious contributors to carry out a genba-based, systemic analysis of the environmental crisis.²⁴ The goal was for the resulting analyses to support local activists, connect different struggles, publicize them, and influence other movements.²⁵ Like the Nationwide Local Struggles Symposium, *Technology and Humans* was an amalgamation of different characters. The magazine's contributors included many engineers and scientists, but the journal also published the work of a cadre of environmentally concerned activists, journalists, industrial workers, union leaders, economists, and Marxist intellectuals, who developed a vibrant critique of Japanese society and its rapid, technologically driven transformation.

The horrors of pollution and the optimism surrounding widespread local movements prompted allies such as Takahashi Noboru and other *Technology and Humans* contributors to engage the fragmented environmentalist movement from a different perspective. As interlocutors, *Technology and Humans*' environmentalists were careful to emphasize the centrality of local activism. The magazine's contributors were committed to the idea that protest movements had to be led from the grassroots in an organic fashion. The writers believed and it

²⁴ Sugioka Sekio, Tanaka Kimio, and Tanno Kiyoshi, "50 gōkinen zadankai: *gijutsu to ningen* 50 gō no kiseki," *Gijutsu to ningen* (September 1977): 50.

²⁵ Furihata Setsuo, "*Gijutsu to ningen* to Shakaikagaku," *Gijutsu to ningen* (July 2002): 45-46, 56.

was not their position to be political vanguardists. These self-imposed restrictions reinforced the tension between the goals of local autonomy and a nationwide environmental movement. From the magazine's perspective, "there [was] no other means to stop pollution" than by "fishermen, farmers, citizens (*shimin*), and workers rising up (*tachiagari*)" against polluting factories and development projects at genba.²⁶ Yet, they argued that "because [activists] direct their movement against local government officials and individual factories, the real enemy remains concealed. Under this skillful contrivance, the real murderer slowly replicates its crimes over and over again."²⁷ According to this formulation, activism should be local, but the villain was national and even supra-national. The enemy was systemic, able to "replicate" the same conditions over and over again across Japan's landscape. The magazine's writer-activists stepped into the same terrain as the Nationwide Local Struggles Symposium by embracing the same tension, but with their focus on the "real murderer," the constellation of power that dominated genba from above.

Technology and Human' contributors found themselves at a similar impasse with respect to the local-national question as other Tokyo-based interlocutors, such as the "Research on Environmental Disruption" group led by academics Tsuru Shigeto and Miyamoto Ken'ichi, as well as wastewater engineer Ui Jun's "Public Lectures" group of environmental activists. Tsuru and Miyamoto's group began publishing a magazine in 1970 that analyzed pollution through the lens of "interdisciplinary research." Their magazine was directed both at regular citizens and academics on the front lines of anti-pollution. It aimed to "take the stand point of pollution victims who were isolated from public view."²⁸ The editors believed that resolving the pollution

²⁶ Hoshino Yoshirō, "Setonaikai ni miru shizen to ningen no hakai: atarashii rekishi wo hiraku genten wa nanika," *Gijutsu to ningen* 1, no. 1 (Spring 1972): 19.

²⁷ Takahashi Noboru, "Gendai no kaijū konbinaato wo ou: mizushima kōgyōchitai wo yuku," *Gijutsu to ningen* 1, no. 1 (Spring 1972): 20. Soft rush is used in tatami matting.

²⁸ Miyamoto Ken'ichi, *Kōgai kankyō kenkyū no paioniya tachi* (Tokyo: Iwanami Shoten, 2014), 13.

crisis required uniting scientific research with social science analysis because, since ecological violence was built into the economic system, its solution would require a fundamental cultural and economic shift.²⁹ Ui's organization was formed out of the spontaneous initiative of audience members who attended lectures on the environmental crisis he held after hours at the University of Tokyo in 1969. The organization's purpose was to provide strategic support, without taking the lead, for genba-based movements.³⁰

Historian Simon Avenell argues that many high-level interlocutors, including researchers like Miyamoto and government officials like those in progressive Tokyo Governor Minobe Ryokichi's office, attempted to co-opt the energy of the genba-based anti-pollution movements for national political goals that were at odds with the perspective of local activists in the 1970s.³¹ In part, Avenell focuses on particular local movements, such as the Yokohama Freight Line Struggle, that do emphasize local autonomy as their primary goal, if not singular purpose, and lets them stand in for the perspectives of most local anti-pollution protests.³² However, as the Nationwide Local Struggles Symposium demonstrated, the connection between local activism and the possibility of a nationwide struggle was an open question for activists themselves, which complicated the relationship between the movements and Tokyo-based activists like those in *Technology and Humans*. It was a productive tension that animated environmentalists to grapple with the complicated relationship between state power and local strategies of resistance.

²⁹ Miyamoto Ken'ichi, et. al., "Zadankai: kankyō mondai to gakusaiteki kyōryoku," *Kōgai kenkyū* 1, no. 1 (Summer 1971): 5-15.

³⁰ Ui Jun, *Jishu kōza kōgai genron no jūgonenkan* (Tokyo: Akishobo, 2007), 4-18.

³¹ Simon Avenell, *Making Japanese Citizens* (Berkeley: University of California Press, 2010), 149-170.

³² Simon Avenell, "Regional egoism as the public good: residents' movements in Japan in the 1960s and 1970s," *Japan Forum* 18, no. 1 (August 2006): 95-96.

In order to address the local-national divide, *Technology and Humans* printed a large amount of work from 1972 to 1975 on Japan's Comprehensive Development strategies and on the networks of industrial production that were rapidly expanding as a result. The work was intended to engage the tension expressed in the symposium by building a systemic analysis that was genba-based but not directive to activists. The magazine's contributors aimed to pave the way for a "synthesis" of genba-based activism by constructing a monstrous vision of the systemic causes of pollution—state development policies and industrial production—that would function as a living, ongoing ecological critique.

III. Visualizing the Land-Eating, Industrial Pollution Monsters

“We are now in the age of giantization.”³³

– Kondō Kani'chi, *Technology and Humans* (1973)

In 1971 Japan's resident monster, Godzilla, was called upon to do battle with a new villain, the toxic sludge eating monster named Hedorah, in the film *Godzilla vs. Hedorah* (*Gojira tai hedorah*). Hedorah was a monster that fed off of industrial toxic waste from petrochemical combines, growing larger and more horrific the more it ate.³⁴ The name Hedorah was a play on the Japanese word for sludge, “*hedoro*,” which was a major source of industrial pollution—and public concern—in the early 1970s.³⁵ In its first iteration of the film from 1954, Godzilla had represented humanity's militarization of nuclear energy raining apocalyptic destruction on Tokyo. *Godzilla vs. Hedorah*, however, was intended to illustrate how humanity's industrial achievements had turned on the creators in classic monster movie fashion. Toxic byproducts

³³ Kondō Kan'ichi, “Gendai ni okeru kyodai-ka no kōzō,” *Gijutsu to ningen*, no. 7 (Fall 1973): 28.

³⁴ *Gojira tai Hedorah*, directed by Yoshimitsu Banno (Toho Studios, 1971).

³⁵ Margaret McKean, *Environmental Protest and Citizen Politics in Japan* (Berkeley: University of California Press, 1981), 31.

from the industrial development that had made Japan into an economic power fed an out-of-control creature intent on destroying Japan's cities. The new Godzilla film expressed the sense of impending global doom that Japanese residents felt during the pollution crisis.

While *Godzilla vs. Hedorah* used the metaphor of an alien monster, for most environmentalists the pollution spewing monster at the heart of the environmental crisis was the petrochemical combine itself—the living machine that drove Japan to the brink of toxic destruction. The image of monstrosity provided a starting point for environmentalists to craft a “synthesis” of the environmental crisis. Depicting petrochemical combines as “monsters” (*kaijū*) akin to Hedorah allowed environmentalists to counter the legitimacy of Japan's Comprehensive Development program and the “clean” image of industrial production by foregrounding the inherent ecological violence. *Technology and Humans*' writers refashioned the state's industrial growth paradigm, based in “giantizing” industry, into a grotesque, living machine premised on excessive expansion that threatened to consume *all land* in the world.

The sense of monstrosity was embodied in the postwar industrial development strategy that I translate as “giantization” (*kyodai-ka*). Petrochemical combines were the center of this economic and technological development process. As *Technology and Humans*' contributor and engineer Kondō Kan'ichi expressed in the quotation at the beginning of this section, giantization defined Japan's era of rapid economic growth and the era of pollution. In general parlance of those years, the Japanese term “kyodai-ka” signified a strategy for raising industrial capacity by using technological advancements to increase the scale and efficiency of production.³⁶ For industry and government planners, giantization was a mark of pride and achievement, expressing

³⁶ “Kyodai” was used in this manner throughout the New National Comprehensive Development Plan (1969), for example.

humanity's ability to reach new levels of industrial production. Environmentalists, however, flipped the connotation of the word to render it negative: a technological monster expanding beyond human control and the pernicious mismanagement of technological development.³⁷ I translate "kyodai-ka" as "giantization," rather than large-scale, its more common translation, in order to emphasize the term's critical content within environmental discourse. "Giantization," I believe, more accurately conveys the sense of a monstrous process that threatened to cause ecological collapse. After all, is not true monstrosity the representation of dangerous excess that pushes scientific creations beyond their proper magnitude?

Japan's government planners and leading industrial conglomerates achieved the giantization of industrial production through the petrochemical combine. Modeled on early-twentieth-century Soviet steel complexes, petrochemical combines' *raison d'être* was industrial efficiency. In postwar Japan oil and petrochemicals provided the primary industrial base for combines, with iron and steel-related industries serving as the secondary pillar of combine facilities. Government planners made the industrial combine the focus of their project to "rationalize" (*gōrika*) Japanese industry at the factory level and in the nation's physical landscape.³⁸ By minimizing the distance between different categories of industrial manufacturing and providing easy access to overseas raw materials via maritime shipping, combines were designed to take advantage of the latest developments in steel and chemical industries. Combines utilized the products and byproducts of different industries—such as oil refining—in other, and

³⁷ Kondō Kan'ichi, "Gendai ni okeru kyodai-ka no kōzō," *Gijutsu to ningen*, no. 7 (Fall 1973): 30-31.

³⁸ The 1962 National Comprehensive Development Plan emphasized the "rationalization of industry" (*kigyō no gōrika*) and the "rational and appropriate regional distribution of resources" as core elements of land-use development. "Maegaki" in *Zenkoku sōgō kaihatsu keikaku* (1962).

generally volatile, manufacturing processes.³⁹ Highly explosive materials and production processes were necessarily crowded together in the massive but surprisingly cramped industrial spaces.⁴⁰ Combines often housed oil refineries, oil storage facilities, chemical plants, iron and steel works, and thermal energy plants. By distributing high-tech combines across the country and linking them through advanced communication and transportation networks, government planners aimed to turn Japan into a giant, highly efficient industrial network.

Constructed by large industrial firms from the 1950s to 1970s, rapid industrial expansion centered on combines transformed Japan's coastal spaces.⁴¹ In order to create enough coastal land for each industrial complex, construction companies would reclaim plots as large as 5,000 hectares from the ocean. A total of fifteen industrial combines were built, mostly during the era of high economic growth. In the early 1970s, the Mizushima Petrochemical Combine that obscured Takahashi Noboru's view with smoke and ash was the largest petrochemical plant in the world, producing over 1.5 million tons of petrochemicals per year.⁴² And yet, that was not enough for Japanese industry. The Japanese government and private petrochemical and steel companies planned to build two additional combines in Northern Japan that would add to the nation's already staggering industrial output. Planners hoped to build out the productive capacity of one of those combines, Tomakomai in Hokkaidō, to 1.6 million tons of petrochemicals per

³⁹ Hoshino Yoshirō, "Setonaikai ni miru shizen to ningen no hakai: atarashii rekishi wo hiraku genten wa nanika," *Gijutsu to ningen* 1, no. 1 (Spring 1972): 6-19.

⁴⁰ Murata Tomijirō, "Sekiyukagaku Konbinaato ron: seisei no hissensei to rekishiteki igi," *Gijutsu to ningen*, no. 8 (Winter 1974): 26-28.

⁴¹ Honma Yoshihito, *Kokudo keikaku no shisō* (Tokyo: Nihon Keizai Hyōronsha, 1992) and Kawana Hideyuki, *Dokumento nihon no kōgai: Dai go kan sōgō kaihatsu* (Tokyo: Ryokufū Shuppan, 1990).

⁴² Honma Yoshihito, *Kokudo keikaku no shisō* (Tokyo: Nihon Keizai Hyōronsha, 1992), 64.

year—exceeding Mizushima’s capacity—and 8 million tons of steel per year.⁴³ They had even greater plans for the other planned northern combine at the town of Rokkashō in Aomori Prefecture. Under the proposed development plan for Rokkashō, the finished petrochemical complex would produce an unheard-of 4 million tons of petrochemicals per year.⁴⁴ It was the unsurpassed scale of Japan’s petrochemical combines and the lack of pollution oversight that rendered them an environmental nightmare.

From Control Room to Toxic Monster

The language of “giantization” and “kaiju” not only illustrated the gargantuan scale of industry but also rendered the combines as animate objects—creatures rather than factories. Here we see the emergence of a truly ecological narrative focused on the *animate*, on a living world rather than the dead, concrete world of industry and economic growth. Combines were not described as mere technological inventions that humans placed on the natural landscape. Many activists argued that they should be integrated into the ecological world, albeit in a mutated form. They were the undead, an animate but unnatural life. *Technology and Humans’* environmentalism grew out of this recognition. Environmentalists cleverly shifted the vocabulary of economic growth from a natural expansion of production and consumption to a grotesque mutation, arguing through the vocabulary of monstrosity that economic growth had a hideous life of its own. Environmentalists expressed this critique by visualizing the industrialization of landscape and depicting the built industrial infrastructure as the consumer of nature, à la Takahashi Noboru’s description of the idyllic Kurashiki landscape covered with toxic smoke.

⁴³ Tomakomai’s petrochemical combine would never reach those glittering heights. Due to the 1972-1973 Oil Crisis and subsequent efforts by the Japanese government to shift industrial production away from petrochemicals, Tomakomai’s projected capacity was reduced from 1.6 million tons of ethylene per year to 400,000 tons. Honma Yoshihito, *Kokudo keikaku no shisō* (Tokyo: Nihon Keizai Hyōronsha, 1992), 57, 64.

⁴⁴ Honma Yoshihito, *Kokudo keikaku no shisō* (Tokyo: Nihon Keizai Hyōronsha, 1992), 49.

In the 1960s the dominant image of the petrochemical combine was the sleek, high-tech control room where skilled operators controlled scientific production processes. The combine merged high technology and economic growth into a symbol of civilization progress. In the May 1974 issue of *Technology and Humans*, labor researcher Nakashima Kiyoshi commented on what that image concealed:

The public primarily knows the glittering silver combine and its petrochemical plants through the image of its control room. The control room closely monitors workers and employs cutting-edge technologies. However, when you look past the [high-tech] veneer, you discover that these factories are so pregnant with danger that operating one is like walking around with a bomb that is about to go off (*bakudan wo motte aruiteiru yō na kiken*), as we learned from recent explosions at the Idemitsu and Chisso Goi plants.⁴⁵

The image of industrial expansion in Japan was built on the idea of control: controlling nature, chemical processes, production lines, and even workers. It was premised on the government's framing of combines as forces of "rationalization." For environmentally concerned writers like those in *Technology and Humans*, the image epitomized both an arrogance and blindness to precarity. Indeed, the quotation depicted two opposing realities, one based in technological control and one based in an explosive inability to control production.

⁴⁵ Nakashima Kiyoshi, "Konbinaato bakuhatsu to gōrika: nisseki ukishima no jiko to rōdōsha," *Gijutsu to ningen* (May 1974): 95.



Figure 4: Ominous view of Mizushima Combine in May 1974.⁴⁶

If *Technology and Humans* sought to show the monstrosity of industrial combines, then the cover photo for a photography series published in the magazine in July 1974 was their horror movie poster for it. Photographed by Tanno Kiyoshi, a frequent contributor to *Technology and Humans*, the untitled photograph was the cover photo for a series of images entitled “Mizushima, May 11, 1974.” The combine at Mizushima in Kurashiki, Okayama Prefecture was the biggest and most ecologically destructive of Japan’s petrochemical combines. In his untitled image, Tanno Kiyoshi photographed the combine as a haunting creature stalking the viewer under the cover of its own toxic smoke. The slanted angle of the shot adds to sense of fear and danger. Tanno’s eerie photograph captured the public sense of horror at the height of the pollution crisis. The series “Mizushima, May 11, 1974” alternated images of the steel combine monster and local fishermen who were organizing against the toxic facility. Through the photographs, Tanno

⁴⁶ Tanno Kiyoshi, untitled photograph, *Gijutsu to ningen* (July 1974): 73. Image used under fair use.

explained that the last and only line of defense against the combine’s “endless expansion” was the rural community willing to stand up to it.⁴⁷

In his other photographs of the petrochemical combine in “Mizushima, May 11, 1974,” Tanno Kiyoshi focused on the combine as built infrastructure. In Figure 5, a section of the Mizushima Combine occupies most of the frame, suggesting that there is no world outside of this industrial zone.



Figure 5: Landscape view of Mizushima Combine in May 1974.⁴⁸

Similarly, in an earlier photograph series, entitled “Breathing in the Pollution in Tokyo Bay,” Tanno Kiyoshi conveyed this same sense that industry overwhelmed landscape in his photograph of the Kawasaki Combine in Tokyo Bay (Figure 6). The combine at Kawasaki overlooks Tokyo Bay. Tanno set up his shot to capture the combine as a never-ending series of industrial structures encased in ominous shadows against the sea. Unlike the close-up of the combine

⁴⁷ Tanno Kiyoshi, “Mizushima gogatsu 1974,” *Gijutsu to ningen* (July 1974): 73-77.

⁴⁸ Tanno Kiyoshi, untitled photograph, *Gijutsu to ningen* (July 1974): 76-77. Image used under fair use.

monster in Figure 4, in this image Tanno captured the industrial complex as an infinite landscape. The contrast between sea and endless factory space invites the viewer to imagine that all land and human-occupied space has been industrialized, taken over by dystopian black towers.

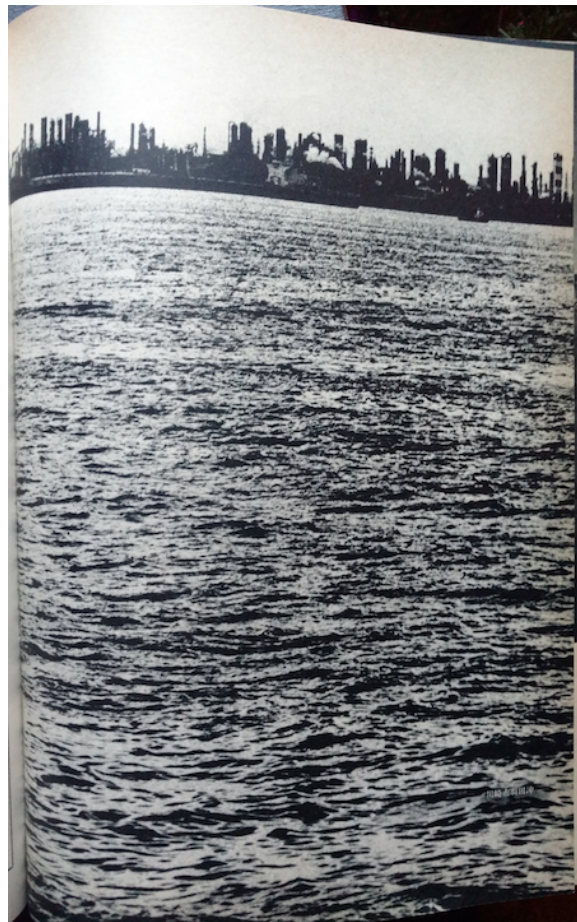


Figure 6: Untitled photograph of the Kawasaki Combine.⁴⁹

The only “ecological” element, the sea, has been appropriated for industry through the oil tankers that deliver the source of energy and raw materials for many of the production facilities. Figures 5 and 6 portended a nightmarish future where giantization has devoured the entire landscape, and

⁴⁹ Tanno Kiyoshi, untitled photograph, *Gijutsu to ningen rinji zōkan gō: sekiyu bunmei no gijutsu to kōgai* (September 1977): 182-183. Image used under fair use.

the combine had become the world.

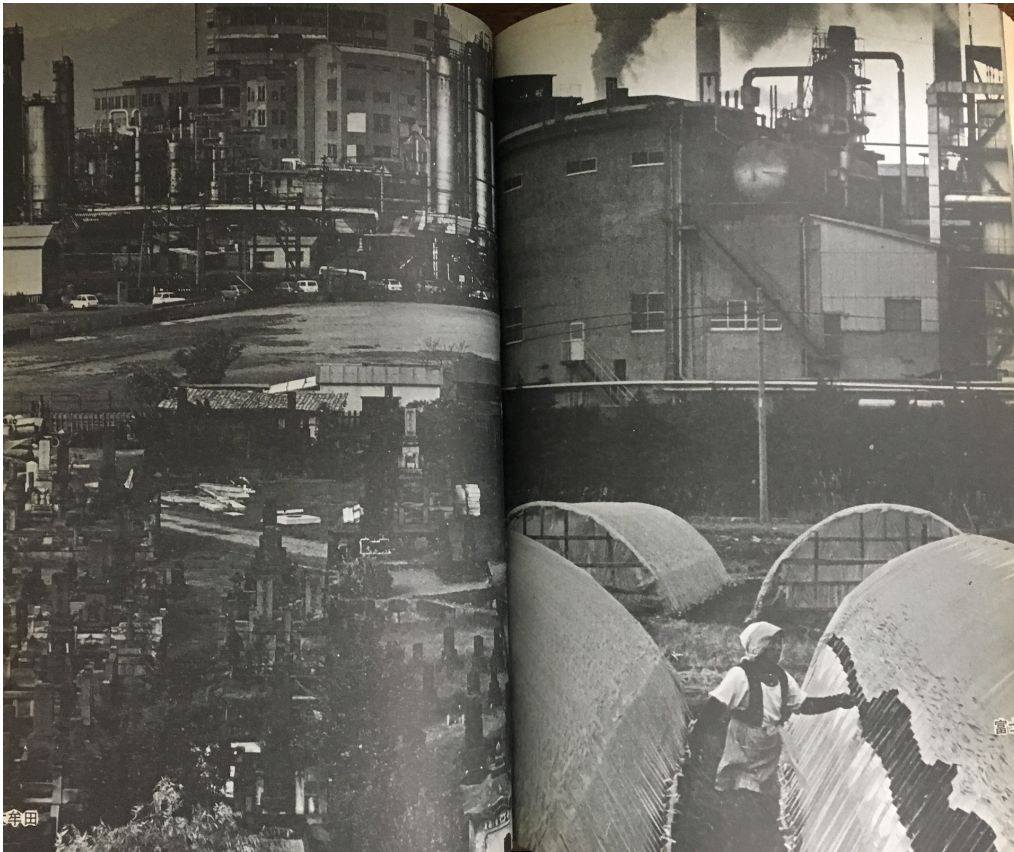


Figure 7: The view outside petrochemical combines (1977).⁵⁰

Tanno Kiyoshi would photograph a number of Japan's petrochemical combines in the same manner. Like the images shown here, Tanno either presented the combine as dominating the entire frame or as overtaking natural landscapes and residential and city spaces.⁵¹ Tanno Kiyoshi's photographs, printed on expensive glossy paper, allowed *Technology and Humans* to visualize the dystopian reality of the industrial combine for its readers.

As a jump-start for *Technology and Humans*' urban audience, Tanno's images revealed

⁵⁰ "Guravia: Nihon no konbinaato," *Gijutsu to ningen rinji zōkan gō: sekiyu bunmei no gijutsu to kōgai* (September 1977): 177-184.

⁵¹ For example, see Tanno Kiyoshi, "Guravia: Nihon no konbinaato," *Gijutsu to ningen rinji zōkan gō: sekiyu bunmei no gijutsu to kōgai* (September 1977): 177-184.

the “real world”—the industrial spaces—that consumer life concealed. He sought to point out that industry made everyday life possible by supplying the industrial and consumer products necessary for it. Tanno Kiyoshi, moreover, foregrounded rural farmers, fishermen, and residents as both the victims of the industrial processes upon which urban residents depended and the activists who could stave off ecological collapse (Figure 7). The images thus visibly linked city life to ecological violence and rural dispossession.

In *Technology and Humans*' visual and textual representations, the combine became the machinic mutation of economic growth premised on reprocessing life into raw materials for the combine. The combines turned living ecological space (landscape) into dead matter (concrete and steel) and then back into a living machine (combine monsters) that in turn fed off more life. Takahashi Noboru's descriptions were pregnant with representations of the combine as a living machine: “The industrial combines resemble giant monsters (*kaijū*) that devour everything that surrounds them in order to continue their limitless expansion.”⁵² Indeed, the title of Takahashi's article, “Pursuing the Monster Combine (*kaiju konbinaato wo ou*),” imagined the combine as a creature that stalked the land. But the monster was also an elusive one, which could only be envisioned by going to the genba of Kurashiki and hunting it down in order to see its (mechanical) flesh.

Another editor, Katai Takeo, used the same language to describe the petrochemical combine at Kashima, Ibaraki Prefecture in a report on Comprehensive Development. Here is Katai's grim description of development: “The sun continues to shine on the white sand of the reclaimed land site, which awaits the final dredging up and factory construction. And the giant

⁵² Takahashi Noboru, “Gendai no kaijū konbinaato wo ou: mizushima kōgyōchitai wo yuku,” *Gijutsu to ningen* 1, no. 1 (Spring 1972): 21.

iron and steel works before our eyes vigorously advance [the industrial expansion]. In the end it will consume everything (*subete wo nomikondeshimau*).”⁵³ Later in the article, Katai would add, “combines will continue [expanding] until they sever all life (*inochi wo tatsumade*).”⁵⁴ While Takahashi described the combine using the same word (monster, or “kaiju”) that was used to describe Godzilla and Hedorah, Katai, however, described the combine as a bacteria or mechanical fungus covering over the land. Still, both images envisioned the steel factory as a living subject—in Katai’s formulation, like Takahashi’s, the combine eats the land. The idyllic picture of white sands and sunshine contrasted with the toxic monstrosity of the steel plant. Katai concluded his article with the same sense of overwhelming devastation that Takahashi Noboru felt. The monster combine was metabolizing *all land*, resulting in the total destruction of human life (“sever all life”).

“Devouring,” “limitless expansion,” “sever all life”—Takahashi Noboru, Tanno Kiyoshi, and Katai Takeo’s shared vocabulary of consumption and death created a counter-vision to the petrochemical combine’s control room. Instead of functioning according to humane instructions from a human-operated control room, the combine was depicted as a the machine that devoured life in order to be born again as a mutated form of mechanical life. From the perspective of industry and government, the combine was about production—creating goods for the sake of prosperity. It was a stable, well-designed technological edifice. However, in environmental narratives the combine and private industry had become a machine of pure consumption that radiated death and ecological violence. It was undead in that the combine was animate and a part of a living ecology it hoped to destroy, but not natural life itself. Combines primarily existed to

⁵³ Katai Takeo, “Kashima wo meguru yottsu no tatakai,” *Gijutsu to ningen* (June 1974): 86-87.

⁵⁴ Katai Takeo, “Kashima wo meguru yottsu no tatakai,” *Gijutsu to ningen* (June 1974): 90.

consume natural and human resources with no productive ends except their own monstrous growth, breaking the cycle of ecological systems. The horizon for such a machine was endless expansion until it destroyed life itself.

The Monster's Plastic Guts: The Technological System of Giantization

Like seabirds in the Pacific Ocean, the industrial monster's guts were choked with the material that drove the system of giantization: plastic. The rise of land-use development in Japan coincided with a global boom in industrial and consumer applications for plastics that fed off the availability of cheap crude oil from the Middle East. The Japanese petrochemical industry rapidly expanded in the postwar, deriving plastic resins from crude oil brought to its Pacific Coast on tanker ships. Plastics defined a new global era of extraction-production-consumption that reached unprecedented scales. Global production increased from 2 million tons per year in 1950 to over 50 million tons by 1973.⁵⁵ In other words, in the 1970s the experience of seeing land devoured by industry along its coasts was mirrored by the experience of an everyday life drowned in plastic goods.

Prompted by the mass intrusion of plastics into everyday life, *Technology and Humans'* environmentalists illustrated for their readers the vast network of extraction and production that allowed goods and materials to be manufactured and circulated on what was previously thought an unimaginable scale. In this way, the image of the combine as an animate creature took on a far more devastating significance for everyday life in Japan. Once combines had been built, they could not be erased. It became difficult to undo or disassemble them. Instead, government and

⁵⁵ "Global plastics production," Our World in Data, accessed November 17, 2019, <https://ourworldindata.org/grapher/global-plastics-production>. Plastic production stands at nearly 400 million tons annually today and is expected to grow to 2.8 billion tons by 2050. From 1950 to 2015, we produced 8.3 billion tons of plastic, of which 5.8 billion has been discarded or incinerated.

industry leaders felt pressed to make ongoing returns on their investment by continuously finding new “sustenance” for the infrastructure they had built. The plastic resin monster not only stalked the landscape: it drove the entire economy. The nature of the immovable and resource-craving infrastructure meant that simply shifting the culture of economic growth to one focused on sustainability that included government regulations or changes in economic policies would not solve the environmental crisis as long as the industrial network and combines existed. The monster could not be displaced, only destroyed.

The scope of the plastic commodity chain was far outside the perspective of most Japanese citizens, most of whom were still adjusting to buying Yakult brand yogurt in disposal plastic bottles rather than reusable glass ones. Since *Technology and Humans*' writers included many engineers, magazine personnel had the technical expertise to analyze industrial production inside and out. Writers depicted extraction, production, and consumption as an expansive system premised on pollution. Former combine engineer Takahara Hiroshi, writing in the January 1974 special issue on Japan's “Oil Civilization,” laid out the entire technological system of the petrochemical combine as a linear model. As he explained, massive oil tankers bring crude oil into storage facilities on the coast; the facilities pump crude oil to the refinery; the refined oil is used in adjacent petrochemical factories that produce chemicals for products such as trash bags, fertilizers, and tires; the refined oil is also used by thermal energy plants at the adjacent steel manufacturing facilities; oil is further used as a lubricant in various types of machinery and to produce asphalt for roads; and oil is also refined into fuel for private vehicles, military vehicles, and airplanes. Takahara also listed the chemicals that were dumped into the water and or dispersed in the air as pollutants at each step.⁵⁶

⁵⁶ Takahara Hiroshi, “Sekiyu gijutsu to wa nanika,” *Gijutsu to ningen*, no. 8 (Winter 1974): 8.

Takahara's diagram of the extraction-production-consumption petrochemical lifecycle (Figure 8) visualized the distance from extraction to production in Japan, as well as the breadth of the manufacturing infrastructure that was based on crude oil. The description introduced readers to the full ecological impact and vast industrial networks contained within the commercial products they consumed. In the drawing, a single stream of crude oil, brought in on giant tankers, expands into numerous product streams ranging from transportation to industrial goods, construction, consumer products, and military applications. In addition to its large scale, Takahara illustrates the linear nature of the production system—an open-ended system that consumed resources at ever greater scales without any regenerative component. As it expanded, the system's main function was to increase the number of industrial products it required, consumers products it manufactured, and pollution it deposited back into the environment.



Figure 8: Takahara Hiroshi diagramed the “petrochemical technological system.”⁵⁷

In order for the system to expand, it needed markets. Environmentalists framed the linear production system as a self-sustaining living thing that created its own markets by fueling demand for its products. Environmentalists argued that the industry expanded not in response to native consumer demand but was instead the result of the industry flooding the market in order to artificially drive up demand. The consumer was thus the pawn of an industrial giantization

⁵⁷ The system goes from extraction through transport, processing, and manufacturing, and finally ends at consumption in various forms, including finished plastic consumer goods and fuels. “Diagram One: Sekiyu no gijutsu taiki” in Takahara Hiroshi, “Sekiyu gijutsu to wa nanika,” *Gijutsu to ningen*, no. 8 (Winter 1974): 8. Image used under fair use.

scheme. Engineer and union activist Kondō Kan'ichi made this argument in a March 1975 article entitled "The Structure of Mass Plastic Production." According to Kondō, the Ministry of International Trade and Industry, responding to industry demands, raised the per-facility cap on ethylene production, the base for plastic resins, from 200,000 tons to 300,000 annually in the late 1960s. This allowed the industry to flood the market with plastics, driving down costs and driving up demand. It was an effective strategy. The quantity of plastic resins produced from vinyl chloride alone doubled in four years, rising from 485,000 tons in 1966 to 1.16 million tons in 1970.⁵⁸ The net domestic consumption and production of plastics also doubled during that time frame, with consumption rising from 1.66 million to 4.08 million tons and production rising from 1.99 million to 5.13 million tons.⁵⁹

Environmentalists interpreted this as a horrific new mutation in industrial society. Indeed, Kondō's argument echoed an earlier article by the engineer Maekawa Michio. In a 1973 article entitled "The Technological System of Discarding," Maekawa asserted that petrochemical production in Japan had been based on low-cost mass production and consumption since it took off in the 1950s, inaugurating an "era of disposability" (*tsukaisute no jidai*) marked by the "exaltation" of consumption.⁶⁰ Since the 1960s, plastics manufacturing had "recklessly expanded the scale (*sono kibo wo gamushara ni kakudai shiteyuku*)" of "discarding" and mass production that the petrochemical industry pioneered.⁶¹ In an article on steel production that followed

⁵⁸ Polyethylene and vinyl chloride were the two main plastic resins produced in Japan.

⁵⁹ Kondō Kan'ichi, "Purasuchikku ryōsan no kōzō," *Gijutsu to ningen* (March 1975): 56-59.

⁶⁰ Maekawa Michio, "Tsukaisute no gijutsu taikai 1: purasuchikku no haikibutsu kōgai no kongen," *Gijutsu to ningen*, no. 6 (Summer 1973): 8-9.

⁶¹ Maekawa Michio, "Tsukaisute no gijutsu taikai 1: purasuchikku no haikibutsu kōgai no kongen," *Gijutsu to ningen*, no. 6 (Summer 1973): 8-9.

Maekawa's in that same issue, *Technology and Humans*' editors argued that the system of "mass production for disposability" pioneered in petrochemicals and plastics had also transformed steel, iron, and non-ferrous production based on mass production, disposability (*tsukaisute*), and waste (*rōhi*).⁶² The editors concluded that "the only way to escape this vicious cycle (*akajunkan*) [of mass production and waste] is to fundamentally remake this production system of disposability that forcibly increases the mass consumption [of these products] (*shōhi wo zōdai saseru*)."⁶³ The hope of activist-writers like Maekawa Michio was that "citizens" would rise up to resist "mass consumption" in order to force "big business to revise its philosophy of discarding (*tsukaisute*)" and end their endless "massification" (*ryō no kakudai*) of production—producers would never stop it on their own.⁶⁴ In Maekawa's description an endless cycle of growth in production and waste accompanied the petrochemical monster.

Takahara Hiroshi's diagrams and Tanno Kiyoshi's photographs of industrial combines were complimentary representations of a new, emerging world. It was a world defined by unparalleled levels of production and consumption created through vast, integrated networks that moved materials across the globe. In their representations, as well as those of Maekawa and Kondō, environmental consciousness hinged on the *ecological impossibility* of the current system. The metabolism of the living machine—its digestive system—was naturally expansive and depended on both global resource extraction, seeking new inputs, and creating new markets for its goods.

⁶² Henshūbu, "Tsukaisute no gijutsu taikai: kyodaika to shigen rōhi no shigen," *Gijutsu to ningen*, no. 6 (Summer 1973): 12.

⁶³ Henshūbu, "Tsukaisute no gijutsu taikai: kyodaika to shigen rōhi no shigen," *Gijutsu to ningen*, no. 6 (Summer 1973): 13.

⁶⁴ Maekawa Michio, "Tsukaisute no gijutsu taikai 1: purasuchikku no haikibutsu kōgai no kongen," *Gijutsu to ningen*, no. 6 (Summer 1973): 11.

Technology and Humans' environmentalist imagery intervened in the international conversation about the ecological limits of economic growth. Oil and petrochemicals had driven a global era of high economic growth from the 1950s to early '70s, in which Japan's unprecedented double-digit GNP growth stood out. Simultaneous to the launch of *Technology and Humans*, economists and policymakers in parts of the world began to understand that there may be ecological limits to growth. The realization was famously expressed in a 1972 publication commissioned by the Club of Rome, entitled *The Limits to Growth*, which was developed by a team of international researchers who simulated the impact of unlimited economic and population growth on the planet's carrying capacity.⁶⁵ The argument put forth by the authors of *The Limits to Growth* stated that governments had to shift their primary goal of economic growth to sustainability in order to preserve a high standard of living long term.⁶⁶

The Japanese government took a different tack: they aimed to sustain growth in the face of ecological limits but shifted their projections for GNP growth from double digits to a "modest" 7-8% per year increase in the 1970s.⁶⁷ Indeed, the government's stated solution to the pollution crisis was to foster the development of "pollution-regulating technologies" within toxic industries, thus finding ways to clean up factory production without significantly reducing outputs. This strategy relied on technical fixes to pollution.⁶⁸ In *Technology and Humans*'

⁶⁵ In 1980 the magazine's editors would criticize *The Limits to Growth* as representative of efforts by those "in power"—referring to governments, major companies, and economists invested in the idea of growth—to desperately regain control over the endemic crisis economic growth had created. "Kyodai bunmei no mujun to chōkoku," *Gijutsu to ningen rinjizōkangō kagaku gijutsu ron e no dokusho annai gendai kagaku gijutsu wo kangaeru tame no nihyaku satsu* (June 1980): 319.

⁶⁶ Donella H. Meadows, et. al., *The Limits to Growth* (New York: Universe Books, 1972).

⁶⁷ Honma Yoshihito, *Kokudo keikaku no shisō* (Tokyo: Nihon Keizai Hyōronsha, 1992), 42-46.

⁶⁸ Tsuru Shigeto, "History of Pollution Control Policy," in *Environmental Policy in Japan*, eds. Shigeto Tsuru and Helmut Weidner (Berlin: Edition Sigma, 1989).

environmental narrative, there was no question of limiting growth. The impossibility of limiting growth was already built into the industrial landscape. Environmentalists believed that only a mass action, a “synthesis” of environmental movements, offered any hope of resolving the crisis.

IV. The Monster in a White Shirt and Tie: Comprehensive Development Planning

In environmental narratives the petrochemical combine monster was the product of Japan’s misguided approach to managing and developing land (*kokudo riyō keikaku*). In contrast to environmentalists’ vision of toxic monster combines, the vision of bureaucratic planning, held by bureaucrats, was a dull fantasy that involved reconfiguring communities and ecological spaces into the raw materials of industrial growth. For environmentalists, bureaucratic planning fed the monstrosity; for planners, it was merely their day job to draw up “rational” economic growth plans. *Technology and Humans’* environmentalism aimed to exploding the tidy image of bureaucratic planning that concealed ecological and social violence.

Japan’s Comprehensive Development was the bureaucratic planning apparatus that designed the country’s national land-use policies (*kokudo riyō*). Land-use policy involved organizing Japanese territory to maximize economic efficiency by distributing industry and infrastructure across the country. The term “national land” did not refer to publicly owned land, but rather to the totality of Japan’s sovereign territory. Through the concept of “national-land use,” government planners imagined the Japanese nation as a singular territory that could be managed the state’s technical capacity and authority. One of the main purviews of land-use policies from the 1950s to 1970s was industrial siting for petrochemical combines.⁶⁹

Japan’s central bureaucracy carried out land-use development under the framework of “Comprehensive Development Planning” (*sōgō kaihatsu*). From the 1960s to the early 1970s,

⁶⁹ Honma Yoshihito, *Kokudo keikaku no shisō* (Tokyo: Nihon Keizai Hyōronsha, 1992), 2-10.

Comprehensive Development had two plans as its central pillars. The first plan was the 1962 National Comprehensive Development Plan (*Zenkoku sōgō kaihatsu keikaku*), which was designed to correct urban overcrowding and regional inequality created by Japan's postwar economic recovery. The second plan was the 1969 *New National Comprehensive Development Plan*, which was designed to counteract the severe environmental crisis precipitated by the previous plan as well as the problems of urban overcrowding and regional inequality that the 1962 plan had intensified rather than solved. Both were developed by the central government's Economic Planning Agency (*Keizai kikakuchō*) in consultation with other ministries and the cabinet's Economic Council, which consisted of business leaders, leading academics, unions, research institutions, and media members, among others.⁷⁰ The 1962 and 1969 plans primarily identified locations for large-scale industrial complexes as well as transportation and communications infrastructure in order to expand and manage an integrated national network for circulating goods and raw materials.⁷¹ In 1974 the newly formed "National Land Agency" became responsible for national land-use planning and designed the three subsequent comprehensive development plans (*zensō*).⁷²

Comprehensive Development incorporated far more than the two national plans. Comprehensive Development also consisted of a network of prefectural and regional development plans written by prefectural bureaucracies. These plans that generally followed, although sometimes preceded, the two national plans. Other components of Comprehensive Development included plans created by competing Ministries as well as development-focused

⁷⁰ Victor D. Lippit, "Economic Planning in Japan," *Journal of Economic Issues* 9, no. 1 (March 1975): 41.

⁷¹ See for example, "shin nettowaaku no keisei" in the 1969 plan: *Shin zenkoku sōgō kaihatsu keikaku*, 19.

⁷² Keizaikikakuchō, *Sōgō kaihatsu no ayumi* (Tokyo: Keizaikikakuchō, 1975), 34-45.

laws like the 1962 Law Promoting the Creation of New Industrial Cities. The 1950 Comprehensive National Land Development Law (*kokudo sōgō kaihatsu hō*), which formulated the legal framework for Comprehensive Development, laid out a structure of overlapping development plans at the national, prefectural, and regional levels.⁷³ Important “local” plans included, but were not limited to, the Mutsuogawara Development Plan in the late 1960s for Mutsuogawara in Aomori Prefecture; the various phases of the Hokkaidō Comprehensive Development Plan throughout the 1960s and early 1970s; and the various Kashima development plans for Kashima, Ibaraki Prefecture beginning in 1960 when then governor Iwakami Nirō spearheaded a new era of industrial development in Kashima.⁷⁴ Regardless of whether the prefectural plans preceded or followed the national plans, they all conformed to the basic development logic outlined in the national comprehensive plans. Indeed, the national plans were broad policy statements that left the development details to be handled by planners who worked on site-specific plans, such as those in Kashima and Mutsogawara. The national government designated particular sites (*kyoten*) for industrial use, while prefectures and municipalities designed large-scale reclaimed land projects that would populate these industrial sites and acquired the necessary coastal land from residents—in turn displacing farming and fishing communities. Each regional plan was a building block for the larger national vision of

⁷³ Kawana Hideyuki, *Dokumento nihon no kōgai: Dai go kan sōgō kaihatsu* (Tokyo: Ryokufū Shuppan, 1990), 14-15 and *Kokudo sōgō kaihatsu hō* (1950).

⁷⁴ There were many other laws and plans within this network, such as the 1962 Law Promoting the Creation of New Industrial Cities (*Shin sangyō toshi kensetsu hoshin hō*) and the 1964 Law for the Promotion of Special Industrial Zones, which designated seven new cities (including Mizushima) and seven new industrial zones for combine development respectively. Although an LDP party document rather than an official government, Tanaka Kakue’s *Plan for Restructuring the Japanese Archipelago* (1973) was another pillar of Comprehensive Development until the effects of the 1972-1973 Oil Crisis killed most of its development vision.

Comprehensive Development, and the fundamental piece for each plan was land, most of which was reclaimed from the sea or acquired by displacing coastal communities.

It is hard to understate the cultural impact of Comprehensive Development.⁷⁵ Development planning, and the development of national land (*kokudo*) in particular, was at the heart of the postwar vision that saw Japan remade into an economic behemoth and high-consuming wonderland. As a broad approach to governance, Comprehensive Development was supposed to fulfill the state's postwar promise to engineer an economically strong, secure, and prosperous country—a technological utopia devoid of inequality and social ills. Indeed, Comprehensive Development was based in the dream that the state could use science to control society, economy, and environment with teams of technocratic experts in bureaucracy, academia, and private industry.⁷⁶ However, by the 1970s environmentalists were deriding Comprehensive Development for ushering in an environmental catastrophe—the mutated catastrophe of bureaucratic rationality—that was devastating the environment and communities through land-use development plans.⁷⁷ Comprehensive Development did not just draw the ire of environmentalists. Criticism of development planning was “overwhelming” throughout Japan in the early 1970s in response to the environmental crisis, urban overcrowding, and regional inequality.⁷⁸

⁷⁵ Victor D. Lippit, “Economic Planning in Japan,” *Journal of Economic Issues* 9, no. 1 (March 1975): 44.

⁷⁶ Laura Hein and Scott O’Byrne have discussed the dream of rational governance in the immediate postwar at length. Laura Hein, *Reasonable Men, Powerful Words: Political Cultural and Expertise in Twentieth-Century Japan* (Berkeley: University of California Press, 2005) and Scott O’Byrne, *The Growth Idea: Purpose and Prosperity in Postwar Japan* (Honolulu: University of Hawai’i Press, 2009).

⁷⁷ See *Technology and Humans*’ two special reports on *sōgō kaihatsu*: “Desukuwaaku no bōryoku ‘shinzensō,’” *Gijutsu to ningen* 1, no. 2 (Summer 1972): 16-56 and “Sōgō kaihatsu no shisō to genjitsu,” *Gijutsu to ningen* (June 1974): 6-57.

⁷⁸ Honma Yoshihito, *Kokudo keikaku no shisō* (Tokyo: Nihon Keizai Hyōronsha, 1992), 73.

The Pacific Belt: From Planning to Toxic National Land Development

The plans were more than paper. Although such expansive developments plan could never fully be realized, they nonetheless had profound effects on the Japanese archipelago as a territory.⁷⁹ From the 1950s through the early 1970s, thousands of hectares land were reclaimed from the sea, kilometers of coastline acquired from rural communities, and fifteen petrochemical combines built. Land was purchased, dug up, paved over with concrete, and, finally, inundated with toxic waste.

By the early 1970s, Comprehensive Development had reshaped a sizable portion of the national land (*kokudo*) into a highly industrialized and toxic zone stretching from Tokyo to Kyushu that contained the majority of Japan's industries and population. The "Pacific Belt" (*taheiyō beruto*) region of Japan had become the clogged industrial heart of Japan's over-concentrated industry. The Pacific Belt is a 750-mile stretch of the Pacific Coast of Japan that begins at the Kantō Plain and Ibaraki Prefecture in the North and continues to the northern tip of Kyushu in the South. It contains Tokyo, Kawasaki, Yokohama, Nagoya, Osaka, the Seto Inland Sea, and the northern industrial zones of Kyushu. Known for its natural beauty, the Pacific Belt had been a major area of commerce since before the Tokugawa Era.⁸⁰ However, in the early 1970s, industrial pollution had devastated the largest area of the Pacific Belt, the Seto Inland Sea,

⁷⁹ Kawana Hideyuki, *Dokuyumento nihon no kōgai: Dai go kan sōgō kaihatsu* (Tokyo: Ryokufū Shuppan, 1990), 7-64.

⁸⁰ As Hanayama Yuzuru shows, there was a symbiotic relationship between harbor development and the growth of adjacent major cities from the Meiji era onward, which led to postwar industrial zones along the coast being developed close to metropolitan areas. He rightfully points to the role of "industrial-siting policy and land use control (sic)" in environmental disruption because those interrelated policies built upon the historical foundations of industry in the Pacific Belt and further intensified their concentration. Hanayama Yuzuru, "Land Use Planning and Industrial Siting Policy," in *Environmental Policy in Japan*, eds. Shigeto Tsuru and Helmut Weidner (Berlin: Edition Sigma, 1989), 415.

Since then, it had been commonly referred to as the “dying Seto Inland Sea” (*hinshi no seto naikai*).⁸¹

Japan’s industrial structure was dependent on importing raw materials such as oil and iron. 70% of the archipelago consists of difficult-to-inhabit mountainous regions or uplands, which therefore led to the concentration production and population in pockets of the remaining 30%.⁸² In the postwar period, the dependency on foreign oil and iron ore made coastal access to the Pacific Ocean crucial to industrial production. Oil prices dropped as Middle East oil fields grew significantly from the 1950s onward, and 60% of Japan's energy production came from crude oil in the 1960s, which fueled the country’s petrochemical boom. The largest tankers in the world were built in Japan from the 1950s to 1970s to deliver crude oil to coastal combines.⁸³

In terms of industrial needs, the Pacific Belt was scarce in resources and land, but by 1972 this long, narrow coastal region contained 63% of Japan's population and a staggering 84% of its national, industrial output.⁸⁴ Indeed, in 1969 48% of Japan’s population was crowded into a mere 1.2% of the nation’s total land area.⁸⁵ Large-scale manufacturing was thus fitted into a relatively small region that was also home to a majority of the population. By comparison, the

⁸¹ Hoshino Yoshirō, “Setonaikai ni miru shizen to ningen no hakai: atarashii rekishi wo hiraku genten wa nanika,” *Gijutsu to ningen* 1, no. 1 (Spring 1972): 6-8.

⁸² John Sargent, “Industrial Location in Japan since 1946,” *GeoJournal* 4, no. 3 (1980): 207; Ui Jun, “The Singularities of Japanese Pollution,” *Japan Quarterly* 19, no. 3 (July 1972): 281-285.

⁸³ The largest oil tanker in the world in 1955 displaced 46,000 tons. By 1973, the world record holder was 468,000 tons displacement. Both were built by Japanese shipping companies. Hanayama Yuzuru, “Land Use Planning and Industrial Siting Policy,” in *Environmental Policy in Japan*, eds. Shigeto Tsuru and Helmut Weidner (Berlin: Edition Sigma, 1989), 415-416.

⁸⁴ John Sargent, “Remodelling the Japanese Archipelago: The Tanaka Plan,” *The Geographical Journal* 139, No. 3 (October 1973): 428-429.; Hoshino Yoshirō, “Setonaikai ni miru shizen to ningen no hakai: atarashii rekishi wo hiraku genten wa nanika,” *Gijutsu to ningen* 1, no. 1 (Spring 1972): 6.

⁸⁵ *Shin zenkoku sōgō kaihatsu keikaku*: 5.

output of oil refining, steel production, copper refining, petrochemical production, and lead refining in the Seto Inland Sea alone matched the total capacity of the United Kingdom for each industry.⁸⁶

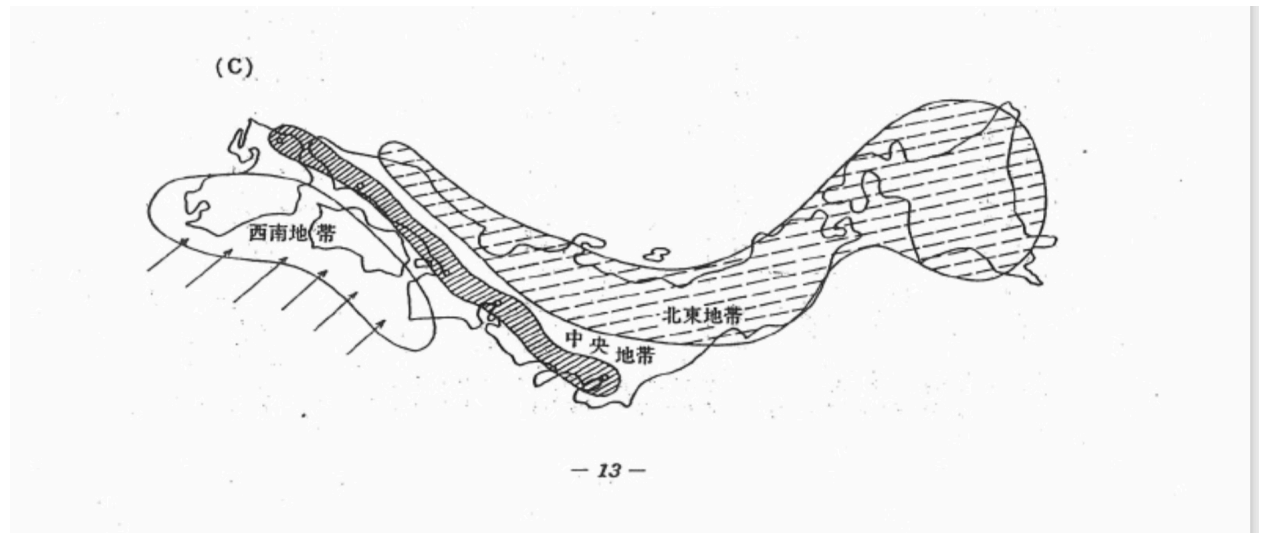


Figure 9: Japanese development map. The Pacific Belt is the darkly shaded middle section.⁸⁷

V. The Violence of Desk Work and the Catastrophe of Bureaucratic Rationality

[The government's] approach to development (*kaihatsu*) is purely the *bureaucratic desk work of demarcating* [spaces for industrial development]. By utilizing its power to [demarcate such spaces], the Japanese government established a development paradigm that would achieve its goal of a high-growth economy. Development is one-sidedly forced on the residents (*jumin*) of the communities sited for development. [Development] stole the land upon which residents made their living (*seisan genba*) and imperiled their livelihood. Japan's policies for high economic growth used "Comprehensive Development" (*sōgō kaihatsu*) as their primary weapon (emphasis mine).⁸⁸

The monstrous face of industrial pollution was concealed by the clean, suit-wearing image of the white-collar bureaucrat. *Technology and Humans* would call this concealment the

⁸⁶ Tsuru Shigeto, *Japan's Capitalism: Creative Defeat and Beyond* (Cambridge: Cambridge University Press, 1993), 129-130.

⁸⁷ Map showing the concentration of industry in Japan's central region, from the 1969 New National Comprehensive Development Plan. *Shin zenkoku sōgō kaihatsu keikaku* (1969): 13. Image used under fair use.

⁸⁸ Henshūbu, "Kaihatsu to gyomin: ankēto repōto," *Gijutsu to ningen* (June 1974): 54.

“Violence of Desk Work.” While environmental activists fought industrial monsters on ruined landscapes, the magazine’s writer-activists were equally cognizant that the crisis was vomited out from government office buildings in Tokyo. The technology of bureaucratic planning, what I call “bureaucratic rationality,” was the other driving force behind their environmental vision.

In the June 1974 issue on Comprehensive Development, *Technology and Humans*’ editorial staff condemned the development paradigm as bureaucratic “desk work” (*desuku waaku*). This rather dense quotation cited above contained most of the elements of the critique of bureaucracy that would reappear frequently in the magazine. First, the metaphor of “desk work” framed development as a disengaged mode of economic planning carried out by distant technocratic experts—the suit-wearing bureaucrat who drew up development plans at his or her desk for communities he or she never visited.⁸⁹ Second, the distance between bureaucracy and *genba* allowed bureaucratic planning to perpetrate violence on Japanese communities because it reinforced the sense, in planners’ minds, that selected communities were blank spaces on pieces of paper and easily reconfigured. The violence of this activity was concealed behind the clean image of the bureaucrat. Third, the violence was carried out by utilizing the state’s power to “demarcate” or “designate” (*senbiki*) spaces for development. Finally, Comprehensive Development existed for a singular purpose: executing the national framework for high economic growth, which, magazine contributors pointed out, meant that the state worked in service of private corporate profit.

Technology and Humans’ contributors confronted two questions. First, how could the

⁸⁹ Laura Hein shows how the technocratic consolidation of power made political conflict less visible as government officials aimed to remove economic and political decisions from “political discussion” and leave them in the hands of “technical specialists.” Hein also critiques historical narratives that interpret Japan’s postwar society as dominated by a harmonious unity between government and business and demonstrates that their relationship was often more conflictual and chaotic. Laura E. Hein, *Reasonable Men, Powerful Words: Political Culture and Expertise in Twentieth-Century Japan* (Berkeley: University of California Press, 2004), 7-10.

state's planning framework appear to be so natural? Second, how was it so deft at concealing its own violence? Indeed, the paradigms of economic growth, "scientific" economic planning, and industrial growth were so thoroughly naturalized in the 1950s and '60s that the possibility of a different version of reality was beyond the imagination of much of the Japanese public.⁹⁰

Bureaucratic rationality was doubly monstrous: it produced ecological and social violence while concealing it through the clean lines and naïve visions of Comprehensive Development.

Technological and Humans' environmentalists confronted Comprehensive Development with the counter-vision of bureaucratic desk work, which they depicted as inherently violent, and the dream of a planned, utopian world as fundamentally toxic.

The first step of bureaucratic violence was the tool of "designating" (*senbiki*) rural communities for development, which relied on economic inequity to dispossess these communities and to intensify existing unevenness. An anonymous oil-industry engineer offered the environmentalist interpretation of land acquisition in the fall 1972 issue of the magazine:

Petrochemical combines demand land (tochi wo motomete). [To fulfill that demand], the oil industry expands into fishing and agricultural communities, of which Oita and Kashima [two major petrochemical combine sites] are examples. As a matter of course, building oil refineries in agricultural areas dispossessed (*shūdatsu*) farmers of their land and polluted the air. In fishing villages, seaweed beds and fishing areas have been destroyed by reclaimed land (*umetate*), and [industry] has made the fish deformed and rotten (emphasis mine).⁹¹

The combine, rendered again as animate, drove a development process premised on rural dispossession and rural ecological devastation. In the engineer's critique, development planners become subservient to the petrochemical monster, as they are tasked with feeding it more and

⁹⁰ Scott O'Bryan, *The Growth Idea: Purpose and Prosperity in Postwar Japan* (Honolulu: University of Hawaii Press, 2009), Introduction.

⁹¹ "Gendai gijutsu no genkai: seiyujo ni okeru kōgai no subete," *Gijutsu to ningen* 1, no. 3, (Fall 1972): 99-106.

more inputs and then scrambling to contain the blight it creates in rural areas. For *Technology and Humans*' writers, the development process could not take place without this violence.

Industrial companies felt that their decision to raze and rebuild in certain areas was justified by the image of these communities as dying and as home to low-income individuals in need of government rescue. The authors of the national Comprehensive Development plans explicitly depicted economic development as a cure for regional inequality and the depopulation of rural areas. For environmentalists, that logic instead rendered rural areas as “blank spaces” ripe for development. Since they were not industrialized, government and industry leaders viewed rural communities as essentially empty—and, therefore, perfectly suited to be turned into something industrial. Amagasa Keisuke, one of *Technology and Humans*' editors, showed how this happened with development planning at Awaji, the same island where activists organized the Nationwide Local Struggles symposium discussed in the previous chapter. Amagasa argued that the act of “designating” (*senbiki*) places as “underpopulated spaces” (*kasochi*) allowed planners to ignore the “local landscape” (*fūdo*) and to imagine these places as empty zones that could “literally” be “comprehensively developed” (*sōgō kaihatsu*) from nothing into sites that supported infrastructure and industrial projects.⁹² Indeed, environmentalists in *Technology and Humans* regularly argued that government planners perceived development sites, regardless of their extant ecologies and communities, as “blank spaces” (*kūhaku*).⁹³

Regional economic inequality had been baked into the postwar state. After the American occupation of Japan, power was increasingly concentrated in the national government and the

⁹² Amagasa Keisuke, “Shima ni otozureta akumu no harō: Awajishima no mittsu no machi to kaihatsu keikaku,” *Gijutsu to ningen* (June 1974): 60.

⁹³ Takahara Hiroshi, “Daikibo kōgyō kichi keikaku no kōgai to kikennsei,” *Gijutsu to ningen* (June 1974): 31.

centralized bureaucracy.⁹⁴ This paralleled the concentration of capital, as 82% of the executive offices of all major firms were concentrated in Tokyo, Nagoya, and Osaka.⁹⁵ Margaret McKean argues that prefectural financial distress, caused by the unequal relation between prefectures and the national government, influenced local governments to court industrial development with enthusiasm. Prefectural governments were responsible for spending 72% of the federal budget, yet they only collected 30% of the tax revenue. According to McKean, because the prefectures tended to function as the executors of the central government's plans, the government continued to assign new spending obligations to these areas without providing a means for increased tax revenue.⁹⁶

Prefectural governments clamored for a piece of the development pie, readily offering up wide tracts of land in hopes of boosting tax revenue and local economic resilience.⁹⁷ For example, in 1951 the newly elected governor of Okayama Prefecture—where the Mizushima Petrochemical Combine would later be sited—espoused the symbiotic relationship between local development and Japan's economic nationalism in his first speech to the prefectural assembly:

Hope for our nation's future economic development is completely dependent on the development of heavy industries (*mattaku kōgyō no hatten kakatteiru*). Therefore, here in our prefecture we must work to attract (*yūchi*) industries in order to promote the development of our industrial economy. If we successfully lure major industries here, then related industries will pour in, and we will no doubt solve our current problem of excess labor capacity.⁹⁸

⁹⁴ Miyamoto Ken'ichi, *Nihon no toshi modani: sono seiji keizaigaku teki kōsatsu* (Tokyo: Chikuma Shobō, 1969), 162-164.

⁹⁵ Miyamoto Ken'ichi, "Industrial Policy and the Case of Large Industrial Complexes," in *Environmental Policy in Japan*, eds. Shigeto Tsuru and Helmut Weidner (Berlin: Edition Sigma, 1989), 428.

⁹⁶ Margaret McKean, *Environmental Protest and Citizen Politics in Japan* (Berkeley: University of California Press, 1981), 22-23.

⁹⁷ Hanayama Yuzuru, "Land use Planning and Industrial Siting Policy," in *Environmental Policy in Japan*, eds. Shigeto Tsuru and Helmut Weidner (Berlin: Edition Sigma, 1989), 419-420.

⁹⁸ Kawana Hideyuki, *Dokumento nihon no kōgai: Dai go kan sōgō kaihatsu* (Tokyo: Ryokufū Shuppan, 1990), 150.

His speech set the stage for Kurashiki's development plan, which would be introduced the following year. The enthusiasm with which prefectural governments embraced heavy industrial development, believing that they should tie their local economies to national industrial development, showed how the framework of Comprehensive Development quickly became entrenched in the early postwar period. Rhetorically, Oakayama's governor argued that development was the responsibility of local governments and of the Japanese people, echoing the militant nationalism of the wartime period in a new economic vogue.

The national framework for development was still at the heart of the environmental crisis in the 1970s. *Technology and Humans'* environmentalists crafted its critique of Comprehensive Development in the wake of the 1969 National Development Plan, which sited three new low-income rural areas for combine development—Tomakomai in Hokkaido, Rokkasho in Aomori, and Shibushi in Kagoshima—in a continuation of the same “demarcation/designation” logic. The magazine's contributors argued that the framework of *national economic interests* parasitically preyed on these areas. Here is how Takahara Hiroshi, a petrochemical engineer, critiqued the regional development plan for Tomakomai, Hokkaidō (the 1970 “Phase Three Hokkaidō Comprehensive Development Plan”) and its “vision for a national (*kokkateki*) [development] project”:

This is not a master plan that local residents [near development sites] can understand or participate in. It is a destruction plan (*hakai keikaku*) [that will bring about] industrial pollution ‘on a magnificent scale hitherto unseen in the world’ and plunder land and water. It will do so because the plan was created through the *desk work of bureaucrats* [sent from the central government] who “designed” (*sōshutsu*) the plan “under the rubric of national land-use (*kokudo*).”⁹⁹

⁹⁹ Takahara Hiroshi, “Daikibo kōgyō kichi keikaku no kōgai to kikennsei,” *Gijutsu to ningen* (June 1974): 32.

Takahara rendered Comprehensive Development as pure “destruction” (*hakai*) that was incapable of producing anything else. The dislocation between bureaucratic planning and *genba* yielded toxic fish and a bloodlust for land, water, and any resource that would satiate the combine monster.

Technology and Humans aimed to infiltrate the clean bureaucratic language of development with an opposing language of toxicity and injustice that tied development to the industrial combine monster. I emphasize here Japanese environmentalists perceived the crisis of ecological deterioration as a global crisis of post-World War Two bureaucratic rationality. The optimism of technocratic planning had in fact authorized a series of violent planning techniques obscured by the veneer of scientific management. In other words, the white-collar planner should be wearing a hazmat suit, not a cheap suit and tie.

Factory Japan Becomes a Toxic Utopia

Against the image of local communities dutifully enduring development for national interests, environmentalists depicted the nation as a singular space of toxic decay where the pollution monsters had seized control. In the summer 1972 issue on Comprehensive Development, entitled “The Violence of Desk Work,” *Technology and Humans*’ editors reconfigured the geographic imaginary of the 1969 New Comprehensive National Development Plan into what they believed it would actually produce: Japan, “The Pollution Archipelago,” a toxic utopia that absorbed poisonous factory waste in order to keep the machinery of economic growth running. For *Technology and Humans*’ environmentalists, the state’s totalizing image of national land development became a world consumed by toxicity. As one scientist wrote in the magazine: “In the last five or six years, before we realized what was happening, the entirety of our national land (*kokudo no zentai*) became the world’s factory town,” and “Japan became the

world's Number One polluted first-world country (*daiichi no kōgai senshin koku*).”¹⁰⁰

In “The Violence of Desk Work” issue, *Technology and Humans* printed a map included in the New Comprehensive National Development Plan that depicted Japan as an integrated network centered on Tokyo, with lines of transportation and communication running from the capital to regional cities that served as nodal points in the network (Figure 10). The map portrayed Japan as a perfect, clean space defined by a centrally planned and operated infrastructure that assigned “command functions” to Tokyo and regional cities, which in turn would manage Japan’s outlying regions. In the map Japan is more circuit board than territory, reinforcing the metaphor of the nation-as-computer that could be controlled from central terminals. Thus, the government map painted an image of a technocratic fantasy in which Japan is run from the “brain”—that is, by Tokyo-based corporate and government technocrats and their regional counterparts.

¹⁰⁰ Shizume Yasuo, “J.D. Banaaru no shisō wo megutte,” *Gijutsu to ningen* 1, no. 2 (Summer 1972): 130.

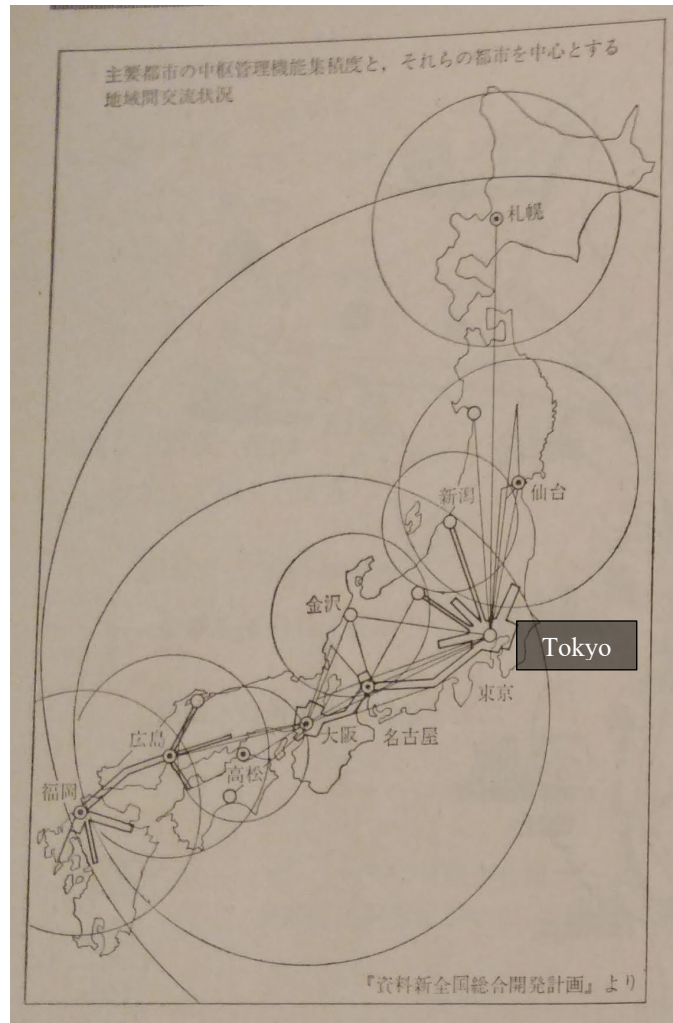


Figure 10: Map of Japan as a network centered on Tokyo.¹⁰¹

To this image, *Technology and Humans* then added their own map of what the Japanese archipelago would look like fifteen years later if all of the 1969 New National Comprehensive Development Plan's goals were fulfilled (Figure 11). The magazine's editors intended to demonstrate how industrialization would restructure the political and physical geography of Japan. Smoke-stack factories represented heavy industries, while suitcases and pigs represented tourism and industrial agriculture, respectively. Numerous highway and rail networks connected

¹⁰¹ Map from the 1969 New National Comprehensive Development Plan reprinted in the following article: "Shiryō Shinzensō: Kokudo sōgō kaihatsu keikaku no 'tatemaē' to 'honne,'" *Gijutsu to ningen* 1, no. 2 (Summer 1972): 37. Image used under fair use.

these enterprises. In their map, *Technology and Humans*' editors depicted how pervasive heavy industry, industrial agriculture, rail networks, and tourism would pervade every inch of Japan.

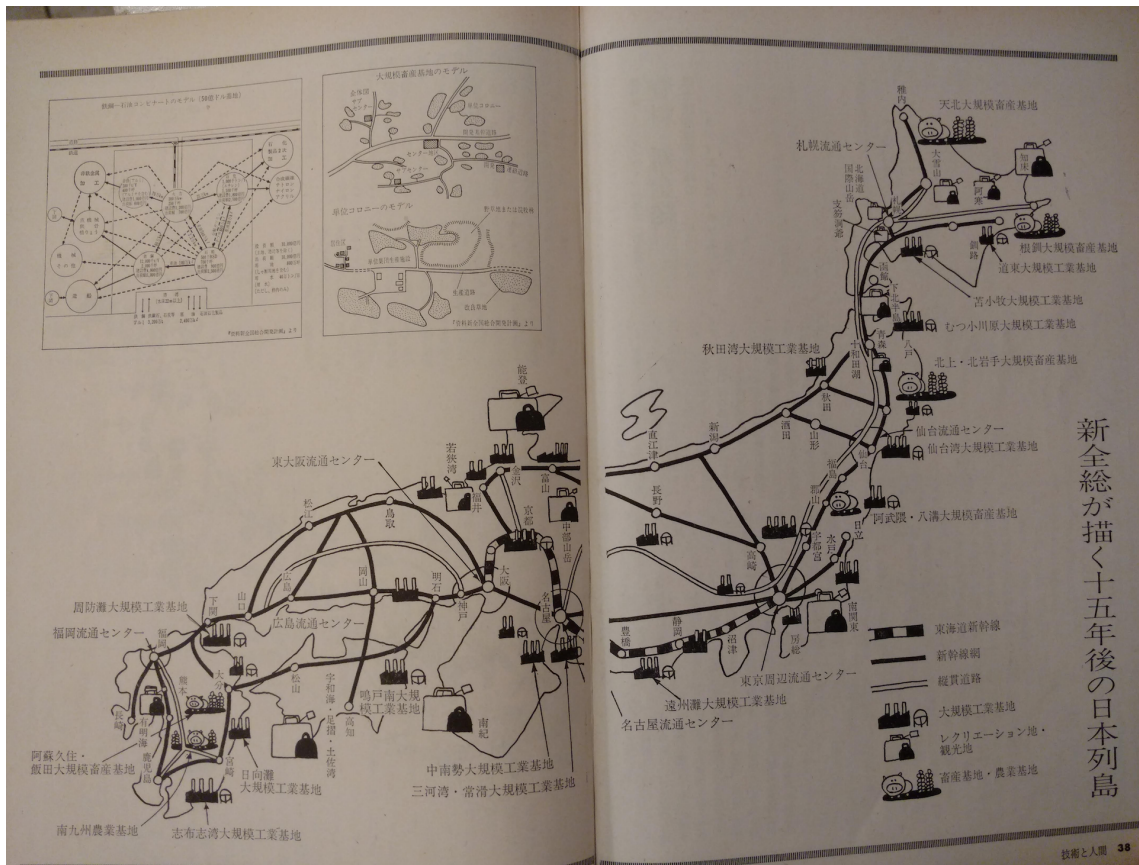


Figure 11: Map showing proposed transportation infrastructure and industrial sites.¹⁰²

The editors included on the map a generic diagram of a petrochemical combine (the first box in the upper left-hand corner the page) and an industrial site (the second box in the upper left-hand corner) drawn from the 1969 development plan. The map represented Japan as one integrated industrial and commercial space, echoing the photographs of combines I discussed earlier. The inclusion of the combine and industrial site schematics reinforced the belief that Comprehensive Development would homogenize the archipelago, stamping out diversity of community and

¹⁰² “Shinzensō ga egaku jūgonengo no nihonrettō,” in “Shiryō Shinzensō: Kokudo sōgō kaihatsu keikaku no ‘tatemaie’ to ‘honne,’” *Gijutsu to ningen* 1, no. 2 (Summer 1972): 38-39. Image used under fair use.

landscape.

While a homogenized “Factory Japan” was horrifying in its own right, *Technology and Humans*’ contributors believed that the toxic nightmare already created by industrial development required its own visualization. They printed a third map that showed all of the known sites of existing pollution in Japan, using gas masks, skulls, dead fish, and other morbid icons to designate polluted genba (Figure 12). According to this vision, the entire archipelago was covered in one form of pollution or another. The editors appended to the map a sardonic declaration: “Japan, ‘the great world power,’ boasts to the world that its newest, biggest showpiece product has become pollution!” The declaration continued, “If the development plan is fully implemented, inevitably Japan’s sovereignty will be snatched away by pollution and its citizens will become slaves to pollution.”¹⁰³

¹⁰³ “Shiryō Shinzensō: Kokudo sōgō kaihatsu keikaku no ‘tatemae’ to ‘honno,’” *Gijutsu to ningen* 1, no. 2 (Summer 1972): 40.



Figure 12: Technology and Humans’ “Pollution Archipelago” map.¹⁰⁴

The maps showed the toxic expansion of Japan’s technocratic planning vision as it was realized, moving from the utopian vision of “Japan-as-computer” to a toxic utopia—the “Pollution Archipelago” overwhelmed by death and decay. The magazine’s editors played on the national paradox at the heart of the state plans. Development was designed to make Japanese products more competitive internationally, yet at the same time it forced Japanese citizens to absorb pollutants so that Japanese industries could keep prices down. State planners claim to work for “national interests” in reality usurped sovereignty from popular control and transferred it to the machineries of technocratic governance. Development subordinated Japanese citizens to toxicity, turning them into “slaves to pollution.” In overlaying the two contrasting images of

¹⁰⁴ “Nihon kōgai rettō,” in “Shiryō Shinzensō: Kokudo sōgō kaihatsu keikaku no ‘tatemae’ to ‘honno,’” *Gijutsu to ningen* 1, no. 2 (Summer 1972): 40. Image used under fair use.

Japan, the editors attempted to show the disconnect between how development planners understood Japan and how Japan's citizens lived the reality of their polluted landscape.

Bureaucratic Rationality Unmasked

In the narratives they created, environmentalists depicted bureaucratic planning as a faceless and uniform technology of state power and Comprehensive Development as a pervasive system devoid of internal complexities or conflicts. That image did not necessarily match the institutional reality of development planning. Although the Cabinet of Japan formally adopted the finalized National Comprehensive Development Plans, the plans themselves were nonbinding, and their implementation required the cooperation of other ministries and local governments. Their most direct influence came by means of their tendency to guide private and public investment.¹⁰⁵ Moreover, the Economic Planning Agency, the institutional author of the plans, was not the only game in town. Other ministries, especially the Ministry of International Trade and Industry, developed their own development visions and often competed with each other.¹⁰⁶ State bureaucracy did not unilaterally dominate Japan's economic development.¹⁰⁷ Nonetheless, state and private industries did work to implement the vision presented in these plans. As Chalmers Johnson and other scholars argue, there existed something akin to a consensus—in broad terms and not without frequent conflict—among private industry and the state at the national and local levels over the direction industrial development should take in

¹⁰⁵ Victor D. Lippit, "Economic Planning in Japan," *Journal of Economic Issues* 9, no. 1 (March 1975): 41-45.

¹⁰⁶ Chalmers Johnson, *MITI and the Japanese Miracle: The Growth of Industrial Policy, 1925-1975* (Stanford: Stanford University Press, 1982), 76-78.

¹⁰⁷ Eric Dinmore argues that in each geographic area targeted for development, ministries competed with each other over the contours of how development should be carried out and that they further competed with prefectural governments' visions for local planning. Eric Dinmore, "Concrete Results? The TVA and the Appeal of Large Dams in Occupation-Era Japan," *The Journal of Japanese Studies* 39, no. 1 (Winter 2013): 36.

Japan. Instead of “consensus” I would call it a systemic compulsion to expand industrial production through land-use development. This systemic compulsion was embodied in the framework of the Comprehensive Development plans.¹⁰⁸ It was not just the work of government planners but an entire network of local governments and private industries that participated in development projects.

By framing environmental degradation as the systemic result of bureaucratic rationality that was compelled to giantize industrial monsters, environmentalists were reacting against the technocratic humanism that dominated economic policy and planning in Japan. Historian Scott O’Bryan has shown how, from the 1940s to the 1960s, government, private business, and the general public in Japan embraced the belief that the economy ought to be “scientifically” managed by technocratic experts.¹⁰⁹ *Technology and Humans’* “violence of desk work” critique aimed to show that the logic behind developmentalism—the belief that humanity could rationally control the economy through good technocratic planning—created the opposite: an out-of-control network of industrial production that would eventually destroy both human society and the environment. The clean bureaucratic vision of restructuring the Japanese landscape into a utopian world was based on supreme confidence in human ingenuity to build a better world. In contrast, it was the industrial monster as a living subject that in fact drove economic decision-making.

VI. Conclusion

In the first half of the 1970s, the terrain for environmentalism in Japan was the bulldozed

¹⁰⁸ Chalmers Johnson, *MITI and the Japanese Miracle: The Growth of Industrial Policy, 1925-1975* (Stanford: Stanford University Press, 1982), 51; and Victor D. Lippit, “Economic Planning in Japan,” *Journal of Economic Issues* 9, no. 1 (March 1975): 41-54.

¹⁰⁹ Scott O’Bryan, *The Growth Idea: Purpose and Prosperity in Postwar Japan* (Honolulu: University of Hawaii Press, 2009), Introduction.

and dredged up landscape of the petrochemical combine, mediated by a distant, abstract bureaucratic development process. The terrain was inhabited by all of the facets of the environmental crisis: local communities at once victimized and called to action, highly toxic industries, and rapid ecological deterioration. *Technology and Humans*' environmentalists represented the effort by many Tokyo-based and genba-based activists to envision a holistic environmentalism across that terrain, one that adequately contended with the systemic nature of environmental devastation and rendering that "system", i.e. the thing out of human control, as a literal monster.

Technology and Humans developed their environmental imaginary at a time when environmentalists across the globe were creating inventive and often opposing visions to inspire ecological action. The description of industrial dystopia was a starkly different image from that of Rachel Carson's *Silent Spring* (1962), which made a generation aware of the silent impact of chemical pollution through the absence of once vigorous animal life. It was also radically different from the global, interconnected visions of Spaceship Earth or the Gaia hypothesis of the 1960s that were based in the belief that understanding our global interdependencies with ecological systems would prompt humanity to become good stewards of the Earth.¹¹⁰ The ominous image of burning smokestacks and land-eating monsters, moreover, contrasted the numerous environmental and conservation movements in the United States that deemed reconnecting with nature—returning to the "land"—sufficient for instilling people with

¹¹⁰ James Lovelock created the Gaia hypothesis, and Spaceship Earth has been used in a number of different contexts, with Kenneth Boulding's 1966 essay "The Economics of the Coming Spaceship Earth" being one of the most significant for 1960s-70s global environmentalism. Ursula Heise, *Sense of Place and Sense of Planet* (Oxford: Oxford University Press, 2008), 21.

environmental awareness.¹¹¹ Instead, the dystopian, industrial environmental perspective in Japan was a powerful counter-reaction to the domestic political dynamics of Comprehensive Development. Moreover, *Technology and Humans*' environmentalism was simultaneously a way to reject the global acceptance of scientifically managed economic growth through technocratic planning that predominated the 1950s and '60s—a period when both explosive (literally) industrial growth and environmental deterioration were surging.

If the 1960s had been guided by utopian visions of economic growth, then the 1970s were weighed down by a sense of impending ecological collapse created by those visions. Optimism in the power of government planning and private industry to engineer a bright future through science and technology mutated into the toxic utopia of the pollution archipelago. The environmental imaginary created by contributors to *Technology and Humans* was based in the dystopian vision of petrochemical combine, which epitomized a world dominated by bureaucratic rationality and land-consuming technological systems. This was the true apotheosis of the state and private capital alliance that dominated high economic growth, according to environmentalists. Writing in the summer 1973 issue of *Technology and Humans*, engineer Takaoka Akashi described the sense that collapse was impending through a nightmarish depiction of combines, pollution, and industry: “From the combine’s flames that assault the sky, and from the blackness that settles around the reclaimed land, which envelops [the area] as if it were at the bottom of an ocean, the vexation of a nightmare that we cannot escape hints at the future of ‘oil’ technology.”¹¹²

¹¹¹ Ursula K. Heise rightly points to the inherent tradition between the globalist and local-ist perspectives within environmentalism from the 1960s onwards, a tension that continues to today. Ursula Heise, *Sense of Place and Sense of Planet* (Oxford: Oxford University Press, 2008), 21-46.

¹¹² Takaoka Akashi, “‘Sekiyu’ gijutsu: gendai shihon shugi no gijutsu taikai,” *Gijutsu to ningen*, no. 6 (Summer 1973): 60-67.

Chapter Four

At the Genba

I. Introduction

Beginning in February 1970, Nemoto Sueichi would step out into the chill winter air each morning and afternoon to photograph the sky above his land. He would repeat this routine every day for the next four years. Hardly a naturalist, Nemoto's interest lay in the dark hue of the once beautiful Kashima sky. Nemoto's viewfinder searched for volatile human-made particles that transformed the air around him, using his camera to create a daily record of visible air pollution. Living in Izumigawahama, a hamlet of Kashima, Ibaraki Prefecture, Nemoto documented pollution from one of the largest industrial complexes in the country, which had transformed rural Kashima in the 1960s. In addition to the photographs, he took daily samples from soil, water, and fish and animal life. He was a farmer and fisherman turned citizen-scientist, and data collection had become his mode of resistance against polluting heavy industries. Next to Nemoto—in fact, right up onto his property line—Sumitomo Metals, one of Japan's mega-conglomerates, had built their Kashima Iron and Steel Works. In February of 1970, the plant's blast furnace came online. Fueled by dirty petroleum coke, the plant released thirty tons of particulate matter into the air each month that, when wind conditions were just right, would blanket Nemoto's house in black clouds so thick (*makkuro*) that he could not see his hand an inch from his face. Nemoto called this his "particulate matter hell (*funjin jigoku*).” When the summer winds blew, he would have to close his aluminum storm shutters to keep out the dust, which turned his home into a furnace in the sweltering heat. Nemoto breathed in the dirty air day after day, but he stayed put in order to fight Sumitomo.¹

¹ Katai Takeo, "Kashima wo meguru yottsu no tatakai," *Gijutsu to ningen* (June 1974): 86.

Nemoto Sueichi was one archetype of the paradigmatic environmentalist: he was a local resident (*jūmin*)—a direct stakeholder—fighting an uphill battle to prove, with mountains of self-collected data over months and years, that industrial infrastructure was harming his health and the surrounding environment. Nemoto’s story was published in the June 1974 issue of *Technology and Humans*, written up by editor Katai Takeo, an engineer by trade, who interviewed Nemoto earlier that year. Katai and his fellow *Technology and Humans* contributors represented a different type of environmental activism. They sought to support and publicize actions such as Nemoto’s through documentary-style articles and to provide less-accessible scientific, economic, and political analysis to the public. *Technology and Humans*’ contributors thus constituted another archetype of the environmental movement: the writer-activist who visited the “genba” in order to tell Nemoto and other activists’ and victims’ stories.

This chapter unpacks the dynamics between environmental writer-activists represented by *Technology and Humans* and the genba of rural activism through the magazine’s writings on activists such as Nemoto Sueichi. The main conduit for the interaction between the two areas was through “reportage” journalism, a style of writing that *Technology and Humans*’ contributors adopted when addressing local resistance to the harms of pollution. Reportage required writer-activists to engage genba directly by documenting environmental conditions and modes of local struggle.² For local activists, working with *Technology and Humans* provided them with access to a wider public. For urban writer-activists, it was a more complicated journey. Believing these rural genba had been forced to sacrifice health, community, and

² Kamata Satoshi has perhaps written most extensively in this genre, both on rural environmental issues and industrial labor—writing from the genba of factory work—beginning in 1970 with his work on the famous Itai-Itai Disease, *Kakusareta kōgai dokyumento itai itai byō wo otte*. Kamata Satoshi, *Kakusareta kōgai dokyumento itai itai byō wo otte* (Tokyo: Sanichi Shobō, 1970).

environment in the service of industrial growth, urban writer-activists made an ethical commitment to support communities' struggles.³ This form of writing from the genba shaped how the pollution crisis was represented in the moment, and many writers (who were also trained scientists and engineers), such as Ui Jun, Miyamoto Ken'ichi, Hoshino Yoshiro, and Kamata Satoshi, would go on to write the history of the pollution crisis in the decades that followed. Many environmental writer-activists who lived in Tokyo or other urban centers felt duty-bound to engage and translate the experience of the putatively separate environment of rural communities for a wider public. Despite the fact that the reportage style was a standard mode of writing among environmentalists across in Japan, no historian has directly taken up the subject, even as it informed Japanese pollution history in the U.S. and Japan.⁴

It was through this urban-rural dynamic and the reportage writing that environmental writer-activists envisioned a new mode of decentralized activism that emerged organically from particular places. According to that vision, activism should be location-specific and based on the connection between individuals and the communities in which they lived. The underlying impulse of 1970s environmentalism was to connect with these places in order to support residents strategically but without imposing outside perspectives or directives. This put writer-activists in a peculiar position. For them, genba-based activism represented the possibility of a broad alliance of organic activist movements. However, according to their own ethos, the writer-

³ Ui Jun, "Anti-Pollution Movements and Other Grassroots Organizations," in *Environmental Policy in Japan*, eds. Shigeto Tsuru and Helmut Weidner (Berlin: Edition Sigma, 1989), 105-109.

⁴ In English-language scholarship, most of historians have drawn on the work of Ui Jun, Miyamoto Ken'ich, and other writer-activists from the time period, but none have discussed the phenomenon gofenba-based environmentalism and writing. The closest a historian has come to engaging the meta-sphere of environmental writing in Japan can be found in Simon Avenell, *Making Japanese Citizens* (Berkeley: University of California Press, 2010) and *Transnational Japan in the Global Environmental Movement* (Honolulu: University of Hawai'i Press, 2017).

activists could neither lead local movements in creating this alliance nor usurp locals' control over their activism. It was a political activism defined by the urgency of the problem and the indeterminacy of the solution.

In addition to upholding the principle that they should not dictate strategies to local activists, *Technology and Humans*' writers also transposed a growing sense of urban alienation onto rural communities that were in the maelstrom of the state-led industrial development process outlined in Chapter Three, even if they were often unaware that they did this. In the genba-based reports of environmental writer-activists, writers unwittingly used the crisis of environmental degradation to mirror a crisis of urban dehumanization defined by the domination of every life by new technologies. Writer-activists engaged genba as the "frontiers" (*henkyo*) into which an alienated, urban world expanded. Under the guise of "social welfare" policies, state development programs aimed to harness agricultural laborers and families for the new industrial economy—as workers and consumers—as well as capture land for industrial use and as a space that would absorb toxic industrial byproducts. Part of the reason they focused on the conflicts created by industrial expansion at rural genba was because *Technology and Humans*' writers linked this conflict to an anxiety that urban life that was, in the minds of the magazine's writers, destroying the ability of Japanese citizens to resist state and corporate intrusion into everyday life.

But rural resistance also represented hope, according to *Technology and Humans*' contributors. As I argued in Chapter One, many environmentalists believed that Japan's technocratic government and corporate conglomerates developed technological systems that increasingly dominated everyday life in urban centers. Rural genba, in turn, represented liminal spaces where they hoped to find a people still capable of struggling. Apropos of the magazine's

title, rural genba contained the possibility of *humanity*'s resistance to the *technological* domination built into the dehumanized urban world.

The obvious pitfall for *Technology and Humans*' environmentalism and the entire genre of genba-based writing might be a tendency to romanticize agrarian life as idyllic, a lifestyle in which rural communities were connected to nature and the surviving remnants of a pre-capitalist way of life. However, *Technology and Humans*' writer activists had more nuanced approach. They avoided totally essentialized agrarian communities, and they wove in a language of indigeneity and otherness as they grasped for a terminology to define rural communities' resistance to industrial expansion. Writer-activists represented rural communities as complicated places where traditional power structures—such as village leadership or farming and fishing cooperatives—often facilitated industrial development projects. They recognized that rural communities had their own internal dynamics that did not easily fit into a generalized stereotype of a uniform agrarian world of resistance. In that sense, *Technology and Humans* contrasted with reactionary environmentalist thinkers in the 1980s and '90s, who imagined a pure, premodern Japanese past where people lived in harmony with nature and advocated for a return to that fantasized past.⁵

The problem with which *Technology and Humans* grappled continues to vex environmentalist thought of the twenty-first century, as evident in the field of post-colonial ecocriticism and the work of writers like Édouard Glissant and Donna Haraway.⁶ These writers

⁵ Richard Reitain, "Ecology and Japanese History: Reactionary Environmentalism's Troubled Relationship with the Past," *The Asia Pacific Journal Japan Focus* 15, no. 3 (February 2017).

⁶ Édouard Glissant, *Poetics of Relations* (Ann Arbor: University of Minnesota Press, 2010); George B. Handley and Elizabeth DeLoughrey, "Introduction Toward an Aesthetics of the Earth" in *Postcolonial Ecologies*, eds. George B. Handley and Elizabeth DeLoughrey (Oxford: Oxford University Press, 2011); and Ursula Heise, *Sense of Place and Sense of Planet* (Oxford: Oxford University Press, 2008), 21-46.

advocate for a form of environmentalism centered on the need to engage communities, peoples, and landscapes on the margins—the “other world” that persists despite ecologically destructive urban-industrial expansion that is happening on a global scale. According to this approach, marginalized communities offer the possibility of an alternative way of constructing the world that will avoid environmental cataclysm. However, despite looking to the “other world” for models, these writers seek to avoid essentializing marginalized communities with fantasies that they live in perfect harmony with nature. The question for present-day thinkers and for contributors to *Technology and Humans* is whether it is possible to talk about the destruction of non-urban communities and landscapes without reducing either to useless stereotypes. Many present-day thinkers envision the world today as a vast terrain of local geographies struggling against a singular force of industrial globalization that threatens to consume the globe.

Technology and Humans pioneered a similar perspective in the 1970s. Yet in addressing the problem, *Technology and Humans*' writers were sometimes stymied by their own approach. In their reportage-style articles, the contributors documented local struggles over and over, highlighting the possibilities for them to become an expansive national or global struggle. They appeared to be moving from genba to genba, waiting in vain for the spark that would explode environmental activism to the next level. Their deference to the autonomy of local groups became its own impasse.

In the first part of the chapter, I analyze *Technology and Humans*' approach to writing about genba. In that section I explore the process of meticulous documentation and the long search for an expansive, spontaneous activist movement with particular attention to the magazine's writing on pollution at the Kashima Petrochemical Combine. In the latter half of the chapter, I show how writer-activists transposed a growing sense of urban alienation onto rural

environmental conflicts. Rural genba became sites for imagining a way out of the urban-industrial hellscape.

II. Truth and Landscape: Writing at the Genba

Kashima is much closer than I imagined. From Shinjuku Station [in Tokyo] it's a little over two hours. As the train approaches Jūnikyō Station, the outline of Kashima Combine appears in the right-side window. And then ashen clouds blot out the sky as if they were crushing [the landscape]. At last the silhouette becomes reality. The ashen-colored mass swallows the railcar, and the train rapidly quickens its pace. An unknown fear clings to me and then settles into anxiety (*fuan*). And then, finally, I am completely enveloped in the ashen mass (*katamari*).⁷

This was how Katai Takeo opened his article on anti-pollution activism in the town of Kashima, Ibaraki Prefecture. Katai began with the imagined distance between Tokyo and Kashima, approaching it as if it existed in a different world. However, the new Kashima rail line, which was opened just two years prior to an industrial development project, quickly disrupted the sense of otherness. Life at Kashima may have been different from life in Tokyo, but it was now much more accessible to Katai. Nonetheless, he does enter another world—that of the toxic, ashen mass that consumed him and his train car. At first glance, Kashima's landscape was little more than industrial infrastructure and pollution. Katai's description read as a ritual sacrifice to both, gesturing to the sacrifice residents made for the sake of national prosperity. Kashima's industrial development had been constructed as a "national project" in order to support rapid economic growth in Japan, and Tokyo benefited the most from Japan's industrial expansion. It was Kashima's residents' duty to endure pollution. Katai, the Tokoyite, enveloped himself in pollution generated by industrial development.

In unpacking Katai's narrative of a rural world consumed and replaced by the mass of toxic industry, I am interested in how writer-activists engaged rural genba in a manner that

⁷ Katai Takeo, "Kashima wo meguru yottsu no tatakai," *Gijutsu to ningen* (June 1974): 81.

oscillated between two perceptions of those places: rural genba as dying agricultural communities and as wellsprings of new forms of activism generated from everyday life. In part, this question tracks from the odd ambiguity in Katai's writing—rural spaces are different but also not different. More importantly, the question is embedded in the genre of writing. The reportage style of journalism or “reporting from the genba” that Katai Takeo and *Technology and Humans*' contributors adopted was excruciatingly meticulous in its descriptions of the everydayness of activists and victims—and intentionally so.⁸ Writers were correcting the decades-long lack of engagement with these places driven by national media and national government. Despite the detailed quality of the journalists' work, Katai's dramatic introduction spoke to the sense of power and otherworldliness that writer-activists attributed to these rural places. To writer-activists in *Technology and Humans*, there was something in the everyday world of rural communities that generated a powerful form of activism, something that might be harnessed to drive activism on a national scale.

Technology and Humans' representations of rural genba as both dying and resisting revolved around the capture of space for toxic industrialization. Katai and other writers were interested in how local activists prevented the complete enclosure (*enkurōjā*) of rural communities by industrial development and pollution—or the total transformation of local sites into industrial spaces. The problem was spatial, and “genba” offered a means to counter the spatial logic of industrial expansion by focusing on the right of local residents to preserve and define their communal spaces. Using the magazine's articles on Kashima as an example, I show how the dynamic between urban writer-activists and local residents played out through the desire

⁸ This style of writing was ubiquitous in Japan in the 1970s and in anti-pollution publications generally. Kamata Satoshi, who I cover in this section, was one of the more famous reportage writers. He produced dozens of monographs beginning in the early 1970s. *Technology and Humans* adopted this style for reports on rural activism.

of Katai and others to see rural spaces preserved as sites of resistance to industrialization. This meant preventing the acquisition of land and of water resources and using the ongoing occupation of polluted residential spaces to block the final conversion of Kashima. Here I look at articles on Kashima published in the summer and fall of 1974, in the midst a new fight by farmers, fishermen, and local residents to prevent Sumitomo Metals and other companies from extracting water resources at Kasumigaura Lake, on which fishermen and farmers depended.

The Japanese government and Ibaraki's prefectural government had trumpeted Kashima as a success story for industrial development that aimed to grow the national economy as well as improve the standard of living for rural residents. This was part of the state's explicit goal to correct the disparity between what it saw as a poor and backwards rural sector and prosperous urban consumer world.⁹ After the Yokkaichi Combine in Mie Prefecture became a national scandal for intensive air pollution, government and industry leaders had touted Kashima as the model for a "pollution-free combine" (*kōgai no nai kombinaato*). Governor Iwakami Nirō, who spearheaded industrial development in Kashima, went so far as to immortalize its success in a plaque that declared, in English, the project to be a "victory of humanity" for improving the lives of local farmers and residents. The plaque was placed in an observation deck on the coast in front of the Sumitomo Metals plant. However, by the time Katai Takeo visited the observation deck, it was "abandoned and falling into ruin."¹⁰

Development at Kashima began inauspiciously in 1959 when then-mayor Kurosawa Yoshijirō met with recently elected Governor Iwakami to ask for a modest harbor expansion to

⁹ Laura Hein, *Reasonable Men, Powerful Words: Political Cultural and Expertise in Twentieth-Century Japan* (Berkeley: University of California Press, 2005), 1-10.

¹⁰ Katai Takeo, "Kashima wo meguru yottsu no tatakai," *Gijutsu to ningen* (June 1974): 87.

boost fishing and local trade, a request that Kurosawa's constituency eagerly supported. Kurosawa and Kashima residents got far more than they had bargained for. In 1960, Governor Iwakami released his "Comprehensive Development Plan for the Kashima Nada Shore," which aimed to bring large-scale petrochemical and steel manufacturers to Kashima and expand the harbor to accommodate large oil tankers.¹¹ Throwing national support behind Kashima's development, the Japanese state's 1962 National Comprehensive Development Plan designated Kashima as a "new industrial zone," and land developers began purchasing property from residents living in the proposed development sites in 1964. In order to rescue "poor" farming and fishing communities from their "backward" living conditions, national and local officials worked with oil and steel companies to build an industrial combine near the town of Kashima. Governor Iwakami Nirō spearheaded development efforts under the slogan "mutual benefit for agriculture and industry (*nōkō ryōzen*)," and development plans included measures to industrialize local agriculture.¹²

Kashima residents were soon alarmed by the scope of the proposed development plan. Nearly half of Kashima's residents participated in a series of bus trips to the town of Yokkaichi, in Mie Prefecture, which suffered horrific air pollution from an industrial complex of similar scope to that proposed at Kashima. Residents worked with activists from Yokkaichi and Numazu in Shizuoka Prefecture who had experience fighting industrial projects. In the mid-1960s, the protest movement against development began building momentum, which prompted Mayor Kurosawa to take a stand to delay development by refusing to allow the city council to meet for a year. This temporarily prevented the city from approving the purchase of land for industrial

¹¹ Katai Takeo, "Kashima wo meguru yottsu no tatakai," *Gijutsu to ningen* (June 1974): 86.

¹² Ōzaki Masaharu, "Kashima kara futatsu no messeeji," *Gijutsu to ningen* (July 1974): 106-108.

construction. Kurosawa's activism was not kindly rewarded. Developers pressured him; cars began to follow him at night; and local reporters called him "Dictator Kurosawa" and decried his "anti-democratic governance." Kurosawa was eventually forced out of office when a 1966 court decision threw out his 1962 election victory on the charge of bribery. The "bribe" consisted of a 500-yen sympathy payment to a friend's daughter who was hospitalized, a common practice in Japanese society. The next mayor flipped to being pro-development, and the Kashima Combine progressed at a rapid pace, killing the protest movement.¹³

Kashima Oil and Mitsubishi Petrochemical began operating oil and petrochemical facilities in 1970, and Sumitomo Metals' Kashima Iron and Steel Works opened in 1972, completing the main elements of the combine. By the end of that year, twenty-three of thirty-four planned enterprises were operating at the combine, and over 590 billion yen had been invested in industrial development. The National Rail line that took Katai Takeo to Kashima in 1974 opened in 1969 as a part of the development program. By 1972, developers had purchased 95% of the required 2,650 hectares of land for the first phase of development, and 75% of the area's 1,590 farming households had been moved.¹⁴

Kashima's residents did not remain silent on the resulting environmental degradation for long. In 1971, a new "Pollution Counter Measures Group" (*Kōgai taisaku kigyōkai*), led by farmer Hamada Hiroshi, as well as a local a café owner and a dairy farmer, was at the forefront of a burst of anti-pollution activism in Kashima. Taking on the mantle of citizen-scientists, Hamada's group worked with the local chapter of the Japan Scientists Association to measure pollution levels around the combine. They found significant concentrations of a number of

¹³ Katai Takeo, "Kashima wo meguru yottsu no tatakai," *Gijutsu to ningen* (June 1974): 88.

¹⁴ Ōzaki Masaharu, "Kashima kara futatsu no messeeji," *Gijutsu to ningen* (July 1974): 106-108.

pollutants, including cyanide. The protest movement achieved its primary goals of demonstrating that the Kashima Combine had polluted the local environment and “smashing” the “warped myth of the ‘pollution-free combine,’” garnering national news coverage of environmental degradation in the area. After that, activism dissipated, though Hamada did lead the organization’s remaining members in a new effort to stop the expropriation of local water resources by Sumitomo Metals and other industrial factories.¹⁵

The disparity between the massive scale of development and the micro-level of rural activism set the stage for *Technology and Humans*’ engagement with rural activism. In the midst of the ebb and flow of activism, *Technology and Humans* editor Katai Takeo went to the Sumitomo Metals’ iron and steel works at Kashima to see the desolation for himself. The area around the plant, Sanhama or “Three Shores,” was known as the pollution sandwich (*kōgai sandoicchi chiku*) because it was surrounded on three sides by Kashima Bay, the Sumitomo plant, and a reclaimed land construction site, which contained pollution in those hamlets. The air was filled with particulate matter pollution (*funjin kōgai*) from Sumitomo’s coke gas blast furnaces. The area was an “empty zone” (*shinkū chitai*) as two of the three hamlets, Izumigawahama and Kunisuehama, had already been evacuated, with most residents pressured into selling their land or driven out by toxic gas. Katai described the scene: “On both sides of the road, residents have disappeared as a result of relocation programs, and their withered, crumbling homes continue to line the road.” An “aggressive” land-buying and relocation campaign, beginning in 1964, forced many residents to move to a new housing development nearby, and pollution emanating from the plant after it finally came online finished the job. Some residents did leave proudly, imagining that by foregoing their property rights they made a modest

¹⁵ Katai Takeo, “Kashima wo meguru yottsu no tatakai,” *Gijutsu to ningen* (June 1974): 82.

contribution to national prosperity. Sociologist Ōzaki Masaharu argued in *Technology and Humans* that the goal of the development project was to “administratively and legally turn this place into Sumitomo’s territory (*sumitomokinzoku yōchi*).”¹⁶ Turning the area into a toxic wasteland had helped achieve the goal of transferring territory to Sumitomo, but it also meant that disrupting that process of enclosure might offer a strategy for shutting down the plant and slowing down expansion.

I emphasize here that writer-activists defined the question of industrial expansion in spatial terms. The crisis of industrializing the countryside revolved around enclosing existing communities in industrial zones—literally sandwiching Izumigawahama—and turning rural communities into empty spaces. For environmental writer-activists, the question was how to counter the spatial logic of industrial development with a different logic: by focusing on *genba* and putting the local residents who inhabited and fought for *genba* at the forefront.

As these hamlets were being emptied out, Katai Takeo came to Izumigawahama because there was still some hope left for resisting Sumitomo. There he interviewed Nemoto Sueichi, a member of one of only two remaining households in the neighborhood. Katai portrayed Nemoto as a solitary figure who “risked his life standing up to” the polluting Sumitomo plant. Nemoto’s house was located next to the steel plant, and in fact Sumitomo had illegally built part of its fence on his property. By remaining at his home, Nemoto was exposed to the plant’s daily pollution output, which, depending on the wind, could “completely cover his house” in toxic dust from Sumitomo’s coke gas furnace.¹⁷ With his land transformed into a toxic zone, Nemoto’s “resistance” began with his refusal to abandon his property, which prevented his neighborhood

¹⁶ Ōzaki Masaharu, “Kashima no kōgaigata enkurōjā,” *Gijutsu to ningen* (September 1974): 92.

¹⁷ Katai Takeo, “Kashima wo meguru yottsu no tatakai,” *Gijutsu to ningen* (June 1974): 86.

from becoming totally consumed by industrial infrastructure.¹⁸ Nemoto presented his actions to Katai as an attempt to stop the endless chain of dispossession that rural residents suffer: “Those people who were evicted from here cannot endure the pollution [in their new neighborhood] and are driven to the next relocation destination (*kōgai ni tamarazu, sara ni tsugi no itenchi e to oitaterareteittemasu*).”¹⁹

Nemoto Sueichi’s form of activism was the citizen-scientist variety. He spent day after day documenting pollution from Sumitomo. This, Katai Takeo believed, was Nemoto’s most important strategy to resist the polluting factory. Nemoto photographed the smog-filled sky, the dead plants and fish, and the water discharged from Sumitomo and Nippon Stainless’s steel pipes. He measured pollutants in the air and groundwater, while analyzing the bodies of dead carp that floated to the surface of his pond whenever the particulate matter pollution became particularly dense. Each day he recorded the multifaceted intrusion of toxic substances into the environment, observing that local animals had thinner blood and that local dogs bled out easily when injured.²⁰ His daily measurements were by no means futile. Indeed, he forced the local government to acknowledge that Sumitomo Metals was depositing cyanide pollution in the local area based on measurements taken from his pond, which the local environmental bureau had originally blamed on the concentration of parking lots and resulting tailpipe emissions in Kashima.²¹

Katai found a similar effort to resist enclosure in Hamada Hiroshi’s new campaign. Soon

¹⁸ Katai Takeo, “Kashima wo meguru yottsu no tatakai,” *Gijutsu to ningen* (June 1974): 86-88.

¹⁹ Katai Takeo, “Kashima wo meguru yottsu no tatakai,” *Gijutsu to ningen* (June 1974): 86.

²⁰ Katai Takeo, “Kashima wo meguru yottsu no tatakai,” *Gijutsu to ningen* (June 1974): 86.

²¹ Ozaki Masaharu, “Kashima no kōgai gata enkuroojaa,” *Gijutsu to ningen* (September 1974): 92.

after the Pollution Counter-Measures Alliance's momentum faded, Hamada launched the "Stop the Industrial Use of Water Struggle" to prevent the construction of a second pipeline that would have pumped water from nearby Kasumigaura Lake to Kashima Combine. Exploiting the local watershed, the combine had already caused the salinization of local soil, harming crops, caused carp die offs in mass due to water shortages. In Hamada's view, as long as factories continued to pollute the area, new developments could not be tolerated: "If they pollute then we will not let them have the water. If we give them water, then pollution will worsen (*motto hidokunaru*)."

Katai called this a "unique movement" (*yuniiku na tōsō*) for fighting pollution at the "point of extraction"—where industry extracted natural resources that would be turned into pollutants—rather than at place where effluents had already been deposited in the local ecosystem.²² To protest water extraction at Kasumigaura Lake, Hamada and ten other activists occupied the project site, living in tents for a year.²³ In this case, the key form of resistance, for Katai, lay in blocking the extraction of resources by industry by physically occupying the land slated for development. Similar to Nemoto's form of protest, Hamada and his fellow activists refused to relinquish space and resources.

In his writing, Katai Takeo presented Nemoto's and Hamada's stories as authentic narratives from the genba by foregrounding his interviews and by focusing on describing their views and actions, rather than those of Katai himself. It is evident in his narrative that Katai viewed both individuals as heroes for their efforts to block industrial expansion. He admiringly depicted Nemoto as one of the few remaining inhabitants of a dead, toxic world—an inhabitant who had risen up to transform the polluted space into a space of contestation. In his portrayal of

²² Katai Takeo, "Kashima wo meguru yottsu no tatakai," *Gijutsu to ningen* (June 1974): 82.

²³ Katai Takeo, "Kashima wo meguru yottsu no tatakai," *Gijutsu to ningen* (June 1974): 84.

Hamada, he described Hamada as a rural activist courageously defending water resources by occupying space that would be industrialized. At the same time, Katai continued to express fear that Nemoto and the rest of the rural areas of Kashima were rapidly being consumed by development and continually threatened by this permanent enclosure, despite their resistance: “Still, land reclamation continues uninterrupted,” he wrote. “Dump trucks drive around depositing new land, and the bulldozers roar.”²⁴ The tension between empowered activism and the overwhelming force of energy muddled Katai’s narrative into a mix of optimism and pessimism. Local residents were powerful sources of resistance, and yet they were constantly under the threat of disappearing permanently.

Nemoto Sueichi presented a slightly different picture of his concerns over development in an interview published in the September 1974 issue of *Technology and Humans*. Nemoto’s statement lacked the emphasis on enclosure or the sense of historical importance that drove Katai’s narrative. Instead, the issue for Nemoto was highly specific. In the interview Nemoto stated that he would not oppose development if it were done over a “wide expanse of land,” thus diffusing its harms and requiring only the acquisition of a small amount of land.²⁵ The problem, for Nemoto, lay in industrial development’s intensity, the way land purchases unfairly dispossessed local land owners, and the fact that most of the low-to-moderate-income residents ended up being hit with a 60% drop in their overall income after they were displaced.²⁶ His concerns were tied to the mechanisms of dispossession and the problematic manner in which development was conducted in Kashima.

²⁴ Katai Takeo, “Kashima wo meguru yottsu no tatakai,” *Gijutsu to ningen* (June 1974): 90.

²⁵ Ozaki Masaharu, “Kashima no kōgai gata enkuroojaa,” *Gijutsu to ningen* (September 1974): 95.

²⁶ Ozaki Masaharu, “Kashima no kōgai gata enkuroojaa,” *Gijutsu to ningen* (September 1974): 92.

In Katai's work there was a clear effort to use genba-based reporting to theorize an activism centered on preventing the process of industrial enclosure. Writer-activists like him would perceive the rural, everyday world as a bastion of resistance to zoomed-out perspective of state development planners (see Chapter Three). Thus, rural activism became a terrain from which urban environmentalists imagined an alternative to the destructive machines of industrial expansion. This process of imagining was evident in the writings of Kamata Satoshi, another reportage writer-activist. Kamata, who became famous in the 1970s for his genba-focused reporting on dehumanized industrial workers and dispossessed rural communities, made his own journey to Kashima. In a report published just two months after Katai Takeo's, in the August 1974 issue of *Technology and Humans*, Kamata demonstrated a style of reporting that involved inserting himself into the narrative, like an anthropologist recounting field work. At Kashima, he told the story of residents by narrating himself walking through the fields, relating observations, snippets of conversation, and background information.

Kamata was there during planting season, and he walked among the rice farmers in the hamlet of Kamisu as they desperately pumped in fresh water in an attempt to desalinate their fields. In order for their seeds to take, the salt content has to be around 100 parts per million (ppm) or less. At that time it was around 600ppm, despite the abundance of water sources in and around Kamisu, including Lake Kasumigaura and several rivers. Heavy industries in Kashima had created the salination problem. Indeed, industry was particularly thirsty in Kashima. The Sumitomo Metals plant that Nemoto battled required about 4,000 gallons of water per ton of crude steel produced, which was double or more the requirements for comparable facilities, such as Kawasaki Steel's plant in Chiba Prefecture, which used 1,800 tons of water per ton of steel. About 350,000 tons of water were drawn per day from Lake Ksumigaura for industrial use alone.

Kamata wove two tales of Kashima. The first involved the destruction of an agricultural way of life and the transformation of rural land into industrial space. Using the words of farmers with whom he spoke, Kamata recounted how the Kamisu area had already been rezoned for industrial use and how farmers were forced to day-laboring for supplemental income. As in Katai's article, Kamata explained that Kamisu was being enclosed and industrialized by a state (*kokka*) and what he called "monopoly capitalism" (*dokusen shihon*) that "necrotized" (*eshi saseru*) and "crushed" (*tsubusu*) farming and fishing.²⁷ Kamata quoted one farmer who said: "This area has already been made into a town ward and has become a place where farming is impossible." Kamata also decried the ominous presence of Sumitomo Metals' smokestacks, looming in the background as the farmers pumped water into salty fields. But Kamata believed that the farmer in the area demonstrated tenacity: a fighting spirit that compelled them to continue to hold on to their land. The farmers "fight a painful battle" to plant rice because they had no other choice—rice growing was "their livelihood," and they felt that they had the right to preserve it.

The second story that Kamata told in his article focused on local residents' direct-action movement and the possibility for activism that *genba* represented. To elaborate on this point, Kamata Satoshi moved from the rice farmers at Kamisu to Takahamairi, ground zero for the water extraction conflict. At Takahamairi, farmers, fishermen, and local residents battled the rapid extraction of water from Lake Kasumigaura—the "water jug" for the Kashima Combine, and a 1,200-hectare reclaimed land project—accounting for about one tenth of the lake—that would be used for industrial expansion. Over one thousand farmers and fishermen rose up to oppose the land reclamation project. The impetus for the outburst of activism was the mass die-

²⁷ Kamata Satoshi, "Reporutaaju hinshi no kasumigaura wo yuku," *Gijutsu to ningen* (August 1974): 74.

off of carp in 1973. The die-off was a direct result of the local government's decision to close off the sluice that connected the lake to the harbor in order to reduce the salt content in the lake's water to make it more suitable for industrial use. Closing the sluice stimulated growth in the plankton population, which in turn reduced oxygen levels in the lake, killing a substantial number of carp.

The carp die-off brought together farmers battling saline damage in their fields with fishermen at Takahamairi reeling from water shortages in an anti-reclamation movement. The movement counted over 1,000 local members, representing a cross-section of local residents, and led by individuals who did not hold leadership positions in the community or fishing cooperatives. Indeed, traditional community leaders, including local mayors and the heads of the fishing cooperative to which all fishermen in the area belonged, staunchly opposed the movement, supported industrial development, and received payoffs from developers.²⁸ In opposition, local residents carried out a direct-action campaign involving protests, created a petition that garnered 5,000 signatures, and widely publicized the local government's inadequate handling of environmental concerns. In response, several fishermen's boats were mysteriously burned and their carp nets cut, and local officials pressured them with obvious bribes.

While Kamata Satoshi was meticulous in describing the details of local activism, he did not shy away from framing the historical importance of the movement. In an evaluation that was almost antithetical to his first emphasis on a rural way of life disappearing, Kamata argued that the movement at Takahamairi was the locus for a powerful form of activism based in the "diversity" (*tasōka*) of the movement. He referred in part to the way that the movement cut across traditional power structures, subverting town leadership and fishing cooperative

²⁸ Kamata Satoshi, "Reporutaaju hinshi no kasumigaura wo yuku," *Gijutsu to ningen* (August 1974): 73.

leadership, for example, and brought together farmers, fishermen, and residents of different income and status levels.

In addition to the cross-sectional composition of the movement, Kamata emphasized that the power of the movement lay in how it “forged a diverse array” of individual into activists (*kono undō no tsuyōsa wa samazama na hito wo unda*). Localized activism catalyzed rural Japanese citizens to become activists who could did resist industrial development and state power. Kamata gave the example of farmer Suzuki Kiyoshi, a leader in the Takahamairi movement, who went to each highly compartmentalized prefectural government department and synthesized their disparate statistical records on agricultural production, water usage, and so forth in order to point out that the development plans actually got the math wrong on projected impacts on the local environment.²⁹ Kamata and other *Technology and Humans*’ writers described intensive, creative forms of local activism, in line with Hamada Hiroshi’s tent occupation and Nemoto Sueichi’s daily encounter with pollution, that represented genba as incubators of a new class of activists, what one might call a “subjectivity” (*shutaisei*) of resistance forged in rural communities in response to pollution.

Kamata Satoshi’s narrative contrasted with that of local activists who were entirely focused on the immediate issue of scientifically proving that the carp die-off had been caused by expropriating water for industrial use. In the same issue in which Kamata’s article appeared, *Technology and Humans* published a short piece written by Watanabe Toyokichi, a leader of the Takahamairi Anti-Reclamation Group. Watanabe’s article focused on his and other activists’ efforts to obtain a report the prefectural government had buried, a report that proved that the carp die-off had resulted from industrial water use. The Takahamairi Anti-Reclamation Group had

²⁹ Kamata Satoshi, “Reporutaaju hinshi no kasumigaura wo yuku,” *Gijutsu to ningen* (August 1974): 75.

forced their way into the government laboratory that produced the report. Anticipating the action, the government sent riot police and construction workers from the reclaimed land site to guard the laboratory. Watanabe's group battled their way in, and the laboratory's head researcher willingly photocopied the scientific report and handed it over to the activists. The rest of the article summarizes the report and ends with a call to environmentally conscious scientists to help activists carry out a more detailed investigation of the effects of water expropriation. *Technology and Humans* was the ideal venue for the request.

The contrast between Watanabe Toyokichi's descriptions and Kamata Satoshi's clarified how urban-based writer-activists such as Kamata used rural genba to imagine possibilities for a more general resistance to state power and the economic system—a system that Kamata and others identified as monopoly capitalism—that caused environmental degradation and rural expropriation. Kamata Satoshi used the meticulous, investigations of genba to work out a theory of activism and activist subject-formation—that is, how ordinary citizens came to fiercely resist the state—that he perceived to be grounded in everyday life. His analysis operated on a different level from that of local activists, even as Kamata couched his work in a reporting style based in letting the affected individuals speak for themselves.

In both Kamata Satoshi and Katai Takeo's work, as well as that of genba-based reports in *Technology and Humans* generally, there was a continuous push and pull between the rural otherness of genba, expressed through a dying and increasingly captured way of life, and the spontaneous, cross-sectional activism that ushered in what writers perceived to be a new breed of activist. The magazine contributors wrote as travelers and pseudo-anthropologists in rural places that provided a glimpse into an alternate world. Genba were the sites where the consequences of pollution were felt and where the battle over the environment was happening happening. Genba

environmentalism in Japan, from the perspective of writer-activists in *Technology and Humans*, was based in a desire to connect with “unique” rural genba and meticulous documenting the ecological and political harms felt there. At the same time, environmentalists sought movements and leaders that could provide a fountain of creative activism and effective resistance to what Kamata identified as the big targets: the state and the global economic system of monopoly capitalism.

III. Urban Alienation at the Genba Frontier

The search for sources of resistance, the sense of a dying space, and the fear of industrial enclosure—these prominent themes were, in part, how urban environmental writer-activists transposed their rising sense of urban-industrial alienation onto rural genba. Throughout this dissertation, I have tracked the growing concern expressed by *Technology and Humans*’ writers over the inundation of everyday life by technological systems of control and pollution—the two monstrous sides of Japan’s rapid economic growth. In the landscape of rural anti-pollution activism, that anxiety found expression in the conflict between rural communities and industrial developers. Environmental writer-activists framed this conflict as the “frontier” (*henkyo*) where developmentalism aggressively pushed into new territories. In the midst of that maelstrom, urban writer-activists adopted a vocabulary of rural resistance that emphasized these genba as other worlds, or counter images, to that urban landscape. The language of otherness reflected urban writer-activists’ belief that the urban world was isolating, individualizing, and ultimately destructive of popular, democratic forms of resistance.

I analyze this movement through writer-activists’ engagement with what they considered marginalized communities and landscapes as a part of the writer-activists’ efforts to attack the ecologically destructive growth paradigms. Their engagement involved the always-present sense

of these places as other to or outside of the urban-industrial world that threatened to capture them. It was the risk of idealizing and essentializing non-industrial, agrarian communities as sources of resistance to their opposites. *Technology and Humans* took that risk in order to search for a productive form of activism. Despite their efforts, there was never any possibility of resolving the distance between urban and rural activisms and tension that existed across that terrain. Instead, urban writer-activists used the urban-rural dynamic to work through a twin crisis of dehumanization in urban everyday life and ecological destruction across urban and rural spaces.

Urban Hellscape and the Death of Militant Labor

Technology and Humans presented Japan's cities as urban "hellscape" defined by the loss of communality (*kyōdōtai*) and social solidarity (*rentai*). Indeed, in the pages of *Technology and Humans*, various writers described the city as a place where the "large-scale" implementation of technology "fragmented" and "isolated" members of society into atomized "individuals" (*kojin*).³⁰ *Technology and Humans* editor Amagasa Keisuke, for example, believed that urban life broke down communal ties and degraded individuals' capacity to fight back to the point where urban citizens were stripped "of any sense of radical solidarity" (*radikaru na rentai ishiki no mattaki ketsujo*) that could resist the domination of everyday life by the state and large corporations. Amagasa argued that the "giantization of the city" (*toshikyodaika*), the rapid growth of urban populations, and the depopulation of the countryside from the late 1940s to early 1970s created a "vapid communalism" (*shūgotai*) that "impoverished humanity's sense of reality" (*genjitsukan no toboshii*).³¹

³⁰ Kuno Osamu and Yoshisaka Takamasa, "Gendai gijutsu no chōkoku," *Gijutsu to ningen* (Summer 1972): 11-12.

³¹ Amagasa Keisuke, "Atogaki," *Gijutsu to ningen*, no. 6 (Summer 1973): 152.

Amagasa's language presented urban spaces as antithetical to the communal characteristics and capacity for activism that writer-activists identified at rural genba. More than that, he believed that urban life blocked citizens' ability to perceive "reality," in contrast life at rural genba—the places where one connected to "reality" and "truth." In other words, these writer-activists were convinced that urban society was churning out Japanese citizens without ties to community and without the ability to resist growing technocracy, which included an assemblage of state bureaucracy, private corporate management, and technology. Amagasa's vocabulary reiterated what I identified as *Technology and Humans*' central interpretation of Japanese society as dominated by a partial, incomplete knowledge of reality—a false perspective in which most citizens misrecognized social reality by believed that technological progress would leading humanity to a promised land of prosperity and enlightenment. It was this incomplete knowledge that obscured the reality of technocratic control.³² What the magazine's writers identified as the "technologization" of urban space intensified the problem of misrecognizing reality by isolating and generally degrading humanity's will to resist. Rural genba, which the magazine writers believed existed outside of the urban hellscape, still held out hope for true knowledge and effective resistance.

Indeed, from their first issue, *Technology and Humans*' editors peppered the magazine with articles depicting the degeneration of urban society. For example, they solicited an article from political thinker Nagasaki Hiroshi entitled "Control and Nihilism" (*Seigyo to nihirizumu*). In the article, Nagasaki argued that the growth of "giant urban cities" (*kyodai daitoshi*) in the 1960s produced an urban environment that dissolved existing communal structures (*kyōdōtai*)—such as neighborhood associations—and the class hierarchy through which state and capitalism

³² See Chapter One.

maintained control over society (*kokka shihai no yukō na baikai*). He argued that neighborhood associations had been hollowed out, replaced by a flat urban world where individuals were atomized and isolated from each other. Replacing communal organizations as instruments of control were “technologies of management” (*kanri kikō*) that were pioneered on assembly lines in manufacturing plants. Humanity was, from Nagasaki’s perspective, increasingly “managed” by technological apparatuses that targeted members of societies as individuals.³³ Nagasaki indicated that the extant form of everyday life based in particular, tangible social structures was being replaced with an everyday life based exclusively on a technological domination that focused on the level of the individual, which itself was an outgrowth of developments in factory management. Nagasaki’s analysis helped frame the magazine’s understanding of technocracy, which created new technology-based forms of control that were more difficult to resist than domination through class domination.

In *Technology and Humans*, environmental writer-activists connected this sense of technological domination with an overwhelming anxiety over urban everyday life. In another example from the magazine’s first issue, architect Yoshizaka Takamasa expressed that anxiety in an article entitled “The Endless Hell of the Giant City: Can We Do Anything but Wait for Mass Panic?” (*kyodaitoshi no mugen jigoku: panikku wo hassei wo matsu hokanai?*). Yoshizaka argued that urban “hellscape” were inundated with the ever-present risk of disaster and accidents (*saigai*) caused by overcrowding, a rise in traffic accidents, and pollution. In other words, the urban world was pregnant with imminent disaster at every turn—a permanent state of precarity.³⁴

³³ Nagasaki Hiroshi, “Seigyō to nihirizumu,” *Gijutsu to ningen* 1, no. 1 (Spring 1972): 99.

³⁴ Yoshizaka Takamasa, “Kyodaitoshi no mugen jigoku: panikku wo hassei wo matsu hokanai,” *Gijutsu to ningen* 1, no. 1 (Spring 1972): 38-46.

Although they had different analytical backgrounds, when read together, Nagasaki's and Yoshizaka's articles were representative of a general vision of urban dehumanization that was expressed in *Technology and Humans*. That vision combined the sense of alienation from community (*kyōdōtai*) and technological domination (*seigyō*) with the precarity brought about by pollution. For urban writer-activists the problem of environmental degradation was forever linked to the growth of an urban everyday life dominated by technologies of control. Anticipating later analyses by scholars like Ulrich Beck, *Technology and Humans*' writers presented a worldview where industrial society was premised on producing environmental precarity on greater scales, while also degrading the human being such that the individual became less capable of engaging in collective resistance.³⁵

Finding new avenues of collective resistance was a growing concern for activists and thinkers on the Left in Japan who were concerned about the decline in labor activism, the traditional heart of leftist activism. As Nagasaki Hiroshi's article showed, *Technology and Humans* writer-activists believed that urban dehumanization emerged directly out of the mechanization and alienation experienced by workers in industrial factories, as managers automated assembly lines and employed new techniques for organizing labor. Worker dehumanization was closely linked to the death of the labor movement as a central part of activist politics in Japan. According to historian Andrew Gordon and labor researcher Kumazawa Makoto, most public and private unions in Japan had lost their militancy by the mid 1960s, and Japan's corporate sector had largely succeeded subordinating unions to management. This ushered in the era of "labor-management harmony" (*rōshi kyōchō*) where unions worked to

³⁵ Ulrich Beck, *Risk Society: Toward a New Modernity* (New Delhi: Sage, 1992).

fulfill management goals while protecting annual wage increases for workers.³⁶ For many inside and outside union activism, the end of labor militancy accelerated the loss of what best can be described as the willpower or political consciousness to become engaged individuals capable of activism for industrial laborers. In *Technology and Humans*, the birth of “labor-management harmony” was a dark time marked by the transformation of workers into mere mechanical inputs in the manufacturing process.

To give one example, Kamata Satoshi, who worked in a Toyota plant as a seasonal worker in 1972, and three automotive workers discussed the processes behind worker dehumanization in a 1974 roundtable discussion on working in automotive factories, which were at the forefront of high-tech manufacturing and scientific approaches to labor management. The discussants framed the shift in industrial work as the replacement of the “physical laborer” (*kinniku gata rōdōsha*), who did heavy labor, with the “system worker” (*shisutemu gata rōdōsha*), who worked on the assembly line. The system worker represented the dehumanized worker integrated to the machinery of the assembly line and controlled by automated equipment that could be monitored by supervisors on site or engineers in the control room. Kamata and one of the automotive workers who participated in the discussion (he went under the pseudonym “A”) described the difference between the two types of workers in the following exchange:

A: Ten years ago, I worked as a cargo loader at the docks, but that work was even more intensive than working in a mine. Local farmers and residents would work their part time, but because the work was too demanding they always quit halfway through. That was the drudgery of true physical labor (*hontō no kinniku rōdō no kueki*).

However, the pain (*kurushisa*) of working on the Toyota assembly line—that is different (*ishitsu*), something modern (*kindaiteki*), perhaps?

³⁶ Kumazawa Makoto, *Portraits of the Working Class*, trans. Andrew Gordon and Mikiso Hane (Boulder: Westview Press, 1996), 67-72; Andrew Gordon, *Wages of Affluence* (Cambridge: Harvard University Press, 1998), 132.

Kamata: Perhaps it's the feeling of oppression (*appakukan*)? I think it's the feeling of being dominated (*hishihaikan*).

Assembling one car at a time is itself not at all heavy labor. But you are dominated by the conveyor belt (assembly line). Moreover, it keeps running as an infinite hell (*mugen jigoku*). Thus, the “heaviness” [of heavy labor] transforms into the feeling of oppression (*appakukan*) [in system labor].³⁷

Kamata and the anonymous workers experienced the factory as a highly regulated workspace where management and technology dominated the workers' mind and body. The “modern pain” of the assembly line was, according to these workers, the obliteration of the worker as free-thinking individual. The subordination of the mind to the machine in the endless hell of work represented a terrifying future for labor. What is most interesting about the exchange was how these workers articulated new forms of domination as a loss of physicality under the implementation of technological systems—the hyper regulation of mind and body by machines as the defining experience of work in the 1970s. This corresponded to the anxieties over urban dehumanization based in the technological regulation of everyday life.

According to workers and others who contributed to *Technology and Humans*, the shift from the physical worker to the “system worker” signaled the death of the militant labor activist. Indeed, the most important aspect of this shift to “system workers” was, according to Kamata and the three autoworkers, how the technological controls of the assembly line and the mental colonization of the worker threatened to foreclose any possibility for resistance. As one worker argued, “While the assembly line is operating, the machines are constantly running. From the moment they flip the switch until the first break it does not stop. Therefore, you don't need to monitor the workers—how is even possible to have a workers' movement in a place like this?”³⁸

³⁷ Kamata Satoshi, “Zadankai: Zetsubōkōjō no rōdō,” *Gijutsu to ningen* (July 1974): 61.

³⁸ Kamata Satoshi, “Zadankai: Zetsubōkōjō no rōdō,” *Gijutsu to ningen* (July 1974): 62.

Worker A, contrasted the “workplace of system workers” with his past experience participating in union activism as a physical laborer: “Workers [like those at the docks and coal mines] used to act autonomously (*jishuteki*) and spontaneously (*shizen hassei teki*), and they had kind of consciousness when they carried out their worker movements.” The third worker, C, added that “management is now very deft” at “breaking up worker comradery and creating antagonism between workers (*rōdōdōshi wo bundan shite tekitai sasetari*) or setting spies on them.”³⁹ These workers believed the technological transformation of the workplace made organizing—and even comradery—prohibitively difficult. That difficulty, they suggested, was made worse by the disruption of workers’ consciousness. They framed this change in labor as the end of the spontaneous, autonomous working subjectivity that was embodied in the physical workers, like those who led Japan’s biggest worker uprisings in the late 1950s and early 1960s.

Seeking Humanity in Rural Japan

As a part of the mission to be a generalist magazine, *Technology and Humans* regularly brought together these diverse topics—such as industrial working conditions, urban environments, pollution, scientific thought—in articles written by writers from different philosophical and professional backgrounds and published them side by side so that they could be put into conversation. The thread that connected all articles in *Technology and Humans* was the domination of human consciousness and society by technology, the dark fulfillment of the magazine’s title. This anxiety underlay much of the world of activism and political criticism in Japan in the 1970s.

In the context of the pollution crisis, writers transposed the anxiety over technological domination and the dehumanization of urban life onto investigations of activism at rural *genba*,

³⁹ Kamata Satoshi, “Zadankai: Zetsubōkōjō no rōdō,” *Gijutsu to ningen* (July 1974): 63.

often through the same style of reportage articles I discussed in the previous sections. As they did this, *Technology and Humans*' writers sought a redemptive form of humanity in rural spaces by engaging a language of otherness and nativism. This constituted an experiment—a search for new forms of resistance outside of an urban world that they perceived to be nearly devoid of the possibility of resistance. But rural *genba* were also the “frontier” (*henkyo*) for urban alienization, as the machinations of economic development threatened to transform them. In the words of editor Amagasa Keisuke: “[Industrial development projects] destroy local particularity (*chiiki no tokushusei*) from within and create a landscape (*fūkei*) just like that of the rest of the country.”⁴⁰ Rural spaces were the frontlines for industrial development and pollution and perhaps the last hope for resistance.

At the moment we find ourselves on the edge of an essentializing narrative, one that perceived rural communities as outside the world of urban modernity that the magazine writers inhabited. However, the world of rural *genba* was much more ambiguous in *Technology and Humans*. Katai Takeo, for example, depicted Kashima as foreign and yet unexpectedly close. The rural *genba* was a liminal space, a different world on the verge of being destroyed and also the place where things were happening—where activism was happening. It was moving, changing. Tanno Kiyoshi, a reportage photographer who published pollution-related photo essays in *Technology and Humans* and visited rural places afflicted by development to document pollution and protest, articulated the ambiguity of the desire for “otherness.” For Tanno, photographing *genba* was an attempt to “escape” the “artificially created” environment of the “super overcrowded city of Tokyo (*chōkamitsu toshi*)” in order to “recapture the smell of people

⁴⁰ Amagasa Keisuke, “Shima ni otozureta akumu no harō: Awajishima no mittsu no machi to kaihatsu keikaku,” *Gijutsu to ningen* (June 1974): 54.

who are still breathing (*mada ikiduiteiru monotachi*).⁴¹ This was more or less in line with the sense of urban dehumanization analyzed earlier and with how Katai Takeo's narrativized his journey to Kashima as a journey to another world. Tanno hoped that rural genba would offer an alternative.

Despite his efforts, in his many journeys Tanno Kiyoshi never discovered a place that was truly different, where people were "still breathing." Tanno described his constant sense of disappointment: "However, no matter where I go, I feel like I've been in this small city before, silently there and fading away. The place I visit the most—Kashima's fading wasteland (*areno*)—is seized by an unease that resembles terror (*kyofu*) and an emptiness that borders on despair (*zetsubō*)."⁴² Tanno did not find another world. There was "terror" and "despair" in rural genba as well.

Tanno Kiyoshi's work had a rhythm to it. He constantly expressed a desire to find another world while knowing that the quest would be unsuccessful. Nonetheless, he continued to go to rural communities in order to find possibilities for resistance. This rhythm described *Technology and Humans'* engagement with rural genba. It was predicated on the hope that a "native" world might redeem Japan's decaying urban society and, paradoxically, an understanding that this hope was an impossible fantasy. Nonetheless, underneath the language of otherness was a concerted effort by writer-activists to engage the concrete politico-environmental conflicts at rural genba. Notions of fantasy and reality overlapped in the search for an adequate source of political resistance.

Indeed, underneath Tanno Kiyoshi's despair, there was a sense of loss directed at the

⁴¹ Tanno Kiyoshi, "Tōrisugita toshi no memo," *Gijutsu to ningen* 1, no. 4 (Winter 1973): 50.

⁴² Tanno Kiyoshi, "Tōrisugita toshi no memo," *Gijutsu to ningen* 1, no. 4 (Winter 1973): 50.

disappearance something different, something historical. In search of a world outside of the urban hellscape, *Technology and Humans*' writer-activists adopted the language of indigeneity based in a strong connection to land and community in their descriptions of genba. The language spoke to the spatial dynamics of industrial expansion and environmentalism I detailed earlier. This was apparent in *Technology and Humans*' work on Kashima.

Sociologist Ōzaki Masahiro, who interviewed Nemoto Sueichi, as well as many of the 1,230 residents displaced to make way for industry in Kashima, wrote extensively about them in *Technology and Humans*. He interpreted Nemoto's story in particular and rural dispossession generally as the colonization of an "indigenous population" (*senjūmin*). By invoking indigeneity, Ōzaki envisioned Kashima as a place that was particular and authentic in opposition to the homogenizing force of industrialization that dispossessed and destroyed "otherness." Ōzaki went so far as to declare that dispossession was a form of death, lamenting that "the relocated residents had [already] died once (*ichido shinda*)" from the destruction of their indigenous community:

As a result of development, outsiders (*tanin*) came to [the former residents'] towns and villages as oppressors (*shihaiteki chii*), resembling a "form of colonization" (*shokuminchigata*). From that alone, the resident felt an enormously deep sense of "injustice." In other words, [what they felt] was not a distance (*kyori*) from their homeland (*urusato*) but the complete loss of their homeland (*urusato sonomono no sōshitsu*). . . . It was a total loss of homeland (*kanzennaru urusato sōshitsu*). In particular, the bitterness [the former residents] feel is a feeling of alienation caused by their irrelevance (*muen*) to the advanced industries that thrive [on the residents' former land] (*hanei suru shinshutsu kigyō*).⁴³

The residents' figurative "death" was, in Ōzaki's argument, caused by the "abrupt and complete reduction of their living space (*seikatsu kūkan*)," the loss of "land ownership (*tochishoyū*) that provided their livelihood," and the forced transition to "unstable work," such as day-laboring and

⁴³ Ōzaki Masaharu, "Kashima kara futatsu no meseeji," *Gijutsu to ningen* (July 1974): 106.

other temporary employment, as a part of the “colonization” of Kashima.⁴⁴ In Ōzaki’s language, we find parallels with the crisis of urban alienation through the dissolution of the structures that organized everyday life. The defining difference was the insurmountable disparity (*muen*) between rural communities and industrialization. Here the dissolution of everyday life occurred in much more uneven and destructive terms, not simply reformulating everyday life, as occurred in urban society, but destroying entire communities.

Editor Amagasa Keisuke also likened economic development to a foreign invasion in his report on industrial projects on the island of Awaji, which lies on the Seto Inland Sea between Osaka and the island of Shikoku. In a 1974 article entitled “The Nightmare that Surges onto the Island: Awaji’s Three Towns and Development Planning,” Amagasa described state-led industrial development (*kaihatsu*) as a devastating force—“the nightmare that surges on to the island”—and a foreign entity that aimed (*nerau*) to totally (*sōgō*) transform economy and everyday life on Awaji:

Development (*kaihatsu*) appears from another world (*yoso no sekai kara otozure*). It completely disregards the natural topography (*fūdo*) of each town [in Awaji] and the daily lives (*seikatsu*) of the people [who live there] as it designates (*senbiki*) them [for industrial projects].⁴⁵

In Amagasa’s description of development at Awaji, the crisis of urban dehumanization was repeated on the rural landscape but as an exterior, nightmarish force imposed upon it. The article also spoke to Amagasa and other writer-activists’ desire to preserve something unique from rural *genba*. In his language, Japan’s industrial world and rural landscape were two distinct universes (*yoso no sekai*), where the former invades and transforms everything outside of it.

⁴⁴ Ōzaki Masaharu, “Kashima kara futatsu no meseiji,” *Gijutsu to ningen* (July 1974): 105-106.

⁴⁵ Amagasa Keisuke, “Shima ni otozureta akumu no harō: Awajishima no mittsu no machi to kaihatsu keikaku,” *Gijutsu to ningen* (June 1974): 60.

Mochizuki Isamu, another *Technology and Humans* editor, echoed Amagasa Keisuke's language in his description of development in the village of Rokkasho, in Aomori Prefecture. Rokkasho had been sited for a petrochemical combine, and it was one of the defining points of conflict over development, pollution, and the rights of rural communities in the early 1970s. Mochizuki privileged local residents' historical connection to land in his reportage article on anti-development protests in Rokkasho, where in 1972 more than half of the village's residents were threatened with relocation in order to develop a petrochemical combine. Mochizuki described the severity of that loss:

The majority of villagers for many centuries and generations have been raised toiling on this land and have made their living off the land. These are people who could only make a living here (*koko de nakereba kurasenai*). If they move somewhere else, it will be impossible for them to live in happiness (*kōfuku*).

Mochizuki identified Rokkasho's residents as "independent" (*jiritsu ga dekiru*) and incapable of "becoming salary-men" or white-collar workers if development drove them off their farmland.⁴⁶ In Mochizuki's narrative, local residents of Rokkasho were inseparable from the land, and their dislocation represented the same form of "death" that Ōzaki Masuhara wrote about in Kashima.⁴⁷ He moreover emphasized their connection to history over against an urban world that the magazine's writers described as defined by rapid change and the isolation of the individual—a place without history.

In his report on Rokkasho, Mochizuki adopted the language of "indigeneity" used by local activists to describe their struggle against the petrochemical development project. In

⁴⁶ Mochizuki Isamu, "Kenryoku no shisō to henkyō no shisō 1: Shimokitahantō wo yuku," *Gijutsu to ningen* 1, no. 2 (Summer 1972): 41.

⁴⁷ Mochizuki Isamu, "Kenryoku no shisō to henkyō no shisō 1: Shimokitahantō wo yuku," *Gijutsu to ningen* 1, no. 2 (Summer 1972): 41.

adopting that language, Mochizuki interpreted local activists as representing a community protecting their land against the foreignness of modernization:

Residents of Rokkasho exhibited a consciousness that exemplified their so-called “indigenoussness” (*dochaku*). This “indigenoussness” is made up of simplicity, a rejection of outside influences, an attachment (*aichaku*) to the land (represented by the farming and fishing industries), and autonomy (*jiritsusei*). What has suddenly appeared here is the rationalized, state-led development policies, which appear as the force of modernity that will dispose of [rural society]. Of course, the residents would respond by rejecting the destruction of the land and the foreignness [of development]. Actually, there is something more here than the confrontation between “indigenous” and “modern.” It is the confrontation between the people who are whole and the people who are disconnected (*tōtaru mono to krihanasareta mono no taiketsu*).⁴⁸

At the end of the quotation, Mochizuki returned to the problem of urban alienation and the breakdown of communal structures (*kyōdōtai*) by anointing rural genba as the repository of a sense of “wholeness” or communality, which has been lost in urbanization and industrialization—the “forces of modernity.” Communality becomes the explanation for resident’s “indigenous” resistance. Here Mochizuki sought something fundamentally different from the urban hellscape, and he found it in local residents who also embraced an identity of indigeneity.

In Mochizuki’s writing, “modernity,” which he used to refer to urban-industrial society, was the opposite of the indigenous community long rooted in its land. He described modernity as a vague “mass” (*katamari*), a coagulated mix of unrelated things and isolated individuals, that nonetheless was a force that sought to envelope everything outside of it. In other words, urban society was not defined by alienation alone. It was, in the language of environmental writer-activists, a force of geographic expansion that in particular looked to destroy any place that contained elements of being rooted in community and land.

⁴⁸ Mochizuki Isamu, “Kenryoku no shisō to henkyō no shisō 1: Shimokitahantō wo yuku,” *Gijutsu to ningen* 1, no. 2 (Summer 1972): 45.

I want to provide two interpretations of Mochizuki Isamu's and other writer-activists' descriptions of rural genba. The first is strategic and the second is philosophical. As I argued earlier, environmentalists approached the ecological and political crisis of rural development as a spatial problem. Against private capital and the state, which propped up development as necessary for the nation's economic and social welfare, local residents' historical connection to land—their right to protect a community with a history based in this land—provided the most obvious and effective path to resistance. If development aimed to bulldoze any and everything in order to make way for the new, then reaffirming the value of being historically rooted in place countered the worldview that held newness and economic growth as most important.

The philosophical interpretation is trickier. Writer-activists were animated by the feeling of urban alienation to seek out a place of wholeness, especially one that would generate effective forms of activism after the decline of the labor movement in Japan. The strategic possibility of genba-based activism offered the possibility of fulfilling both needs—activism and wholeness. Nonetheless, as Mochizuki Isamu's description demonstrated in particular, by bringing together the urban and rural worlds the environmental crisis unearthed an unstable geographic relationship between an urban-industrial modernity and the rural landscape, which here emerged as representative of what Harry Harootunian would call a remnant, a historical survival from the past that destabilized the narrative of economic growth in Japan. Rural genba offered environmentalists the last bastions of resistance to what Karl Marx called “real subsumption”—the total domination of society by capitalism, where every aspect of human activity is determined by the logic of capitalist accumulation. In *Technology and Humans*, the domination of everyday urban life by new technologies ushered in total domination, and the industrialization of the

countryside continued that process in new areas.⁴⁹ Indeed, writer-activists framed the technological domination of everyday life in a manner that built on Marx's real subsumption argument. Environmental pollution, a result of the industrial expansion that brought about the technological domination of urban life, created a point of rupture that exploded the perceived historical difference and very real economic inequity between urban and rural societies. It was natural for writer-activists to explore the fear of total technological domination in the rural landscapes that were on the edges of industrial development processes.

The other philosophical conundrum—the importance of one's connection to landscape within environmentalism—puts *Technology and Humans* at the beginning of a larger environmentalist context based around mobilizing place-based activism and the connection between communities and land.⁵⁰ In the 1970s *Technology and Humans*' genba-based environmentalism was an attempt to do what continues to be an imperative for environmental thinkers today: establish a connection to land and a connection to place as the basis for environmental activism. Here I will touch on the current manifestation of that problem in environmental scholarship. In order to resist ecological decimation, scholar Édouard Glissant argues that it is necessary to reestablish a “passion for the land,” which he defines as a “revived aesthetic connection with the earth.” The connection to land would provide the starting point for a shared environmental consciousness—a common way of imagining the environment—and for building a society based in sustainable practices.⁵¹ However, Glissant warns that such an effort must avoid a reactionary politics that naively mythologizes premodern societies and their

⁴⁹ See Introduction and Chapter One, entitled “Marx, Time, History,” in Harry Harootunian, *Marx After Marx* (New York: Columbia University Press, 2015).

⁵⁰ Ursula Heise, *Sense of Place and Sense of Planet* (Oxford: Oxford University Press, 2008), 21.

⁵¹ Édouard Glissant, *Poetics of Relations* (Ann Arbor: University of Minnesota Press, 2010), 150-155.

connection to nature. This is the “risk” that Amagasa Keisuke and other environmental writers took in seeking out environmentalism in rural communities that were targeted for industrial development.

Elizabeth DeLoughrey and George Handley, scholars of environmental literature, use Glissant’s “aesthetics of the earth” to sketch out an approach to environmentalism that values local places and knowledge, exposes the ecological violence of state and imperial powers that dispossess marginalized peoples, and can become a force for global activism and social change. This ambitious project, which they term “postcolonial ecologies,” requires, to use Glissant’s language, a “distancing” from “predetermined or imposed norms.”⁵² This involves investigating places—communities, cultures, peoples, and landscapes—that are putatively outside of the dominant logic of imperialism, capitalism, and state power. *Technology and Humans* would have called this a quest to find local places that were outside of the dominant logic of economic development. The key for Handley, DeLoughrey, and Glissant is the act of connecting to the “Other” and imagining alternatives beyond normative values, but without any hope to recuperate these alternative places. As Handley and DeLoughrey remark, this approach “[demands] an imagination of a totality and otherness that can never be possessed.” Postcolonial writing can make visible the communities and landscape destroyed by imperialism, unearthing precolonial environmentally beneficial lifestyles, but precolonial pasts cannot be recuperated—their “otherness can never be possessed”—just as Glissant argues it is impossible to escape to a place untouched by the market. While these “Others” are cannot be recuperated, the act of engaging

⁵² Édouard Glissant, *Poetics of Relations* (Ann Arbor: University of Minnesota Press, 2010), 156; George B. Handley and Elizabeth DeLoughrey, “Introduction Toward an Aesthetics of the Earth” in *Postcolonial Ecologies*, eds. George B. Handley and Elizabeth DeLoughrey (Oxford: Oxford University Press, 2011), 28.

the “Other” is supposed to be a productive site for environmental visions.⁵³

The “Other”—the space that counters capitalism, nationalism, imperialism, the Anthropocene, or whatever dominant center we put forth—is forever outside of our grasp, but by trying to understand it or connect to it we may deploy its alternative nature in order to reshape the present and future. For *Technology and Humans*, however, their “imagination of a totality and otherness that cannot be possessed” involved partially mythologizing the historical difference between rural communities and Japan’s modern urban society. They framed rural places as in part historically isolated from modernity and posited them as “indigenous,” natives to the land who could resist development. However, they were also careful not to “possess” these places by arguing that activism had to be created and led by local community members, not the writer-activists themselves.

The sense of urban alienation in the 1970s was the driving force behind the search for an “outside” (*yoso no sekai*) among environmental writer-activists, and it mirrored the expansion of that urban world into rural communities through economic development policies. Pollution made urban writer-activists aware of the sites of conflict in rural landscapes, drew their attention there, and set in motion the drive for authenticity and resistance at rural genba. In reflecting on similar tenets that appear in Glissant’s philosophy, genba environmentalism hinged on the ambiguous oscillation between nativist interpretation and understanding the impossibility of a real “otherness.” On the other hand, how ‘70s environmentalists in Japan framed the question of resistance presented a similar impasse. Resistance was supposed to be generated from the genba because only that kind of situated resistance could build up into a true counter-hegemony,

⁵³ George B. Handley and Elizabeth DeLoughrey, “Introduction Toward an Aesthetics of the Earth” in *Postcolonial Ecologies*, eds. George B. Handley and Elizabeth DeLoughrey (Oxford: Oxford University Press, 2011), 8.

according to their argumentation. However, urban writer-activists followed an ethical imperative that they had to respect the right of the “Other”—the rural activists—to determine the nature of their activism.

By way of conclusion, I argue that environmental activism had solidified into this configuration. Environmentalism, from the perspective of the writer-activists in *Technology and Humans*, depended on a continuous engagement with the “site,” the genba, which existed as this place of realness, otherness, and resistance for environmentalists. But genba was always unstable for these writer-activists. In their writing, it moved between imagination and reality, between expansive visions for activism and narrow localized problems. Environmentalism was defined by the rhythm expressed by Tanno Kiyoshi, a constant search for reality and activism that required a kind of inaction in the form of always waiting and respecting the desires of the subject of activism—the “Other” of rural genba communities whose will could not be transgressed by urban writer-activists without risking the whole project of genba environmentalism. The continuation of this problem in the work of scholars such as Glissant and DeLoughrey shows that within environmentalism the unstable nature of engaging natural landscapes and communities based in such landscapes remains unresolved and perhaps unresolvable. In the case of *Technology and Humans*, the instability was what animated their thought and activism.

Conclusion

The Reverse Course on Pollution

I. Introduction

While *Technology and Humans* investigated the nature of industrial giantization and government economic planning in the mid-1970s, the context surrounding the pollution crisis was changing rapidly. From October 1973 to March 1974 the Organization of Arab Petroleum Exporting Countries (OPEC) carried out an oil embargo against several countries, including Japan. The Oil Crisis drove up the fossil fuel prices, leading to a severe energy crisis in Japan. The Oil Crisis also ended the double-digit GNP growth in Japan that had been the norm since 1955 and brought with it inflation and rising commodity prices that lasted through the end of the decade.¹ Fear of economic stagnation quickly transformed into fear of total economic collapse as prices continued to increase.² Government planners and industry leaders did not remain idle. At the beginning of the decade, all signs pointed toward a momentous shift in the country's approach to the environment marked by the Ministry of Environment's passing of fourteen pollution laws (and later a fifteenth) that implemented the strictest regulations on polluting industries, including air pollutants such as nitrogen oxide. However, during the Oil Crisis, the Japanese government and industry leaders began to push back on pollution regulations, initiating a general period of retreat on environmental policies.³ This was the beginning of the "reverse

¹ Laura E. Hein, "Growth Versus Success: Japan's Economic Policy in Historical Perspective," in *Postwar Japan as History*, ed. Andrew Gordon (Berkeley: University of California Press, 1993), 115-120.

² Kawana Hideyuki, *Dokumento nihon no kōgai 11: Kankyō gyōsei no kiro* (Tokyo: Ryokufū Shuppan, 1995), 8.

³ As Tsuru Shigeto argues, the rapid uptake in environmental regulations and politics only lasted until the mid-1970s. Tsuru Shigeto, "History of Pollution Control Policy," in *Environmental Policy in Japan*, eds. Shigeto Tsuru and Helmut Weidner (Berlin: Edition Sigma, 1989), 15, 28-40.

course” on environmental policies and issues in Japan.⁴

How did environmentalists in *Technology and Humans* respond to the shifting terrain of the mid-1970s, and how did these changes alter their environmental critique? Environmentalists in *Technology and Humans* continued to develop incisive environmental criticism directed at the new challenges produced by changes in government planning and corporate strategies. They also remained attuned to developments at the *genba* they had written about in the early 1970s.

However, environmentalists began to face both reduced public support for pollution regulation and also a winding down of anti-pollution activism, as the number of such movements peaked in 1973 and declined significantly by 1975.⁵ Although articles in *Technology and Humans* from the second half of the 1970s demonstrated that there were many vigorous activist movements during this period, the powerful momentum of the early 1970s died down on a national level.

I argue that, although *Technology and Humans*' environmental practice never slowed down, the writers faced an increasingly less receptive climate for environmental critique and as a result, environmentalism occupied an increasingly minority position in national discourse, which precipitated a shift in how *Technology and Humans* writers viewed social and environmental problems. Environmentalists lost their optimistic vision for real social change—for a future Japan freed of pollution and the nightmare of developmentalism. Although pessimistic about the direction of Japanese society, environmentalists continued to confront the new permutations of the pollution crisis and expand the scope of their environmental criticism.

⁴ The title of this conclusion comes from an article authored by the editorial staff in the July 1976 issue of *Technology and Humans* entitled “The Reverse Course (*gyakuryū*) on Environmental Policy and the Debates on the Itai-Itai Disease.” Henshūbu, “Kankyō gyōsei no gyakuryū to itai itai byō rongi,” *Gijutsu to ningen* (July 1976): 35-36.

⁵ Jeffrey Broadbent, *Environmental Politics in Japan: Networks of Power and Protest* (New York: Cambridge University Press, 1998), 101-108.

Here I highlight their continued critique of the geographic expansion of industry, developmentalism, and pollution, and its connection to the growth of “technocracy.” As environmental activism receded nationally, *Technology and Humans* contributors concluded that industrial giantization and state development planning had effected a transformation in the daily lives of Japanese citizens that blocked widespread activism and other forms of resistance to those processes. They argued that the “technocratic management” that defined state developmentalism and industrial expansion increasingly dominated everyday life, reshaping the consciousness of Japanese citizens, especially through the proliferation of consumer goods. The magazine’s writers had warned of such a possibility even in their earliest issues. By the late 1970s they believed that Japan was becoming a “technocratic society.” While at the beginning of the decade *Technology and Humans*’ writers imagined an environmental movement that would comprehensively reform state, society, and economy, by the end of the decade *Technology and Humans*’ contributors increasingly felt closed in by a powerful state and corporate alliance that was “systematically managing (*kanri*)” workspaces, living environments, and ecology throughout Japan and invading every part of society.⁶

II. Oil Crises and Corporate Pushback

In the wake of the Oil Crisis, Japan’s manufacturers went to battle against the strict air- and water-pollution regulations. Keidanren, the economic organization that represented Japan’s major corporations, claimed in 1977 that Japan’s enterprises were fighting for survival due to economic stagnation and that they could not stomach the stringency of the government’s environmental policies. In one publication Keidanren argued that the pollution regulations were “unscientific” because they were based on a “philosophical position” taken by government

⁶ Sugioka Sekio et al., “Gijutsu to ningen gojūgō no kiseki,” *Gijutsu to ningen* (September 1977).

officials in response to the initial revelation of the horrors Japan's pollution crisis. According to Keidanren, the state based its "severe" pollution regulations on a general fear of the horrific pollution-related diseases of the 1960s rather than strict scientific recommendations regarding acceptable limits for pollutants.⁷ Japan's automobile, steel, oil, and other heavy industries earned the support of the ruling Liberal Democratic Party and state bureaucracy, which delayed the implementation of some regulations and reduced others. Both government and industry believed that the bureaucratic solutions had resolved the worst of the pollution crisis, especially air pollution and heavy metal contamination, and they feared the consequences of a continued economic downturn.

Keidanren's argument that Japan's pollution regulations were "unscientific" was not surprising. In fact, it marked a return to tactics deployed by state and industry throughout the 1960s to deny the legal claims of pollution victims based on a "strict scientific proof" (*genmitsusei*). Due to the chemical and ecological complexities of how pollutants damage the environment and humans, it was often difficult to establish a "strict" causal link between the pollution-related disease of, for example, fishermen in Mizushima suffering from manganese poisoning and the industrial runoff from nearby steel plants. However, the ruling in the Yokkaichi Asthma case in the early 1970s, in which residents of the city of Yokkaichi sued over asthma caused by pollution from the nearby industrial combine, established that pollution victims need not demonstrate that pollution was the precise cause of their medical condition. Rather, being a resident of an area legally designated as polluted was sufficient evidence to

⁷ Kawana Hideyuki, *Dokumento nihon no kōgai 11: Kankyō gyōsei no kiro* (Tokyo: Ryokufū Shuppan, 1995), 8-10 and Keizai Dantai Rengōkai, "Gensoku keizaika no nihon sangyō no shinro," *Keidanren geppō* vol. 5, no. 3 (1977): 24-26.

establish a company's liability for the medical condition.⁸ In the mid- to late-1970s, heavy polluters redeployed the argument of “scientific strictness” (*kagaku genmitsusei*) against the rationale behind environmental regulation.

Shifting away from pollution regulation, the state began centering environmental policy on building a “comfortable environment” (*kaiteki kankyō*) and developing green technologies.⁹ By the mid-1970s the public was beginning to feel that major pollution issues were resolved or nearly resolved and that the main governmental focus ought to shift to the goal of reducing inflation and commodity prices, both of which rose dramatically after the Oil Crisis.¹⁰ The fear of Japan's flagship corporations going bankrupt was enough to reduce support among the public, bureaucracy, and legislature for strict environmental regulations. Indeed, while public terror over imminent ecological collapse dominated the first half of the 1970s, in the second half of the decade that terror transformed into fear of economic collapse and the loss of Japan's high standard of living.

The first challenges that *Technology and Humans* faced were an environment more hostile to environmentalist advocacy and the cooption of environmental rhetoric by government and heavy industries as a strategy to promote supposedly “green” development projects that in reality intensified environmental disruption. From the Oil Crisis onward, state and industry adopted the language of environmentalism, claiming to be proponents of “non-polluting” industries and “pollution prevention measures,” while publicly criticizing what they considered

⁸ Miyamoto Ken'ichi, “Japanese Environmental Policy: Lessons from Experience and Remaining Problems,” in *Japan at Nature's Edge: The Environmental Context of a Global Power* Miller, eds. Ian Jared Miller, Julia Adeney Thomas, and Brett L. Walker (Honolulu: University of Hawai'i Press, 2013).

⁹ Kawana Hideyuki, *Dokumento nihon no kōgai 11: Kankyō gyōsei no kiro* (Tokyo: Ryokufū Shuppan, 1995), 8-11.

¹⁰ Kawana Hideyuki, *Dokumento nihon no kōgai 11: Kankyō gyōsei no kiro* (Tokyo: Ryokufū Shuppan, 1995), 8-21.

the excesses of the environmentalist movement and shifting environmental policy toward the goal of creating development projects in the health and leisure industries. In short, state and industry advertised new “non-polluting” industrial projects and pollution prevention technologies in order to cover up reduced regulation, ineffective pollution cleanups, and environmental degradation from new industrial development.¹¹

While the government declared victory over pollution, environmentalists in general claimed that pollution was in fact worsening despite new regulations. Writing in their 1975 book *Japan's Pollution*, environmentalists Miyamoto Ken'ichi and Shōji Hikari, whose articles and books had a significant role in publicizing pollution in the 1960s, argued that new large-scale projects of the mid-1970s, such as oil pipelines, oil-storage facilities, nuclear power plants, and bullet train expansions had worsened environmental destruction.¹² Indeed, Prime Minister Tanaka Kakue's 1972 “Plan to Restructure the Japanese Archipelago,” which was never fully realized, proposed solving the pollution crisis by distributing heavy industry throughout Japan. In fact, the areas selected for the redistribution of industry covered 87% of Japan and would include dozens of new industrial combines and nearly one hundred new industrial zones.¹³ Miyamoto and Shoji's perspective was echoed by a number of *Technology and Humans* contributors, who saw broad continuities in government planning from the early 1970s to the late 1970s, even after earlier industry regulations had been put in place, and who believed the pollution crisis was deteriorating rather than improving.¹⁴

¹¹ Tani Miyuki, ““Kenkō” wo uru daikigyō no nerai,” *Gijutsu to ningen* (May 1974): 54.

¹² Shōji Hikari and Miyamoto Ken'ichi, *Nihon no kōgai* (Tokyo: Iwanami Shoten, 1975), 235-238.

¹³ Miyamoto Ken'ichi, “Kōgaimondai no kaitō to tenbō,” *Kōgai kenkyū* 2, no. 4 (Spring 1973): 51.

¹⁴ Ui Jun and Kondō Kan'ichi, for example, asserted that the pollution crisis is worsening in a roundtable discussion in the October 1974 issue. Ui Jun, Kondō Kan'ichi, “Gendai gijutsu no rikkyakuten to kōgai no honshitsu,” *Gijutsu to ningen* (November 1974): 10-11. The editors of the magazine list several instances of the government rolling back

The government offensive against environmentalism was perhaps best symbolized in the 1975 novel *Negligence! (Yudan!)*, written by an anonymous high-level bureaucrat in the Ministry of International Trade and Industry. *Technology and Humans* reviewed the novel in July 1976. *Negligence!* depicted elite bureaucrats as protagonists during a severe oil crisis caused by a complete cessation of oil exports from the Middle East to Japan. The novel sought to dramatize what might happen in the event of a second oil crisis that lasted indefinitely. In the novel the extended ban on oil exports eventually led to the complete collapse of the Japanese economy and hundreds of thousands of deaths due to energy and food shortages. According to Tanaka Kimio, the engineer who reviewed the book for *Technology and Humans*, the message of the novel was painfully obvious: the novel's author argues that the government officials, citizens, and activists who opposed the construction of energy-related projects, such as nuclear power plants and large oil storage facilities, directly caused the end of Japanese civilization and the deaths of hundreds of thousands of fellow citizens depicted in the novel.

The title of the novel itself was a linguistic tactic to reverse the narrative surrounding pollution. Environmental degradation had been caused by corporate and governmental negligence. The novel, however, was intended to cast environmentalists as perpetrating an even greater negligence. They threatened the ability of civilization to survive. Reviewer Tanaka emphasized the “twisted” nature of this logic that would blame environmentalists for a fictional societal collapse caused by oil shortages as well as ignore the history behind Japan's dependency on oil—a dependency that, according to Tanaka, was engineered by elite bureaucrats.¹⁵ While narratives of environmental apocalypse, such as Komatsu Sakyō's *Japan*

environmental regulations in the July 1976 issue. Henshūbu, “Kankyō gyōsei no gyakuryū to itai itai byō rongi,” *Gijutsu to ningen* (July 1976): 35-36.

¹⁵ Tanaka Kimio, “*Yudan!* sono dōkatsu no taikai,” *Gijutsu to ningen* (July 1976): 28-

Sinks, were popular in the early 1970s, *Negligence!* flipped the script by depicting societal and economic collapse caused by environmentalists. According to Tanaka this was representative of the views of elite bureaucrats who believed the Japan's survival depended on the unrestricted development of nuclear power and oil reserves.¹⁶ In *Negligence!* we see early elements of the oil and gas company pushback against environmentalism that dominated the 1980s, 1990s, and 2000s. The oil and gas industry and their supporters successfully inculcated in politicians and the general public a belief that any threat to fossil fuels was a threat to human civilization.¹⁷

In 1970s Japan, environmentalist rhetoric was not entirely ignored by government planners. While the state pushed back against environmentalism, it nevertheless branded itself as environmentally conscious. Indeed, *Technology and Humans* acknowledged that, throughout the 1970s, and especially from the mid-1970s on, the Japanese government and industrial leaders adopted rhetoric of “anti-pollution technology,” including phrases like “harmony between humans and nature.” They even began espousing returning sovereignty to Japan's regions and local communities. *Technology and Humans'* environmentalists, however, argued that the state's new “environmental” ideology was a rhetorical strategy to cover up the continued development of polluting industries.

There was no better example of the government cover-up, according to *Technology and Humans*, than the government's “Third Comprehensive National Development Plan.” The “Third Comprehensive National Development Plan” was enacted in 1977 and would become the major economic development framework for the subsequent ten years. The new plan advocated moving

¹⁶ Tanaka Kimio, “*Yudan!* sono dōkatsu no taikai,” *Gijutsu to ningen* (July 1976): 33.

¹⁷ Journalist Amy Westervelt analyzes how Exxon Mobile waged a highly successful public relations war in the 1980s that accomplished just that in her podcast *Drilled*. Amy Westervelt, “Season One,” *Drilled*, podcast audio, October 21, 2018, <https://www.criticalfrequency.org/drilled>.

away from a structure that positioned major national projects and heavy industries as the core of economic development. Instead, the plan focused on restoring Japan's regional communities and creating a "perfect living environment" for all Japanese citizens. At the heart of this plan was the "Permanent Residency Concept" (*teijū kōsō*). Through the "Permanent Residency Concept," planners envisioned a utopian "living environment" (*seikatsu ken*) for Japanese citizens that was to be "rooted" in Japan's "history" and "traditions" and defined by "harmony" (*chōwa*) among the natural environment, the human "living environment," and the "industrial environment" (*sangyō kankyō*).¹⁸ To create ecological and social harmony, the plan aimed to restore authority and autonomy to regional and local governments, through which citizens would work together to create an "ideal environment." At the same time, government planners hoped to lure the masses of young workers who had fled the countryside in years prior back to rural communities and regional cities by enticing them with the promise of green spaces and employment opportunities. This strategy was intended to alleviate rural poverty and the deterioration of rural communities from depopulation while mitigating urban overcrowding. Thus, government planners envisioned a new "regional Japan" built on harmony with nature as well as cultural tradition and political decentralization.¹⁹

The bureaucratic plan to decentralize government and economy ironically depended on a powerful, centralized state for its implementation, but, despite the opposition of anti-pollution activists to the centralized state, the plan appeared to represent a serious response to the demands of activists. *Technology and Humans* contributors, however, argued that the plan actually

¹⁸ Misonō Hitoshi, "Sanzensō no futatsu no kao," *Gijutsu to ningen* (May 1978): 54.

¹⁹ Misonō Hitoshi, "Sanzensō no futatsu no kao," *Gijutsu to ningen* (May 1978): 54. Prime Minister Tanaka Kakue's 1972 *Treatise on Restructuring the Japanese Archipelago* had also offered a vision for transforming Japan into a "regional society" and ending the disparity between urban and rural spaces.

concealed an anti-environment agenda. Its true purpose, they argued, was to expand polluting industries under a superficial rhetoric of “restoring” (*fukkō*) the prosperity of Japan’s countryside and creating harmony between society, nature, and industry. Misonō Hitoshi, a professor at Tokyo Keizai University, wrote a critique of the plan in the magazine’s May 1978 issue, for which the editors had chosen “The Structure of the Present Crisis” as the issue’s title and theme. Misonō called the plan “two-faced” (*futatsu no kao*) because, underneath a veneer of “harmony with nature,” the plan’s execution demanded the “constructing and preserving of new spaces for heavy industries,” even at four major industrial sites that had been sites of contestation between industry and local residents in the 1970s: Mutsu Ogawara in Aomori Prefecture, Akita Bay in Akita Prefecture, Shibushi in Kagoshima Prefecture, and Tomakomai in Hokkaidō.²⁰ Misonō argued that the development plan sought to advance industrial development in oil-related businesses and other large-scale projects by means of national infrastructure expansion.

According to Misonō, the plan was two-faced because it failed to propose concrete steps for restoring rural and regional sovereignty, instead using the rhetoric of decentralization to mask its development goals. Indeed, the plan’s language was quite progressive. It called for the “decentralization of authority” (*bunkenshugi*), for strengthening local governments, and for giving residents of communities the ability to self-fashion their living environment.²¹ However, Misonō reported that the plan’s sole proposal for carrying out this radical decentralization was relegated to one ambiguous line: “It will be necessary to plan the introduction of new systems and traditions (*seido, kankō*)” in order to create this utopian living environment.²² What those

²⁰ Misonō Hitoshi, “Sanzensō no futatsu no kao,” *Gijutsu to ningen* (May 1978): 52, 61.

²¹ Misonō Hitoshi, “Sanzensō no futatsu no kao,” *Gijutsu to ningen* (May 1978): 57.

²² Misonō Hitoshi, “Sanzensō no futatsu no kao,” *Gijutsu to ningen* (May 1978): 57.

traditions and systems were to be the plan did not say.

As Misonō's critique demonstrated, *Technology and Humans'* environmentalists believed that the state was exacerbating the effects of the violence of desk work and giantization under the new guise of environmentally friendly rhetoric as well as by opening up new areas for profit-making and exploitation. The magazine's contributors had seen signs of this rhetorical strategy earlier in the decade. Tani Miyuki, writing in *Technology and Humans* in May 1974, critiqued the Health and Welfare Ministry, Transportation Ministry, Construction Ministry, and Labor Ministry for creating large-scale development projects to produce green spaces, community centers, sports centers, and other social welfare-oriented projects throughout the nation. While green spaces and social welfare projects were desirable in theory, Tani accused the government of using the pretense of creating a "comfortable environment" (*kaiteki kankyō*) to justify massive construction projects while "large enterprises rush into the health industry" (*kenkōsangyō ni nadarekomu daikigyō*) in order to profit off of human health. *Technology and Humans* critiqued state and industry for monetizing health and human life through a rapid expansion of the healthcare and leisure industries in response to the pollution crisis.²³ As Misonō would articulate four years later, the state strategically deployed the language of healthfulness, comfortable environment, and green space to distract the public from polluting industrial developments. The rhetoric of environmentalism had been turned into a tool for national development planning, a tactic cemented in the Third Comprehensive National Development Plan.

Environmentally friendly rhetoric was ubiquitous in Japan's energy industry. By the mid-1970s, the combined impact of anti-pollution movements and the 1973-74 Oil Crisis, which muddied the future of oil and petrochemicals, caused a shift in government planning toward light

²³ Tani Miyuki, "'Kenkō' wo uru daikigyō no nerai," *Gijutsu to ningen* (May 1974): 56-58.

manufacturing and high-technology industries, especially electronics and automobiles. In energy, this translated into arguments that called for basing Japan's future energy policies on nuclear power rather than oil. Supporters of nuclear power believed that nuclear power as an environmentally sustainable and clean source of electricity in contrast to the "dirty" energy produced by burning oil and coal.²⁴ The shift in energy policy caused a transformation in the history of combines. While oil and petrochemical industries remained important to Japan's economy and the giantized production of both continued, no new combine sites were selected after the Oil Crisis. Rather, some of those that had already been planned as petrochemical combines were re-designated as "nuclear power combines." In his 1974 article on industrial development at Mutsu Ogawara, Kamata Satoshi referenced the mutual decision by Japanese industry and the Ministry of International Trade and Industry to make nuclear combines "the biggest topic of the 1970s." Indeed, after the original plans for the petrochemical combine at Mutsu Ogawara fell through, the development project was reformulated as a proposal for a new nuclear combine.²⁵

III. The Next Phase of the Environmental Crisis: Nuclear Power and Pollution Export

As the government built nuclear power plants in the 1970s, environmentalists took on nuclear power as a new focus. For environmentalists in *Technology and Humans*, nuclear power was simply a mutation of the violence of desk work and giantization. The government's new focus on nuclear power demonstrated to them that the core elements of the environmental crisis were worsening rather than improving. Takahashi Noboru, in a 1973 article entitled "What is a

²⁴ Miyamoto Ken'ichi, "Industrial Policy and the Case of Large Industrial Complexes," in *Environmental Policy in Japan*, eds. Shigeto Tsuru and Helmut Weidner (Berlin: Edition Sigma, 1989), 426.

²⁵ Kamata Satoshi, "Rupo: Shimokitagenshiryoku shinryakuchi wo yuku," *Gijutsu to ningen* (October 1974): 45.

National Project?,” stressed that only .0002 of the approximately four hundred million dollars (in 1973 currency) directed toward nuclear power reactor research that year was budgeted for researching the effects of radiation pollution on ocean life. While walking through the nuclear research facilities, he “saw first-hand the posture of Japan’s nuclear reactor development program in the incredible imbalance (*anbaransu*) between investment in reactor development and investment in the negative consequences it will bring about.”²⁶ According to Takahashi, the state was continuing the development of massive industrial projects through nuclear power, but with even less regard for safety than it had demonstrated in previous years.

In a conversation with Taketani Mitsuo published in *Technology and Humans* in April 1974, Hoshino Yoshirō asserted that nuclear power was an extension of the “era of wastefulness” (*rōhi no jidai*) that “oil, including automobiles and plastic products, symbolized,” thus adding to Takahashi’s previous claim.²⁷ Both Taketani and Hoshino believed that the nuclear industry in Japan, as Takahashi had shown, was based on centralized planning and giantized technological development “without consideration (*wakimaezu*) for the dangers that come with giantizing technology (*kyodaika suru gijutsu*).”²⁸ Hoshino and Taketani criticized the nuclear industry for putting reactors into operational service without fully testing them, citing an incident that occurred in March 1973 when fuel rods in a reactor at the Mihama nuclear power plant cracked and bent, forcing a reactor shut down.²⁹ They argued that the rapid implementation of nuclear power turned Japan and Japanese citizens into “a laboratory” for nuclear experimenting, which

²⁶ Takahashi Noboru, “Rupo nashonaru purojekuto to ha nani ka,” *Gijutsu to ningen*, no. 5 (Spring 1973): 63.

²⁷ Taketani Mitsuo and Hoshino Yoshirō, “Enerugii kakumei ron no kyobō,” *Gijutsu to ningen* (April 1974): 15.

²⁸ Taketani Mitsuo and Hoshino Yoshirō, “Enerugii kakumei ron no kyobō,” *Gijutsu to ningen* (April 1974): 15.

²⁹ Taketani Mitsuo and Hoshino Yoshirō, “Enerugii kakumei ron no kyobō,” *Gijutsu to ningen* (April 1974): 13-14.

“forced ordinary Japanese citizens to become victims (*gisei ni wa jinmin ga saserareru*)” of those experiments.³⁰

Government planners facilitated the development of nuclear power plants in poor, rural areas, turning Japan’s rural communities into “victims” of the nuclear experiment, according to Taketani. In that same 1974 issue cited above, *Technology and Humans* illustrated the point with an article on the community-based anti-nuclear movement at Kashiwazaki Kariwa in Niigata Prefecture, which sought to stop the construction of what would become the world’s largest nuclear power plant. For *Technology and Humans*, the fight between community-based activists, many of whom were farmers, and the nuclear power company at Kashiwazaki represented another battle in the war against environmental degradation and regional inequality, as had the conflicts over industrial combines in years prior. *Technology and Humans’* environmentalists believed that anti-nuclear protests and nuclear reactor development projects were extensions of the pollution crisis brought on by the violence of desk work and giantization, but they also believed that nuclear power raised the stakes and potential dangers given the threat of nuclear meltdowns and radiation pollution.³¹

According to *Technology and Humans*, while nuclear reactors deepened the pollution crisis, a new phenomenon of “exporting pollution” (*kōgai yushutsu*) emerged whereby Japanese companies exported toxic waste and highly polluting factories to foreign countries, particularly “third-world” nations “controlled by dictators.”³² For *Technology and Humans* contributors, this new practice was tantamount to the exploitation of Japan’s “underdeveloped” regions into a new

³⁰ Taketani Mitsuo and Hoshino Yoshirō, “Enerugii kakumei ron no kyōbō,” *Gijutsu to ningen* (April 1974): 17.

³¹ Higuchi Kenji, “Genpatsu keikaku to jūmintachi: kashiwazaki chiku no tatakai,” *Gijutsu to ningen* (April 1974): 60-64.

³² “Kaigai shinshutsu no shikumu to nerai: kyōdō tōron,” *Gijutsu to ningen* (June 1977): 22-23.

Japanese imperialism that exploited “underdeveloped” communities in Asia and elsewhere.³³ Recipients of polluting industries included Thailand, South Korea, the Philippines, Indonesia, and Brazil, and Japanese petrochemical companies also made deals to construct industrial combines in Saudi Arabia and Iran.³⁴

Technology and Humans devoted the June 1977 issue to the problems surrounding the transfer of polluting industries abroad under the title “Plundering Resources and Exporting Pollution and Worker Injuries” (*shigenshūdatsu to kōgai rōsai yushutsu*). Aoyama Tadashi from the Anti-Pollution Export Information Center, a Tokyo-based organization founded by activists involved in the anti-pollution export movement in 1976, wrote about the state of pollution exporting in the June 1977 issue.³⁵ He and other activists called the exporting of pollution “Japan’s economic invasion (*keizai shinryaku*)” of Asia.³⁶ Aoyama explained how exporting pollution constituted a means for Japan’s heavy industries to continue toxic production processes against which activists in Japan had successfully fought. For example, after protests over dumping chrome into waterways forced Nippon Chemical to close a chrome plant in Tokyo, the company began constructing a plant in South Korea to produce sodium dichromate without restrictions on dumping chrome byproducts. At the same time, Japanese oil companies began exporting barrels of oil waste to South Korean companies that were tasked with dumping the waste in the Ulsan and Pusan harbors. In a similar episode, Kawasaki Steel opened a sintering

³³ Simon Avenell treats pollution export extensively in his book *Transnational Japan in the Global Environmental Movement*. See especially Chapter 4, “Pollution Export and Victimhood,” in Simon Avenell, *Transnational Japan in the Global Environmental Movement* (Honolulu: University of Hawai’i Press, 2017).

³⁴ Aoyama Tadashi, “Nihon shihon no kōgai yushutsu no jittai,” *Gijutsu to ningen* (June 1977): 6-7.

³⁵ Derek Hall, “Pollution as State and Corporate Strategy: Japan in the 1970s,” *Review of International Political Economy* 16, no. 2 (May 2009): 275.

³⁶ Aoyama Tadashi, “Nihon shihon no kōgai yushutsu no jittai,” *Gijutsu to ningen* (June 1977): 6-7.

plant in Mindanao, Philippines in 1977 after protests in Japan had made it impossible to build the highly polluting facility there. Japan's five largest aluminum manufacturers created the Asahan Aluminum Project to build an aluminum smelting facility in Asahan, Indonesia that would be capable of producing 25,000 tons of aluminum per year. The project included a government promise that the facility could dump toxic byproducts into local waterways. All of these plants involved processes that had heavily polluted Japan and had become targets for anti-pollution activists.³⁷

In evaluating the “aim and mechanisms of exporting pollution,” environmentalists found an extension of the violence of desk work in Japan's “imperialist” economic expansion. In June 1977 *Technology and Humans* summarized a discussion between Tsurumi Yoshiyuki, Mutō Ichiyō, and other critics of pollution exportation from the Pacific Asia Resource Center, an activist organization that opposed exporting pollution. The summary revealed a new mutation in the logic behind the violence of desk work that *Technology and Humans*' editors had critiqued in their 1972 issue on state planning. The discussants emphasized that exportation of pollution was “spearheaded by the Japanese government (*seifu shudō no kata*)” through financial contributions and loans. For example, 85% of the financing for the Asahan Aluminum Project in Indonesia came from government aid and loans, while only the remaining 15% came from private bank loans. Japanese aluminum companies contributed none of the investment capital. Since they invested little of their own capital, this meant that companies could easily profit through the development and construction of these facilities abroad, even if they did not turn a profit from the actual products manufactured at the new facilities.³⁸

³⁷ Aoyama Tadashi, “Nihon shihon no kōgai yushutsu no jittai,” *Gijutsu to ningen* (June 1977): 7-18.

³⁸ “Kaigai shinshutsu no shikumu to nerai: kyōdō tōron,” *Gijutsu to ningen* (June 1977): 19-20.

While the mechanisms—government aid and loans—that facilitated pollution exporting were clear, the motivation for it was murkier. According to the summary of the “pollution exportation” discussion in *Technology and Humans*, in the mid-1970s, Japan’s petrochemical and aluminum companies were producing at only 60% of their total domestic capacity, a rate that in fact exceeded national demand. Why would Japan’s petrochemical and aluminum industries need to build new massive production facilities, such as an ethylene production plant in Singapore that could produce 300,000 tons of ethylene per year, when production capacity already exceeded demand? According to the Pacific Asia Resource Center, the government’s motivation for promoting expansion abroad was markedly similar to the motivation behind Imperial Japan’s invasion of Asia during the World War II: to guarantee that Japan would always have access to a steady supply of resources for its oil, iron, aluminum, and other industries.³⁹ Japan’s government planners were thus responding to worries over resource scarcity that had been exacerbated by the Oil Crisis, which had threatened to cut off the raw material that fueled Japan’s economy.

What made the extension of the violence of desk work even more pernicious, according to *Technology and Humans*, was that Japanese developers saw foreign communities as populations that could be sacrificed to pollution and foreign land as a mere dumping ground for toxic substances. Japan’s government and businesses incentivized local populations in foreign countries with the promise of employment for residents and the introduction of advanced technologies that would aid the development of national industries, but the reality was much darker. Activists from the Pacific Asia Resource Center argued that the Japanese companies specifically partnered with nations run by anti-communist dictators, such as Ferdinand Marcos in

³⁹ “Kaigai shinshutsu no shikumu to nerai: kyōdō tōron,” *Gijutsu to ningen* (June 1977): 20-21.

the Philippines, and, with their support, exploited poor rural populations. According to the the activists' discussion in 1977, "The people who live in areas that Japan has invested in lose their land, their homes, and their means of subsistence, and they become more and more impoverished."⁴⁰ *Technology and Humans* cited the case of steel sintering plant in Mindanao, Philippines, which only executed the most polluting step of iron and steel production, the sintering, while the other elements of production were done in Japan. Although local Filipinos were employed in constructing the facility, few actually worked at the facility, and many were forced to move from their original homes into new modern housing that they could not afford. Even the raw materials for the plant were imported from Australia. The activists from the Pacific Asia Resource Center concluded that all the Philippines offered Japanese companies was land and people to absorb pollution. Environmentalists believed that exporting pollution repeated the process of exploitation that occurred in the Japanese countryside, where Japanese citizens were forced to consume and endure pollution for the benefit of Japan's urban population. The only difference was that outside Japan this process occurred with even greater disregard for human life.⁴¹

Both the exportation of pollution and the development of nuclear power represented an extreme intensification of pollution and the violence of desk work to environmentalists. Nuclear power plants threatened to irradiate Japan as nuclear industry leaders planned to construct more than fifty power plants throughout the seismically active archipelago. More than twenty of the plants were brought online during the 1970s. The exportation of pollution exposed vulnerable populations abroad to even worse cases of pollution than Japanese citizens had suffered. All the

⁴⁰ "Kaigai shinshutsu no shikumu to nerai: kyōdō tōron," *Gijutsu to ningen* (June 1977): 26.

⁴¹ "Kaigai shinshutsu no shikumu to nerai: kyōdō tōron," *Gijutsu to ningen* (June 1977): 26.

while Japan was becoming known at home and abroad as a “green nation” that had solved its industrial pollution crisis.⁴²

In their last issue of the 1970s, *Technology and Humans*’ editors published a special collection of articles entitled “Pollution Without End” (*Owarinaki kōgai*). By emphasizing that the pollution crisis was not over, *Technology and Humans* staked out a claim against the popular conception that Japan had solved its pollution crisis. In the afterword to the issue, Takahashi Noboru illustrated the magazine’s commitment to resistance even if this made them part of an outnumbered minority:

The beginning of the 1970s was an era when pollution-related issues attracted the attention of the general public. However, taking advantage of the Oil Crisis, large enterprises used the resulting economic recession as a pretense for intensifying their counterattack against environmentalism. This was profoundly effective, and the general public became disinterested in pollution-related issues. In the current atmosphere, books that deal with pollution no longer sell, and pollution issues are no longer fashionable. Nevertheless, pollution has not been eradicated. We will continue to relentlessly (*shitsuyō ni*) pursue pollution.⁴³

Technology and Humans environmentalists remained resolute in their cause even as they acknowledged that the general public no longer considered the environment to be an important issue. Indeed, as Takahashi indicated in the afterword, there were plenty of reasons to be pessimistic. Framing pollution as “without end” was no doubt a statement of pessimism as well as a call to action.

The pessimism of the late 1970s was captured in a January 1979 article by Miyagawa Chūmin, bleakly entitled “The Coming Technofascist Era?” In the article Miyagawa identified what he saw as the growing threat of government and corporate control over society by means of

⁴² Ui Jun and Kondō Kan’ichi, “Gendai gijutsu no ryakkyakuten to kōgai no honshitsu,” *Gijutsu to ningen* (October 1974): 6-17.

⁴³ Takahashi Noboru, “Atogaki,” *Gijutsu to ningen* (December 1979): 144.

new technologies that would allow them to colonize everyday life and even human consciousness. According to Miyagawa, all that stood in the way of the colonization of society was the anti-nuclear movement and a small number of “deviants” (*itsudatsu sha*) who fought against the rising technofascism.⁴⁴ In the magazine’s earlier critiques of the violence of desk work and giantization, environmentalists feared that both processes were homogenizing and “systemizing” Japanese society under the centralized control of technocrats in government and industry. This fear was similarly articulated by various anti-pollution movements at the beginning of the decade.⁴⁵ By the end of the decade, *Technology and Humans*’ environmentalists believed that the “systemization” of Japanese society had been partially completed.

IV. The Future of Genba and Technology and Humans

What did the increased “systemization” of society, the rhetoric of green industry, and the emergence of the nuclear industry mean for *Technology and Humans*’ project, which posited situated knowledge and genba-focused activism as the best basis for resistance to pollution? At the end of the 1970s, *Technology and Humans*’ articles centered on understanding and discerning ways to resist the growth of “technocratic” governance—the “systemization” of society—on a global scale. The magazine’s contributors remained committed to learning how this “systemization” modified different aspects of society. To that end in June 1980 the magazine published a “readers’ guide” that listed some two hundred important monographs by Japanese and non-Japanese authors that editors and contributors believed would aid readers in understanding the crisis they faced. They categorized the books into several different topics,

⁴⁴ Miyagawa Chūmin, “Tekunofashizumu no jidai no tōrai ka,” *Gijutsu to ningen* (January 1979): 48-49, 57-59.

⁴⁵ Simon Avenell, “Regional egoism as the public good: residents’ movements in Japan during the 1960s and 1970s,” *Japan Forum* 18, no. 1 (2006): 89-113.

including pollution, energy, labor, computerization, health care, technology, agriculture, and scientific knowledge.

The book list provided an intellectual map of the “systemization” of society and efforts to develop strategies of resistance. The magazine’s editors summed up the overarching problem of global technocracy in the last article of the readers’ guide, entitled “Giantized Civilization: Its Contradictions and Overcoming” (*Kyodai bunmei no mujun to chōkoku*). The last two books the editors recommended encompassed the fundamental contradiction that the magazine felt Japan was facing. The first book was *The Limits to Growth* (1972), a report by the Club of Rome, that was based on a computer simulation of long-term effects of trends in global social and economic development, including population growth, environmental degradation, resource depletion, and so on. It concluded that humanity would reach the “limits” of growth within a hundred years, at which point there would be a “sudden and uncontrollable decline in both population and industrial capacity.”⁴⁶ The second book was *The Consumer Society: Myths and Structures* (1970 in France, 1979 in Japan) by French sociologist and philosopher Jean Baudrillard. Here is how *Technology and Humans*’ editors connected the two works:

Today’s giantized civilization creates a myriad of contradictions within its own system. The [Club of Rome] reflected (*hanei*) the internal sense of crisis within monopoly capitalism (*dokusen shihon naibu no kikikan*), and the group searched for means to systemically resolve [its contradictions]. *The Limits to Growth* gathered together [different aspects of] that way of thinking. The system itself has reached the point where it must change its value system (*kachikan*). However, today’s “consumer society” was forged from mass production and consumption and has achieved a mythological status (*shinwa*) to the point where it can subsume (*tsutsukomu*) opposing viewpoints. *The Consumer Society: Myths and Structures* expressed the fact that the [consumer society] is increasingly difficult to break through (*tsukiyaburu*).⁴⁷

⁴⁶ Quoted in “Kyodai bunmei no mujun to chōkoku,” *Gijutsu to ningen rinjizōkangō kagaku gijutsu ron e no dokusho annai gendai kagaku gijutsu wo kangaeru tame no nihyaku satsu* (June 1980): 329.

⁴⁷ “Kyodai bunmei no mujun to chōkoku,” *Gijutsu to ningen rinjizōkangō kagaku gijutsu ron e no dokusho annai gendai kagaku gijutsu wo kangaeru tame no nihyaku satsu* (June 1980): 319.

The editors used *The Limits to Growth* to explore the concept of “monopoly capitalism,” a global economy dominated by large and often multinational firms with monopolies over one or more industries. They argued that monopoly capitalism produced a series of crisis that “elites” such as those in the Club of Rome or “technocratic elites” in Japan’s government attempted to resolve within the confines of the existing economic system.⁴⁸ There was good reason to associate *The Limits to Growth* with efforts by policymakers in Japan to rethink the future of economic growth and industrial expansion. On the Club of Rome’s executive committee sat Ōkita Saburo who had a central role in Japanese government economic planning in the 1950s and early 1960s; led Japan’s Economic Planning Agency in 1963; and later became president (1964-1973) and then chairman (1974-1979) of the Japan Economic Research Center, a highly influential policy analysis group whose members included government officials and corporate executives.⁴⁹

Technology and Humans juxtaposed *The Consumer Society* and *The Limits to Growth* in order to show how the space of everyday life was decreasingly a site of resistance to the crises of capitalism and technocratic governance. The magazine’s contributors had believed that if citizens, workers, or engineers were spontaneously stirred to protest against environmental and social problems, then empirical knowledge would aid their efforts and perhaps help expand its range of participants. The magazine’s writers had accepted that they could not force individuals to become activists. Instead, they argued that joining activist causes should be a decision made by the individual, one that emerged out the everyday lives of victims of pollution and industrial

⁴⁸ The magazine’s contributors take the concept of “monopoly capitalism” is derived, in part, from Paul Sweezy and Paul A. Baran, *Monopoly Capital: An Essay on the American Economic and Social Order* (New York: Monthly Review Press, 1966).

⁴⁹ Eiko Maruko Siniawer, *Waste: Consuming Postwar Japan* (Ithaca: Cornell University Press, 2018), 228.

development. Therefore, if Baudrillard was correct in his argument that the mythology of consumption was “subsuming” oppositional viewpoints to the system of mass production and consumption, then what hope would there be for spontaneous activism emerging from everyday life?

The problem of giantization and systemization came down to desire. In their early 1970s critiques of giantization, *Technology and Humans*' writers argued that technocracy produced something unexpected of a “rationally controlled” society: a system of “giantization” involving the continuous expansion of industry, infrastructure, and private consumption that was beyond human control and outpaced human need. The architects of this system in government and private industry were motivated by the singular desire for economic growth and private profit. The magazine's editors used the metaphor of a Godzilla-like monster (*kaijū*) that reproduced on its own to describe the industrial complexes that comprised this runaway system of economic growth and industrial expansion that had created widespread environmental devastation. This “system of giantization” was, in the magazine's depictions, like a living organism. The monster desired more resources, more workers, more consumers, more energy, and more land.

Jean Baudrillard's work offered an explanation for how the “giantized civilization,” as *Technology and Humans* called it, affected individuals at the level of consciousness and prevented them from adequately resisting giantization and the social transformation it brought with it. In their brief summary of the book's importance, *Technology and Humans*' editors quoted J.P. Mayer's forward to Baudrillard's book. Mayer asserted that Baudrillard's analysis demonstrated “how the giant technocratic corporation fosters irrepressible desires,” in turn creating a new “mythology” of consumption that “has become the new morality of our present world.” Baudrillard's explanation of “mythology” and its “irrepressible desires” was later quoted

by Mayer, who was then cited by *Technology and Humans*.⁵⁰ *Technology and Humans*' contributors had at various points also argued that the giantization of production and the resultant increase in available consumer goods made consumers desire more products, thus creating a cycle where production drives consumption through its proliferation of desire.⁵¹ In Baudrillard's argument, individuals did not consume products according to needs or even out of a free, conscious choice. Instead, they consumed goods out of an "irrepressible desire" for things, regardless of their needs or the objects' functions. Moreover, "desire" was manufactured by industry through economic production. For Baudrillard, the system of production used in factories extended outward into the individual, producing in him a "system of needs" or "desire"—a "compulsion"—toward consumption.⁵²

Technology and Humans' contributors interpreted a growing attachment to a high standard of living that had become the norm among the majority of Japan's citizens during the period of high economic growth between 1955 and 1973 as evidence that most Japanese citizens had been colonized by the desire to consume. From 1955 to 1973 per capita consumption grew by an average of 7.51 percent per year.⁵³ With the rise in consumption, working and middle class

⁵⁰ J.P. Mayer, foreword to *The Consumer Society: Myths and Structures*, by Jean Baudrillard (London: Sage Publications, 1998), IX. Quoted in "Kyodai bunmei no mujun to chōkoku," *Gijutsu to ningen rinjizōkangō kagaku gijutsu ron e no dokusho annai gendai kagaku gijutsu wo kangaeru tame no nihyaku satsu* (June 1980): 330.

⁵¹ For examples of this argument, see: Kondō Kan'ichi, "Gendai ni okeru kyodai-ka no kōzō," *Gijutsu to ningen*, no. 7 (Fall 1973) and Maekawa Michio, "Tsukaisute no gijutsu taikai 1: purasuchikku no haikibutsu kōgai no kongen," *Gijutsu to ningen*, no. 6 (Summer 1973).

⁵² Here I note that Baudrillard was staking out an argument against other Marxists who analyzed the problem of consumption as a question of alienation and human beings' relation to objects. In Baudrillard's argument, there is no relation between person and object. Instead the individual is an extension of the system of production itself and simply desires goods regardless of the particulars of the object. This argument, however, was less important to *Technology and Humans* than its implication: that technocratic industry had produced this systematic desire for consumption in the individual. Jean Baudrillard, *The Consumer Society: Myths and Structures* (London: Sage Publications, 1998), 75.

⁵³ Charles Yuji Horioka, "Consuming and Saving," in *Postwar Japan as History*, ed. Andrew Gordon (Berkeley: University of California Press, 1993), 261.

Japanese citizens, especially urban residents, became accustomed to a certain standard of living, and the 1973 Oil Crisis sparked considerable fears that the gains of the high economic growth period would be lost.⁵⁴

The other aspect of consumer desire, according to *Technology and Humans*, was that by the late 1970s states and non-state entities were able to implement a widespread practice of monitoring of individual citizens. *Technology and Humans'* contributors were concerned about what the rapid computerization of workplaces and government. In the early 1970s, *Technology and Humans* had spent considerable time criticizing the computerization and automation of assembly lines, which had been a major focus for Japanese companies in the early 1970s.⁵⁵ In these discussions, the magazine's writers discussed the dehumanization involved in management's use of machines to control and monitor workers.⁵⁶ However, in the second half of the 1970s *Technology and Humans* focused also on the effects of computerization on government administration. The magazine's contributors worried about the creation of electronic files for individual citizens and the growing collection of information individuals' lives that was gathered by the corporate sector. They feared that these practices would provide new means by which corporations could control the everyday lives of Japanese citizens.⁵⁷

⁵⁴ Charles Yuji Horioka, "Consuming and Saving," in *Postwar Japan as History*, ed. Andrew Gordon (Berkeley: University of California Press, 1993), 279-280.

⁵⁵ In 1967, the Japanese government sent a delegation of bureaucrats and representatives of private companies to study developments in "Management Information Systems" in the United States. The delegation concluded in their report that computerization "would be essential for raising operational efficiency (*keiei kōritsu*) as the industrial environment undergoes rapid changes, including the giantization of the scale of production and the complexification of management functions." Moreover, the delegation warned of a "computer gap" (*konpyuuta gyappu*) between the U.S. and Japan that threatened to undermine the international competitiveness of Japanese industry. Quoted in Shiga Akira, "Gendai shakai to konpyuuta," *Gijutsu to ningen* (February 1976): 13.

⁵⁶ Shiga Akira, "Gendai shakai to konpyuuta," *Gijutsu to ningen* (February 1976): 11. For example, the February and June 1976 issues were dedicated to this problem.

⁵⁷ Henshubu, "'Han konpyuuta tsūshin' sōkan sareru," *Gijutsu to ningen* (October 1979): 7; Yoshida Tomoya, "Shin heijō-kyō kōsō to chiiki jūmin kanri," *Gijutsu to ningen* (October 1979): 18-26.

The magazine's conclusion for the 1970s was that the giantization of steel, plastics, chemicals, home electronics, automobiles and related industries had, through technocratic management, succeeded in creating "desiring" consumers and in forging an entrenched "mythology of consumption." *Technology and Humans*' contributors focused on technocracy as a central issue in the late 1970s, dedicating numerous articles to it, including three issues on the theme of "management society" (*kanri shakai*) in 1978 and 1979 and another issue on "technofascism" in 1981.⁵⁸ Articles written between 1978 and 1979 revealed a growing sense that everyday life for Japanese citizens was being dominated by technocratic management at the level of human consciousness, which explained why the magazine's editors found Baudrillard's arguments compelling. Technocratic Japan had also been adept at assimilating and therefore blunting opposing views, as evidenced by its incorporation of environmentalist demands into development planning while supporting the expansion of polluting industries. *Technology and Humans* believed that this was the reason environmentalist movements and the general public's support for environmental issues had waned considerably by 1980. Pollution was becoming worse and spreading farther, reaching new parts of the global ecology.

III. Conclusion

Technology and Humans' political approach reached a fundamental impasse at the end of the 1970s. Their genba-based practice was closely tied to a form of spontaneous activism they witnessed in citizen-led anti-pollution protests of the early 1970s. However, the magazine's writers believed that the growth of Japan's consumer society foreclosed the possibility for that

⁵⁸ The "management society" theme was taken up in the June 1978 issue titled "Nuclear Power and Management Society" (*Genshiryoku to kanrishakai*) and the October 1979 issue titled "The Logic of Today's Management Society" (*Gendai kanrishakai no ronri*), and it was a central problem for their January 1979 issue titled "The 1980s: Its Crises and Outlook" (*Hachijū nendai: kiki to tenbō*). The issue on technofascism was the May 1981 issue "The Era of Technofascism" (*tekunofashizumu no jidai*).

form of activism. They represented a growing pessimism among environmentalists and those on the Left that everyday life could no longer be a site of active protest against state and large corporations. There was little hope for the kind of heterogenous, global activism that they had envisioned at the beginning of the decade. Nonetheless, *Technology and Humans* remained committed to exploring that possibly until the end. Indeed, the magazine survived until 2005. In fact, although by then environmentalism had died down in a sense, the magazine played an important role in the anti-nuclear movement and in debates about the ethics of biotechnology.⁵⁹

The impasse itself resulted from environmentalists' failure to develop a strategic framework for bringing local movements together. The magazine's contributors assumed that a larger movement or alliance could emerge organically through active collaboration among these movements—and perhaps it could have if the Oil Crisis had not disrupted public environmental concern. However, the local anti-pollution movements were themselves highly strategic. They targeted particular individuals in government and factories in order to get them to do something, whether it be to stop pollution or to remedy existing damage. At the national level, there was no such strategic framework. The enemy was the state and monopoly capitalism, but who were the targets and what were the leverages of power that a national movement could use to fight environmental degradation and technocratic domination? From my reading of *Technology and Humans* and many other publications of the time, I believe that, for all their detailed analysis of the machinations of the state and industry, the enemy—state and capital—seemed to hover in the background, only vaguely identified. *Technology and Humans'* environmentalists were in a sense like Michel Foucault. They could tell you the micro-level workings of power and the

⁵⁹ Nishio Baku, "Shūen ni chikaduku genshiryokuhatsuden," *Gijutsu to ningen* (July 2002): 12-19. Amagasa Keisuke, "Ima baiotekunorojii wa dō natteiru no ka," *Gijutsu to ningen* (July 2002): 28-35.

system into which it fit, but they could not tell you how to undo that system beyond calling for a broad coalition of activists.

I argue that, despite the pessimism that soared in the wake of the Oil Crisis, *Technology and Humans*' editors and collaborators believed that a combination of good empirical knowledge and spontaneous, place-based activism would eventually succeed against industrial pollution, and in our present day we now witness a resurgence of this kind of thinking. One can look to, for example, Naomi Klein's *This Changes Everything: Capitalism vs. The Climate*, in which Klein argues that victory over climate change must come through interconnected grassroots, place-based activism against the "elites" of corporate capitalism.⁶⁰ Klein, moreover, believes that activism of this sort must be supported by the deployment of good, empirical and situated knowledge, along with the hope that rational, scientific arguments about the causes of climate change will help persuade the public to force governments to take drastic action.

We are now witnessing a second rupture in world politics brought about by an environmental crisis that once again offers an opportunity to fundamentally remake how we live our lives, consume things, and divvy up authority and power. In 1970s Japan *Technology and Humans* was part of an effort to resist the technocratic, high-modernist mode of governance and economic growth that had built Japan's postwar society as the magazine strove to find alternative visions for social and political life. The magazine's contributors in the first half of that decade had a hopeful optimism that something revolutionary could happen through grassroots activism. None of these visions came to fruition, but their practice and knowledge remain.

Here we must remember *Technology and Humans*' basic answer to the problem of

⁶⁰ Naomi Klein, *This Changes Everything: Capitalism vs. The Climate* (New York: Simon & Schuster Paperbacks, 2014), 295-336, 447.

giantization: have less stuff, consume fewer things, use fewer resources. In other words, humanity should not exceed demand and need by such gargantuan quantities for purposes that seem to have no logical reason. This was true then and now. However, like *Technology and Humans*' contributors did in the past, journalists, researchers in environmental studies, policymakers, and activists are today expending incredible amounts of intellectual effort to understand how that simple solution is systemically blocked. I hope that this dissertation has stirred interest in their story and the environmental problems surrounding it. I believe that their ethical commitment, tenacity, and critical spirit can provide inspiration for the present crisi

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