



# Hydraulic Taiwan: Colonial Conservation under Japanese Imperial and Chinese Nationalist Rule, 1895-1964

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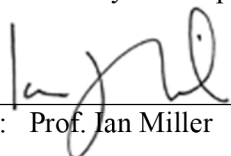
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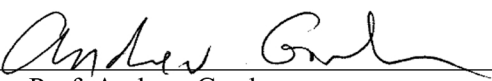
**Hydraulic Taiwan: Colonial Conservation under Japanese Imperial and Chinese Nationalist Rule, 1895-1964**

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March 29<sup>th</sup>, 2023

Hydraulic Taiwan:  
Colonial Conservation under Japanese Imperial and Chinese Nationalist Rule, 1895-1964

A dissertation presented  
by  
John Hitchcock Hayashi  
to  
The Department of History  
in partial fulfillment of the requirements  
for the degree of  
Doctor of Philosophy  
in the subject of  
History

Harvard University  
Cambridge, Massachusetts

March 2023



Hydraulic Taiwan: Colonial Conservation under Japanese Imperial and Chinese Nationalist Rule,  
1895-1964

Abstract

This dissertation presents conservation as a powerful historical force in Taiwan under Japanese colonial and early Republican Chinese rule. Unlike the Qing empire before it, the Japanese colonial state was committed to politically integrating Taiwan's mountainous interior and the indigenous peoples living there; Japanese forces fought brutal wars to suppress resistance and accomplish this. Historians have conventionally treated this history separately from the agrarian development, urbanization, acculturation, and industrialization that took place in the Han Chinese-dominated lowlands. Yet highland and lowland Taiwan were irrevocably linked in both material fact and historical process by the rivers that flowed down from the mountains into the sea. From the outset of colonial rule, scientists and colonial officials saw rivers as bearers of both great potential riches and existential threats. Conserving water became a way to expand supplies of existing resources, such as sugarcane, rice, and timber, while generating another vital resource—hydroelectricity—entirely anew.

Following destructive floods in the early 1910s, forestry scientists were increasingly successful in bringing attention to the causes of flooding in Taiwan's hills and mountains. Although natural processes, Japanese loggers, and Han settlers all contributed to worsening erosion, it was highland indigenes whose lifestyles were targeted for the most dramatic reform. Water conservancy was claimed as justification for the forced relocation of tens of thousands of indigenous peoples from mountain villages to the foothills, where they faced new ecological threats. This coincided with a shift in focus within flood control management from rivers, then river watersheds, and finally to reservoir watersheds created by dam construction. Hydroelectric development and the onset of

World War II intensified scrutiny on highland environments and people living amongst them. After 1945, the Republic of China government cooperated with American financial and technical backers to revive Japanese colonial plans for harnessing the island's rivers. Through locating hydraulic science and technology in relation to direct and indirect dispossessions experienced by diverse colonized peoples across two successive regimes in Taiwan, this dissertation gives an account of the island's integration. Tracing how ethnicized environmental rule took shape amidst this integration contributes to our understanding of modern conservation as science, practice, and social process.

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## Conventions

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This dissertation uses modified Hepburn romanization for Japanese and *Hanyu pinyin* for Chinese. Japanese and Chinese personal names are written with the given name following the surname. Exceptions occur in cases where individuals are recorded using a non-*pinyin* system for their name or following the Western order; both are common for Taiwanese historical figures and scholars. Place names in Taiwan are identified using Chinese-language names in *pinyin*, and/or Atayalic- or Bunun-language names for certain indigenous settlements, across periods of Japanese and Republican rule. Exceptions are Taipei (Taibei) and the Tamsui (Danshui) river. Characters are provided throughout for personal and place names.

Translations of the titles of Chinese- and Japanese-language works are provided in brackets in the footnotes and bibliography. In cases where authors included an English-language title in the original, I use their translation, even if ungrammatical or unidiomatic, for ease of reference.

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## Introduction—Colonialism, Conservation, and Taiwan’s Rivers

On September 3, 1895, Japanese naturalist Tashiro Yasusada (田代安定, 1857-1928) set out from Taipei to venture towards the city of Yilan (宜蘭), in Taiwan’s northeast (see Figure 0.1). The Japanese empire had gained sovereignty over Taiwan from Qing China less than six months prior as spoils of the First Sino-Japanese War (1894-1895) and was still waging a war against the insurgent Republic of Formosa elsewhere on the island. Yilan was on the edge of empire: under stable Japanese military control for the time being but remote and forbidding. Tashiro set about traversing the region and setting down observations about its land, plants, and customs. Assisting him were guides with a facility in Literary Chinese, which allowed for written conversations with local informants with whom he did not share a spoken language. As in many cross-cultural encounters within East Asia before the 20<sup>th</sup> century, Tashiro and his interlocutors wrote messages back and forth on a shared piece of paper—what is called “brush talk,” although Tashiro scrawled his notes in pencil. These scrawls tell us that Tashiro’s travels, even over short distances, proved difficult. Late summer rains lashed Taiwan, swelling rivers. On the afternoon of September 20, Tashiro came across a place where three villagers had just drowned while trying to cross the tumid “Muddy River,” and had to abandon his own plans to cross the river. That night, he stayed up late, locked in discussions with locals about the perennial scourge of flooding.<sup>1</sup>

Flooding was a both a logistical complication for Tashiro’s journey and a long-term barrier to Japan’s designs for its newest colony. In several locations, Tashiro came across rocky

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<sup>1</sup> The “Muddy River” is now called the Lanyang River (蘭陽溪). Tashiro’s given name was also read “Antei.” Tashiro Yasusada, *Giran junkai higoyomi dai-ichi toji* [Yilan tour daily record, part one], 1895, Tashiro Yasusada Collection, National Taiwan University Library, 15-18; Tashiro Yasusada, *Giran kiko dai-ni kan* [Yilan travel record, volume two], 1895, Tashiro Yasusada Collection, National Taiwan University Library, 26. These manuscript records lack page numbers in the original; my pagination follows the library’s digitized versions as available at <https://dl.lib.ntu.edu.tw/s/Tashiro/page/home>.

“wastelands” (荒廢地) that Han Chinese settlers had, over the preceding century or so, struggled to plant with ramie or sweet potato. Even if these farmers managed to clear debris and establish a crop, the floods would invariably come again. When that happened, rivers ramified into a chaotic web of ephemeral streams that carried gravel in them. River beds and banks shifted as “fragments of slate-rock” were deposited in their vicinity, laying the land to waste. Noting valiant but ultimately ineffectual efforts to improve these “wastelands” under Qing rule in Taiwan, Tashiro proposed that canals could be used to channelize the streams and reclaim the land for agriculture.<sup>2</sup> Over the long term, the same floods that brought gravel had also deposited leaves and twigs, which as they decomposed had fertilized the soil. Harnessing the plentiful water supplies to irrigate this fecund black soil could, Tashiro reported, turn it into one of the leading rice-growing regions in the island.<sup>3</sup>

While transforming the Yilan plain through riverine infrastructure could relieve the negative symptoms of flooding, the root cause of perennial inundations lay elsewhere. “These channels,” Tashiro wrote, “are the lower branches of rivers that come surging down from deep within the mountains of the faraway raw savage territory to the southwest.”<sup>4</sup> This was more than a straightforward geographical observation that rivers and floodwaters, along with the slate and sediment and risk they carried, flowed from headwaters in the mountains through the plains and into the sea. By identifying the origin of flooding in the “savage” mountains, Tashiro gestured towards a vast space that remained beyond the pale of Han settlement and beyond the ken of naturalists like himself but was nevertheless fundamental to the in fluvial processes that shaped the lowlands. This highland zone, which Japanese colonizers followed Qing precedent in calling the

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<sup>2</sup> Tashiro, *Giran junkai higoyomi*, 25, 28-29, 56.

<sup>3</sup> Tashiro Yasusada, *Giran junkai fukumeisho dai-ichi toji* [Yilan tour report, part one], November 15, 1895, Tashiro Yasusada Collection, National Taiwan University Library, 6.

<sup>4</sup> Tashiro, *Giran junkai higoyomi*, 25.

“savage territory” (蕃地), covered roughly half of Taiwan’s area at the dawn of Japanese rule. Home to most of the island’s indigenous peoples, it was separated from the rest of the island by the so-called “savage border” (蕃界) shown in Figure 0.2. Knowledge produced by men of science such as Tashiro was critical to Japan’s extension of imperial control over these montane environments and the indigenous peoples living amidst them.



Figure 0.1: “Taiwan Region,” a 1914 physical map of Taiwan from a Japanese geography textbook. Labeled here are key locations mentioned in this introduction. Rivers have also been accentuated, though the Lanyang river that flows through Yilan is missing. Note the upper-left inset map indicating Taiwan’s location relative to eastern China, the Korean peninsula, and southwestern Japan, and the Ryukyu islands.<sup>5</sup>

<sup>5</sup> Moriya Musubio 守屋荒美雄, *Saishin keitō chiri fuzū Nihon no bu* [Newest system of geography, attached maps, Japan section] (Tokyo: Sugimoto kōbun-kan, 1914), map #21. Hiroshima University Library Textbook Collection Database, <https://dc.lib.hiroshima-u.ac.jp/text/metadata/4547>.

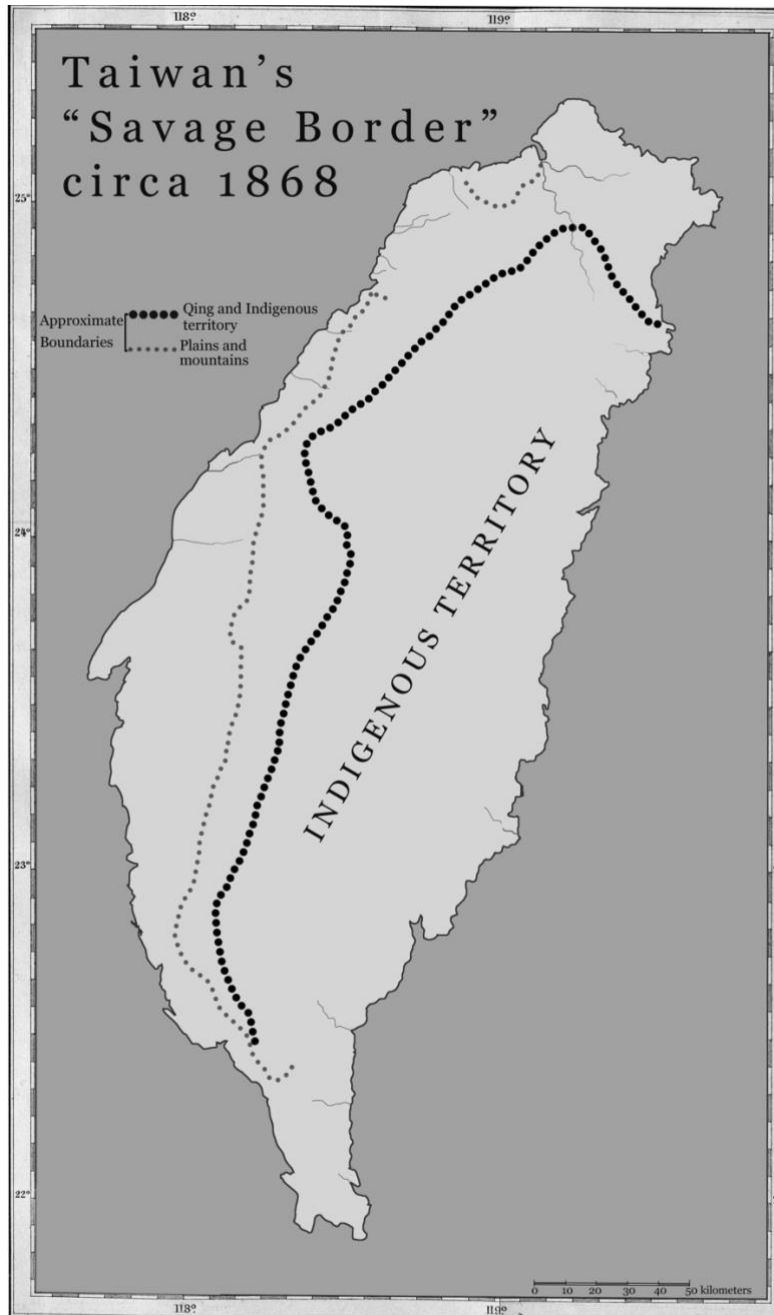


Figure 0.2: The approximate extent of Qing rule in 1868. While not a hard border, this was similar to the division encountered by the Japanese in 1874 and 1895 (see below).<sup>6</sup> From the original map I have preserved coastlines, river courses, and the two lines marking the “savage border” and the boundary between the plains and mountains.

<sup>6</sup> Map by author and based on: Guérin and Bernard, “Ile de Formose avec indication de l'emplacement des tribus aborigènes” [The Island of Formosa with indication of the location of aboriginal tribes], *Bulletin de la Société de Géographie de Paris 5th series* 15 (1868): 636. Original image from “Formosa Nineteenth Century Images,” Reed College, <https://rdc.reed.edu/i/ec9168a0-526d-4d6f-9c44-19aa8a413308>.



This dissertation is an environmental history of Taiwan's rivers under Japanese and early Chinese Republican rule. Scholars of this period have conventionally followed enduring administrative divisions and approached Taiwan in bifurcated terms—addressing either the agriculturally productive and densely populated Han lowlands or the heavily forested and sparsely populated indigenous highlands. I show instead that because rivers and streams transected the “savage border,” they troubled this fundamental divide in two ways. First was through the downstream physical drainage of the mountains into the plains. Second was the upstream movement of colonial rule snaking up through rivers, which in its pursuit of resources and environmental control knit Taiwan together in new ways. As early as 1895, Tashiro Yasusada recognized the twinned threat of flooding and promise of irrigation produced by the high volume of water that, under certain conditions, would come crashing down from the mountains. Soon after, Japanese engineers identified the potential energy of these steep streams as a source of hydroelectric power and the key to electrifying the island. Foresters saw in the threat of flooding and topsoil loss as an incentive to preserve and protect woodlands across Taiwan's mountains—at the expense of land use claims by Han and indigenous peoples alike. These conservationist concerns of foresters had a great impact on colonial police who sought to transform the ways that highland indigenes used water, soil, and fire in the name of protecting montane headwaters. Across various institutional, geographic, and disciplinary contexts, I show how harnessing water came to lie at the heart of Japanese efforts to make the island colony pliant, productive, and predictable.

Regimes across world history have long emphasized control over rivers in producing and protecting resources. This dissertation highlights two distinctive aspects of the variation on this global theme that played out in Taiwan from the late nineteenth through the mid-twentieth century. The first has to do with how colonial scientists, through use and fear of rivers, came to define Taiwan's environment in terms of its watersheds. In the abstract, the concept of the watershed is a

straightforward description of physical drainage patterns (“catchment area” and “drainage basin” are synonymous terms). One need only look at a topographical map to determine which areas of Yilan’s hinterlands, for example, belong to the Lanyang river watershed, in which all snowmelt, rivulets, and streams flow into the Lanyang on their way into the ocean. Nevertheless, the historical process by which scientists and states came to define water, rivers, and environmental protection in terms of watersheds was contested and contingent.<sup>7</sup> Even as Tashiro Yasusada dreamt in 1895 of mitigating floods and improving irrigation on the plains, he did not propose measuring—much less managing—the entire Lanyang watershed. This began to shift in the early 1910s, when destructive flooding across the island coincided with Japan’s conquest of highland indigenous peoples. Recognizing the opportunity for a conservation that reached deeper into the mountains, Japanese forestry scientists and engineers advocated for what I call “upstream thinking”: an approach to flood control that emphasized managing the upper reaches of watersheds as a way to protect downstream locales. The unit of the watershed was crucial to subsequent interventions ranging from new forms of hydrologic measurement to the construction of large dams. Impounding rivers meant that dams, in turn, produced and depended upon their own watersheds. These watersheds remain a fundamental unit for the management Taiwan’s vast mountainous interior.

This fixation on physical drainage also invited scrutiny on social questions. This dissertation’s second main argument has to do with what I term “colonial conservation,” the governing strategy applied not just to watersheds but to the people living within them. Colonial conservation was predicated on the mass expropriation of indigenous land and justified further dispossessions in the pursuit of protecting water, soil, flora, and fauna. Amongst these, this

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<sup>7</sup> For similar developments in the United States and Europe, see Joshua M. Nygren, “The Bulldozer in the Watershed: Conservation, Water, and Technological Optimism in the Post-World War II United States,” *Environmental History* 21, No. 1 (2016): 125-136; Marc Landry, “Environmental Consequences of the Peace: The Great War, Dammed Lakes, and Hydraulic History in the Eastern Alps,” *Environmental History* 20, no. 3 (2015) 3: 422-448.

dissertation focuses on water and soil, the constituent factors of a watershed, and in addition, trees, which store moisture and stabilize soil. I outline the ways in which science defined highland Atayalic and Bunun peoples in northern and central Taiwan in particular as enemies of conservation on the basis of their environmental practice.<sup>8</sup> Resulting reforms were often violent, and they structured state-indigene-environment dynamics in ways that persisted under Chinese Republican (*Guomindang* or GMD) rule after World War II. Beyond analyzing scientific discourse that subsumed indigenous epistemologies as it cast native lifeways—such as swidden agriculture—as backwards, I show how colonial technology materially transformed indigenous land use. Native peoples resisted, refracted, or complied with colonial conservation in diverse ways. Amongst Japanese colonial scientists and officials, there was likewise disagreement over the stakes and strategies of exclusionary conservation. Ultimately, however, I argue for seeing conservation as a powerful force deeply implicated in the conquest of the highlands and the dispossession of their peoples.

*The Beautiful Island: Taiwan through 1895*

Where did those highlands come from? In the long view, Taiwan was first its mountains. Colliding tectonic plates formed the vertiginous, jagged Central Mountain Range, which runs down the island's spine. Taiwan's long, skinny shape formed rivers that, in geological history as today, are generally quite short (see Figure 0.1). Steepness and a susceptibility to erosion, when combined with plentiful precipitation, could easily transform small mountain streams into raging, turbid torrents that rushed down to the sea. Beginning millions of years ago, this basic motion—water washing sediment down from the mountains—started the slow process of sedimentation that formed the island's lowland alluvial plains. Rivers are thus not just a geographical feature that inevitably links

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<sup>8</sup> “Atayalic” (or “pan-Atayal” 泛泰雅族) includes the Atayal, Sediq, and Truku peoples. All speak related languages, and historically authors writing in Japanese, Chinese, and English often collapsed the latter two groups under the umbrella “Atayal.”

trickles on the highest mountaintop to a gushing river mouth at sea level; they are the main geologic mechanism by which an eroding highland gave birth to a lowland by the sea.

Humans have lived in Taiwan for tens of thousands of years. Early inhabitants are identified with Austronesian languages and are hypothesized to be the ancestors of not just Taiwan's modern indigenous peoples but all Austronesian peoples spanning from Madagascar to Hawai'i. Sparsely but broadly settled across the island, these diverse original inhabitants had relatively little contact with outside peoples until the 17<sup>th</sup> century. It was then that mass migration of people from the nearby Chinese provinces of Fujian and Guangdong intersected with Spanish and Dutch colonial ventures centered, respectively, around Taipei and Tainan.<sup>9</sup> The resulting "co-colonization" of Taiwan by European powers and Han Chinese settlers resulted in sweeping transformation and displacement.<sup>10</sup> Indigenous peoples who had lived in the plains and foothills of western and northern Taiwan (most of the island's low-elevation territory outside of narrow plains in the east) were killed, gradually assimilated into Chinese language and customs, or driven into the mountains. The descendants of this final group, along with those already living in the mountains, include the Atayalic and Bunun peoples on whom this dissertation focuses.

The Qing dynasty (1636-1912), founded in 1636 by the Manchu people of northeast Asia, conquered China and brought about the collapse of the Ming dynasty (1368-1644). In 1683, decades after consolidating control over mainland China, it finally wrested Taiwan from the Zheng family, a powerful organization that supported Ming restoration and had itself dislodged the Dutch East India company from its stronghold in southwestern Taiwan. Over two centuries of Qing rule, profound

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<sup>9</sup> Tonio Andrade, *How Taiwan Became Chinese: Dutch, Spanish, and Han Colonization in the Seventeenth Century* (New York: Columbia University Press, 2008).

<sup>10</sup> This dissertation usually uses the term "Han" to describe the majority settler population of Taiwan: speakers of Chinese languages including Hoklo and Hakka whose ancestors came from southeastern mainland China between the 17<sup>th</sup> and 20<sup>th</sup> centuries. This is a choice made in recognition of the confusion invited by the terms "Chinese" or "Taiwanese." There were, naturally, many individuals who occupied ambiguous or multiple ethnic identities.

changes initiated by early waves of Han settlement accelerated. Grasslands previously filled with immense herds of thousands of deer gave way to rice paddies as the Han population expanded and the Qing state sought a taxable agricultural surplus.<sup>11</sup> Clearing vegetation for farmland accelerated erosion, filling wetlands with silt and causing river channels to shift.<sup>12</sup>

These changes in the land coincided with a growing contrast between lowland and highland that was at once environmental and ethnic. Qing officials and writers began to classify Taiwan's indigenous peoples as either docile “cooked savages” or hostile “raw savages”, or less chauvinistically, as either “plains tribes” or “high mountain tribes.” The former lived in proximity to Han areas, adopted Chinese languages and customs, grew rice in paddies, and held tax obligations, while the latter were scattered across the vast areas of Taiwan's interior and east that had negligible Qing state or Han settler presence.<sup>13</sup> In the 1700s, Qing rulers had no ambition of conquering so-called “raw savages” and unifying the island politically. Instead, for the purpose of frontier management they established the so-called “savage border” demarcating the rough edge of effective Qing jurisdiction.<sup>14</sup>

The fact that so much territory and so many inhabitants remained meaningfully outside of Qing authority on the island would come to propel the first Japanese imperial incursion on Taiwan. In 1871, 54 sailors from the Ryukyu islands in southwestern Japan were shipwrecked near Mudan at

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<sup>11</sup> Andrade, *How Taiwan Became Chinese*; John Robert Shepherd, *Statecraft and Political Economy on the Taiwan Frontier, 1600-1800* (Stanford: Stanford University Press, 1993).

<sup>12</sup> Ku Ya-wen 顧雅文, *Xunsu: yu Zengwenxi de bainian duibua* [Tracing a River: Water History and Water Culture of the Zengwen River] (Taizhong: Jingjibu shuilishu shuili guihua shiyansuo, 2022), 50-51.

<sup>13</sup> The categories of “cooked” and “raw” savage had a long history in Chinese thought before this period: Frank Dikötter, *The Discourse of Race in Modern China* (Stanford: Stanford University Press, 1992), 8-10. Topography was not necessarily determinative, as evidenced by the fact that Amis and Tao of lowland eastern Taiwan were considered “raw savages.” This persisted all the way through the mid-20<sup>th</sup> century, when GMD leadership finally dispensed with “savage” labels and instead paradoxically termed them “plain mountain compatriots” (平地山胞).

<sup>14</sup> Antonio Tavares, “Crystals from the Savage Forest: Imperialism and Capitalism in the Taiwan Camphor Industry, 1800-1945” (PhD diss., Princeton University, 2004), 111-118.

Taiwan's southern tip (see Figure 0.1) and, following various standoffs, killed *en masse* by local Paiwan peoples. Japan, facing down the threat of Western imperialism, had recently undergone a regime change in the Meiji Restoration (1868) and sought to assert its authority over the Ryukyus, which had only been partially subordinated to Japanese authority between 1609 and the 1870s. Responding to the massacre and bolstering Japan's position in the Ryukyus eventually motivated the Japanese Imperial Army to launch a punitive mission to southern Taiwan. Japan's Taiwan Expedition of 1874 asserted the right to invade Taiwan and bring the responsible parties to justice on the basis that the killed Ryukyu sailors were Japanese subjects. Because Qing sovereignty did not penetrate beyond the "savage border," the argument went, it fell to Japan to avenge the murder of its subjects in a lawless zone.<sup>1516</sup>

Under internal and external pressure, Japanese military forces withdrew in late 1874, winning an indemnity from the Qing empire and a recognition of Japanese claims to the Ryukyu islands. Dozens of Paiwan and hundreds of Japanese had died, the latter overwhelmingly from malaria. Nevertheless, the threat of Japan as a bellicose neighbor with imperial ambitions, along with the growing importance of Taiwan's agricultural exports, spurred Qing rulers to revise their approach to Taiwan.<sup>17</sup> Remote regions and the "raw savages" were to be integrated under a policy of "opening the mountains and pacifying the savages" (開山撫番). Administrative reforms involving separating first Taipei and later the whole island from Fujian Province elevated Taiwan's importance in the Qing Empire. As Taiwan Province's first governor from 1887 to 1891, Liu Mingchuan (劉銘傳)

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<sup>15</sup> Robert Eskildsen, *Transforming Empire in Japan and East Asia: the Taiwan Expedition and the Birth of Japanese Imperialism* (Singapore: Palgrave Macmillan, 2019).

<sup>16</sup> Danny Orbach makes the important point that this resulted not from a consensus decision but rather the unsanctioned action of Lieutenant General Saigō Tsugumichi: "By Not Stopping": The First Taiwan Expedition (1874) and the Roots of Japanese Military Disobedience," *The Journal of Japanese Studies* 42, no. 1 (2016): 29-55.

<sup>17</sup> Taiwan's global economic import was elevated after the 1858 Treaty of Tianjin, one of the "unequal treaties" forced on the Qing empire by Western powers, opened ports near Taipei and Tainan to foreign trade.

oversaw efforts to transform Taipei into a modern, Western-style city while brutally subjugating northern indigenes and seizing greater control over resource extraction in their lands.<sup>18</sup> The scope of Liu's accomplishments was limited: the railway tracks laid numbered a few dozen kilometers, attempts at introducing electric illumination were abortive (see Chapter I), and “savage pacification” was geographically quite constrained. In a short duration of time and against political opposition, late Qing initiatives fell far short of their goals but nevertheless provided a durable set of templates for Japanese colonial rule. When Japan took over control of Taiwan from the Qing in 1895, there was thus already momentum pushing towards the island's integration.

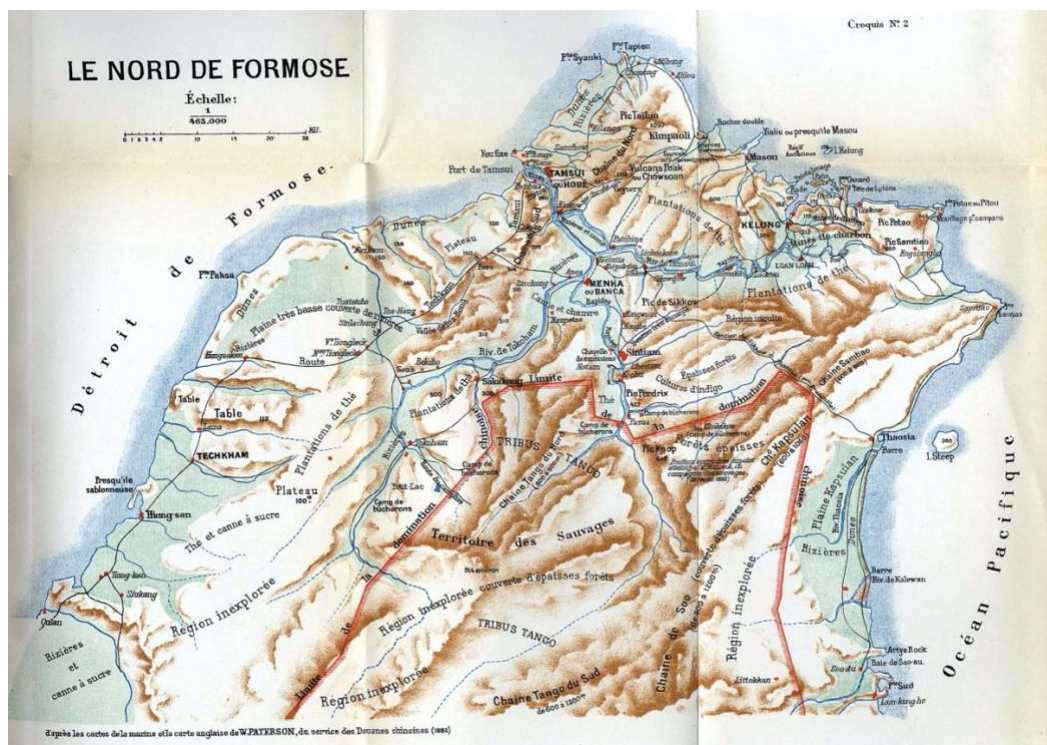


Figure 0.3: “The North of Formosa.” The area labeled “Menka ou Banca” is now Wanhua, central Taipei. Note that much of the highland territory enclosed by the red (savage) border is marked as unexplored. This includes the dotted lines that are little more than guesses of rivers’ upper branches. “Formosa” was a common European name for Taiwan from the 16<sup>th</sup> through 20<sup>th</sup> centuries.<sup>19</sup>

<sup>18</sup> Emma Jinhua Teng, *Taiwan's Imagined Geography: Chinese Colonial Travel Writing and Pictures, 1683-1895* (Cambridge, MA: Harvard University Asia Center 2004), 209-236.

<sup>19</sup> Eugene Germain Garnot, “Le nord de Formose (Croquis. No. 2)” [North Formosa (Sketch No. 2)], in *L'expédition Française de Formose, 1884-1885* (Paris: Librairie Ch. Delagrave, 1894), 16. From “Formosa Nineteenth Century Images,” Reed College, <https://rdc.reed.edu/i/819da13a-23a1-4fa6-9d6a-241c9a34cab2>.

Nascent in the late nineteenth century was a spatial sense of Taiwan's rivers as originating in particular mountain valleys and flowing across the "savage border" into the foothills and plains. Where once there had been blanks on the map, cartographic representations began offering more detailed depictions of the "transmontane territory" (後山) in eastern and highland Taiwan.<sup>20</sup> The 1894 French map in Figure 0.3 provides a snapshot from the eve of Japanese rule: note how rivers trail off into indistinct dotted lines in their upper reaches. Responsible for this growing interest, among other factors, were the camphor laurels (*Cinnamomum camphora*) growing in large stands across mid-elevation areas of central and northern Taiwan. Harvested and processed into crystals and oil, camphor was an indispensable part of the growing global celluloid industry in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries. As a crucial camphor supplier, Taiwan drew interest and investment from around the world. The label of "woodcutters' camps" (*camps de bûcherons*) labeled in Figure 0.3 marks the locations of camphor harvesting zones right along the "boundary of Chinese dominion" (*Limite de la domination chinoise*)—the so-called savage border. On the ground, the camphor boom manifested in the violent expansion of Han, and later Japanese, extraction and settlement of the mountains.

Continuities from the Qing into the Japanese period are intricate when it comes to the camphor trade. Such connections between late imperial Chinese rule do not characterize the subject of this dissertation. Unlike camphor, rivers did not draw colonial capital, authority, and violence into the indigenous highlands before the Japanese empire took control of Taiwan. This was not because successive waves of colonists had an easy relationship with the island's unruly rivers. In the 1650s, for instance, relentless siltation made it difficult for the Dutch East India Company to maintain a navigable channel between its base at Fort Zeelandia, near modern-day Tainan, and the sea. Frustrated mariners anchored offshore rather than run aground, slowing down shipping, but amidst

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<sup>20</sup> Teng, *Taiwan's Imagined Geography*, 233-234.



their consternation Company officials accepted that the siltation was a natural process that they could do little to arrest.<sup>21</sup> Flooding and susceptibility to erosion were also exacerbated by the conversion of grassland into farmland across the western plains. Qing responses to periodic flooding included providing emergency aid, temporarily reducing tax obligations, and rebuilding bridges and canals.<sup>22</sup> But neither these efforts nor extensive modifications made to waterways for irrigation purposes amounted to pushing upstream in order to control a river, much less a watershed. While Qing rule left a complex legacy for Imperial Japan and, later, Republican Taiwan, aspirations to master over waterways was something new that emerged gradually after 1895.

*Literature Review: Connecting Colonialisms*

When Tashiro Yasusada noted that the same rivers that brought floods to the lowlands also transected the divide between the indigenous highlands and the Han and Japanese lowlands, he was anticipating later Japanese colonial arguments about flood control as a problem of upland watershed management. This linking through rivers of Taiwan's two ethnically and politically distinct zones was significant historically and, I show below, also relates to one of this dissertation's interventions in the historiography of Taiwan. Tracing this type of watershed thinking forward beyond Japanese rule into the Republic of China period of World War II constitutes a second intervention.

Japan's anti-indigene colonial wars succeeded in quelling mass resistance but failed in their goal of true integration. Paul Barclay has argued that "fiscal exhaustion" led the Japanese colonial government, by 1914, to abandon its ambition to absorb the aboriginal zone behind the "savage

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<sup>21</sup> J.L. Blusée et al, ed., *De dagregisters van het kasteel Zeelandia, Taiwan 1629-1662, Deel III: 1648-1655* [The day registers of Fort Zeelandia, Taiwan, 1629-1662, Volume III: 1648-1655] (The Hague: Instituut voor Nederlandse Geschiedenis, 1996), 172-174.

<sup>22</sup> Yu-ju Lin 林玉茹, "Qingdai Taiwan de hongshui zaihai" [Flood disasters in Qing-era Taiwan], *Taiwan wenxian jikan* 49, no. 3 (1998): 83-104.

border” and the people living there into the “normal” colonial administrative apparatus that governed lowland, Han areas; Taiwan’s indigenous peoples as such and the distinct legal regime that still applies to them are the result.<sup>23</sup> The persistent division between what we might call Han Taiwan and indigenous Taiwan is reflected in, and even reinforced by, historical scholarship. Taiwanese history has come into its own in the past few decades, as Taiwan’s liberalization following the end of martial law in 1987 has gradually facilitated archival access and institutional support. Amidst this efflorescence, however, a bifurcation in scholarship has largely persisted.<sup>24</sup> By demonstrating that colonial scientists linked the lowland requirements for electricity or flood protection to highland landscapes and their peoples, I highlight one vein of connection that thinking about Taiwan in ethnically bifurcated terms overlooks.<sup>25</sup> This helps locate lowland concerns in topics that are often approached as residing wholly within indigenous history, such as the sedentarization of highland swiddeners, and simultaneously writes indigeneity into the economic and technological aspects of Japanese imperial history. In my account of Taiwan’s integration, seemingly peripheral places, peoples, and practices acquired weighty, shifting significance for both the island holistically and, until 1945, the Japanese empire broadly. As a matter of policy, elevating the periphery’s importance often served to drive native dispossession—I do not take this linkage of the highland to the lowland and beyond as natural or inevitable. As a matter of historical methodology, however, making these

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<sup>23</sup> Paul Barclay, *Outcasts of Empire: Japan’s Rule on Taiwan’s “Savage Border,” 1874-1945* (Oakland: University of California Press, 2017), 34.

<sup>24</sup> Exceptions include Leo Ching, *Becoming “Japanese”: Colonial Taiwan and the Politics of Identity Formation* (Berkeley: University of California Press, 2001); in contemporary anthropology, see Tomonori Sugimoto, “Claiming Space, Land, and Ecology: Mapping Geographies of Indigenous and Decolonial Urbanisms in Taipei,” *International Journal of Urban and Regional Research*, published online November 24, 2022, publication in print forthcoming.

<sup>25</sup> Scholarship on rivers in Taiwan that treats both lowland and highland includes Su-bing Chang 張素玢, *Zhuoshuixi sanbai-nian: lishi, shehui, huanjing* [Three-hundred year history of the Zhuoshui River: history, society, environment] (New Taipei City: Weicheng chuban, 2014); Ma Chu-Chiang 馬鉅強, “Rizhi shiqi Taiwan hechuan zhengce yanjiu” [The Study of Taiwan’s River Policy in the Period of Japanese Rule—the Focus of Water Control] (PhD Diss., National Cheng Kung University, 2015).

arguments requires following these connections across sub-disciplinary divides.

As an environmental history attentive to the non-living entities of rivers, silt, and infrastructure, this dissertation strives to bridge not only the often-separate realms of Han and indigenous history but also the distinct periodizations of Japanese colonial and Chinese Republican history. In doing so, it aligns with a growing body of trans-World War II scholarship. A good deal of work on the Japanese home islands has, in the past few decades, rejected a hard division between “prewar,” “wartime,” and “postwar” history. Historian Komagome Takeshi, a specialist on colonial Taiwan, called in 2009 for such an approach to be developed for the history of Taiwan as well.<sup>26</sup> Since then, a number of studies have pioneered this transwar framing in Taiwan as they simultaneously advanced the study of Republican Taiwan as history; parallel trends have characterized work on other regions in Japan’s empire.<sup>27</sup> That the Japanese empire deeply shaped the post-1945 history of the territories it occupied is incontestable. Understanding *how* this happened, however, requires close research. This dissertation will make clear that although the Republic of China brought a distinct administrative system along with roughly one million Mainland Chinese to Taiwan after losing the Chinese Civil War, it still inherited and was transformed by the Japanese legacy. Some of this can be explained as the momentum carried forward by the “envirotechnical system” of highland rivers, dams, and land use prescriptions.<sup>28</sup> This inheritance from Japanese

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<sup>26</sup> Komagome Takeshi 駒込武, “Taiwan-shi kenkyū no dōkō to kadai—gakusaiteki na Taiwan kenkyū no tame ni” [Directions and Issues in Research on Taiwanese History—For Interdisciplinary Research on Taiwan], *Nihon Taiwan gakukai-bō* 11 (2009): 75-89.

<sup>27</sup> Chang, *Zhuosbuxi sanbai-nian*; Andrew D. Morris, *Colonial Project, National Game: A History of Baseball in Taiwan* (Berkeley: University of California Press, 2010); Matsuoka Tadasu 松岡格, *Taiwan genjūmin shakai no chibōka: mainoriti no 20-seiki*, [The regionalization of Taiwanese indigenous society: a minority’s 20<sup>th</sup> Century] (Tokyo: Kenbun Shuppan, 2012); On Korea, see Hannah Shepherd, “Cities into Empire: Fukuoka, Pusan, and Japan’s Imperial Urbanization, 1876-1963” (PhD diss., Harvard University, 2018); on Manchuria, Victor Seow, *Carbon Technocracy: Energy Regimes in Modern East Asia* (Chicago: University of Chicago Press, 2021).

<sup>28</sup> Sara B Pritchard defines envirotechnical systems as “inextricably embedded environments and technologies that continually reshaped individual parts of the system and the whole” in *Confluence: The Nature of Technology and the Remaking of the Rhône* (Cambridge, MA: Harvard University Press, 2011) 19. Her conception of systems draws from the “technological systems” described in Thomas P Hughes, *Networks of Power: Electrification in Western Society, 1880-1930*

Taiwan was layered with Cold War-era American technical assistance, which, as in Japan and elsewhere around the world, promoted massive multi-purpose dams as an ultimate technology of economic development and environmental control.<sup>29</sup> Amidst these powerful structural forces, I also locate agency with particular individuals and groups. As happened elsewhere in the empire, for instance, technical specialists were some of the last Japanese residents to leave Taiwan after World War II, being retained to, for example, draw up Sun Moon lake headwater conservancy plans for the Republican government. I thus contribute to the burgeoning interest in the dismantling of the Japanese empire and concomitant building of the Cold War order.

Beyond East Asia, *Hydraulic Taiwan* speaks to the global histories of colonialism and conservation. High imperialism in the 19<sup>th</sup> and 20<sup>th</sup> centuries fed and was fueled by a “great acceleration” in fossil fuel consumption and human transformation of the global biosphere. Historians have sought to clarify the ways in which colonial power both accelerated environmental destruction and sought to protect natural resources—if only so that it might better harvest them over a long period. Colonized peoples, who had their own customs and purposes for using the natural endowments reconceptualized as “resources,” all too easily became obstacles to these

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(Baltimore: Johns Hopkins University Press, 1983). My account of system momentum is likewise indebted to *Networks of Power*, especially pp. 15-17, and Hughes, “Technological Momentum,” in *Does Technology Drive History? The Dilemma of Technological Determinism*, ed. Leo Marx and Merritt Roe Smith (Cambridge, MA: The MIT Press, 1994), 141-150.

<sup>29</sup> Christopher Sneddon, *Concrete Revolution: Large Dams, Cold War Geopolitics, and the US Bureau of Reclamation* (Chicago: University of Chicago Press, 2015). On Japan and its (former) empire, see the work of Eric Dinmore and Aaron Stephen Moore: Dinmore, “Concrete Results? The TVA and the Appeal of Large Dams in Occupation-Era Japan,” *Journal of Japanese Studies* 39, no. 1 (2013): 1-38; Dinmore, “High-Growth Hydrosphere: Sakuma Dam and the Socionatural Dimensions of ‘Comprehensive Development’ Planning in Post-1945 Japan,” in *Environment and Society in the Japanese Islands: From Prehistory to the Present*, ed. Bruce L. Batten and Philip C. Brown (Corvallis, OR: Oregon State University Press, 2015), 114-135; Moore, *Constructing East Asia: Technology, Ideology, and Empire in Japan’s Wartime Era, 1931-1945* (Stanford: Stanford University Press, 2013); Moore, “Japanese Development Consultancies and Postcolonial Power in Southeast Asia: The Case of Burma’s Balu Chaung Hydropower Project,” *East Asian Science Technology, and Society* 8 (2014): 297-322. Recent works within the vast global literature on large dams includes Xiangli Ding, “The Yellow River Comes from Our Hands: Silt, Hydroelectricity, and the Sanmenxia Dam, 1929-1973,” *Environment and History* 27, no. 4 (2021): 665-694; Christine Folch, *Hydropolitics: The Itaipu Dam, Sovereignty, and the Engineering of Modern South America* (Princeton: Princeton University Press, 2019); Matthew P. Johnson, “Temples of Modern Pharaohs: An Environmental History of Dams and Dictatorship in Brazil, 1960-1990s” (PhD Diss., Georgetown University, 2021); Stephan F. Miescher, *A Dam for Africa: Akosombo Stories from Ghana* (Bloomington: Indiana University Press, 2022); Jerome Whittington, *Anthropogenic Rivers: The Production of Uncertainty in Lao Hydropower* (Ithaca: Cornell University Press, 2019).

processes. The ideal of modern scientific forestry, for instance, imagined forests as empty of humans, save perhaps for enlightened managers and their employees. National parks, monuments to “untrammled” wilderness, also required the removal of people living within them. Discourses of native practice as backwards, uncivilized, and ecologically harmful were taken to justify enclosure and seizure of vast swaths of land.<sup>30</sup> At the same time, such a condescending attitude was compatible with an appropriation of native knowledge into colonial technoscience.<sup>31</sup>

Japan’s imperial expansion, motivated particularly during the Second World War by resource capture, exhibited similar dynamics to those of Western empires. Historians of Japan have recently drawn greater attention to environmental dimensions of empire-building, from the colonial animals put on display in the heart of Tokyo to the offshore expansion of fishing fleets across the Pacific.<sup>32</sup> David Fedman has made clear that because the empire supplied much of its raw material from the forests of the Korean peninsula, it subjected people living there to both accusations of recklessness and a regime of “slow violence” resource restriction. Similarly focusing on woodlands, Komeie Taisaku has shown how Japanese forestry described swidden agricultural practices in divergent terms across the home islands (in premodern and modern periods), colonial Korea, and colonial Taiwan.<sup>33</sup>

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<sup>30</sup> On imperial forestry, see Ramachandra Guha and Madhav Gadgil, “State Forestry and Social Conflict in British India,” *Past & Present* 123 (1989): 141-177; S. Ravi Rajan, *Modernizing Nature: Forestry and Imperial Eco-Development 1800-1950* (Oxford: Oxford University Press, 2006); Thaddeus Sunseri, *Wielding the Ax: State Forestry and Social Conflict in Tanzania* (Athens, OH: Ohio University Press, 2009). Even among a settler population, elite conservation could condemn lower-class land uses. For the case of the American West, see Louis Warren, *The Hunter’s Game: Poachers and Conservationists in the Twentieth-century America* (New Haven: Yale University Press, 1997); Mark David Spence, *Dispossessing the Wilderness: Indian Removal and the Making of the National Parks* (New York: Oxford University Press, 1999); Karl Jacoby, *Crimes Against Nature: Squatters, Poachers, Thieves, and the Hidden History of American Conservation* (Berkeley: University of California Press, 2003).

<sup>31</sup> Yuting Dong, “Colonizing Manchuria: The Translation of Indigenous Practice into Colonial Expertise in the Construction of Japan’s Empire in Northeast China, 1905-53” (PhD diss., Harvard University, 2021).

<sup>32</sup> Ian Jared Miller, *The Nature of the Beasts: Empire and Exhibition at the Tokyo Imperial Zoo* (Berkeley: University of California Press, 2013); William M. Tsutsui, “The Pelagic Empire: Reconsidering Japanese Expansion,” in *Japan at Nature’s Edge: The Environmental Context of a Global Power*, ed. Ian Jared Miller et al. (Honolulu: University of Hawai’i Press, 2013), 21-38.

<sup>33</sup> David Fedman, *Seeds of Control: Japan’s Empire of Forestry in Colonial Korea* (Seattle: University of Washington Press, 2020); Komeie Taisaku 米家泰作, *Mori to hi no kankyōshi: kinsei, kindai Nihon no yakibata to shokusei* [An environmental

Korea, which became a Japanese protectorate in 1905 and a territory in 1910, exhibited particularly close ties with Taiwan; although not the subject of this dissertation, a number of foresters and officials introduced below worked first in Taiwan before moving to positions in Korea or elsewhere in the empire. At the same time, Taiwan's subtropical and tropical environments functioned as a key site for knowledge production oriented at Japanese southwards expansion.<sup>34</sup>

Several features distinguish *Hydraulic Taiwan* within this literature on Japanese and global colonial environmental history.<sup>35</sup> First is the centrality of rivers to my analysis. My chapters cover topics including hydroelectric generation, war, lowland flooding, forest protection, indigenous environmental knowledge, and forced relocation. This ranges somewhat more broadly than many of the works that have innovated the genre of “river biography.”<sup>36</sup> Uniting these diverse concerns, I argue, were the ways that all were locked in with watershed thinking and practice. In my account, a focus on water, soil, and their transport, links river history tightly to the subfields of forest and engineering history, while touching the history of medicine and indigeneity as well. Aspects of the overarching importance of watersheds here have to do with particularities of Taiwan's geography and the institutional structures my actors were situated within. At the same time, the rise of the watershed as a unit of environmental governance was a global phenomenon, one which I present this dissertation as a case study of.

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history of forest and fire: swidden agriculture and vegetation in early modern and modern Japan] (Kyoto: Shibunkaku shuppan, 2019).

<sup>34</sup> Seiji Shirane, *Imperial Gateway: Colonial Taiwan and Japan's Expansion in South China and Southeast Asia, 1895-1945* (Ithaca: Cornell University Press, 2022).

<sup>35</sup> My understanding of colonial conservation perhaps resonates most closely with the “environmental rule” described in Pamela D. McElwee, *Forests are Gold: Trees, People, and Environmental Rule in Vietnam* (Seattle: University of Washington Press, 2016).

<sup>36</sup> For a useful overview, see Matthew Evenden, “Beyond the Organic Machine? New Approaches in River Historiography,” *Environmental History* 23, no. 4 (2018): 698-720. Seminal early works in the subfield include Richard White, *The Organic Machine: Remaking the Columbia River* (New York: Hill & Wang, 1995); Donald Worster, *Rivers of Empire: Water, Aridity, and the Growth of the American West* (New York: Pantheon Books, 1985).

Another distinctive feature of my case is that many, though not all, of my actors made a case for what Pamela McElwee calls “environmental rule” without describing drastic environmental degradation.<sup>37</sup> Unlike Ceylon’s highlands, Lesotho’s gullies, or southern Korea’s denuded “bald mountains,” Taiwan’s mountains were not in a state of acute crisis.<sup>38</sup> While erosion and typhoons created real threats, the *prospect* of future harm was paramount to how officials and foresters constructed highland indigenes as a threat to watersheds. This prospect was inextricable from ways in which colonial power viewed the same peoples as a threat to public order and state authority. Situating native dispossession within a material context thus allows us to see how indigeneity in Japanese and Chinese Republican Taiwan had a prominent environmental dimension, one counterpoised against an East Asian ideal of settled wet-rice agriculture. Taiwan, with its layered history of colonizations and diverse peoples, is a particularly rich site to explore this.

#### *Dissertation Structure*

Bookending this dissertation are the commencement of Japanese rule in Taiwan in 1895 and the completion of the Shimen Dam in 1964. These seventy years saw changes on the island no less dramatic than elsewhere in the world during the same time period: urbanization, electrification, massive population growth, political consolidation and, after World War II, regime change. This shifting context and the range of topics I discuss require an equally broad array of sources. The Japanese colonial state was nothing if not dedicated to record-keeping, and reams of documentation survive from the Government-General and its employees. The Republic of China on Taiwan and its

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<sup>37</sup> Pamela D. McElwee, *Forests are Gold: Trees, People, and Environmental Rule in Vietnam* (Seattle: University of Washington Press, 2016).

<sup>38</sup> James L. A. Webb, Jr., *Tropical Pioneers: Human Agency and Ecological Change in the Highlands of Sri Lanka, 1800-1900* (Athens: Ohio University Press, 2002); Kate Barger Showers, *Imperial Gullies: Soil Erosion and Conservation in Lesotho* (Athens: Ohio University Press, 2005); Fedman, *Seeds of Control*.

international partners similarly left behind rich materials. Particularly important for accessing the work of scientists and police are reports, maps, charts, unpublished notes, and articles in trade journals. Where my actors were less voluble, such as the on the intersection of technology and indigenous society, newspaper sources are valuable. Large archives produce correspondingly large lacunae, and in Taiwan the dearth of sources produced by indigenous peoples is striking. Oral histories, variously collected in or translated into Japanese and Chinese, are crucial for supplementing—and at times challenging—the perspectives that survive in official, media, and scientific records.

Chapter I begins with the construction of a hydroelectric plant at Guishan, along the Xindian river south of Taipei, to show how the goal of illuminating and powering the capital in the first decade of colonial rule relied upon the assertion of control over mountain streams. Colonial officials worked with private Japanese and Han Taiwanese actors to build and safeguard this plant from Atayal attacks. After the plant's completion in 1905, hydroelectricity was critical to the Japanese conquest of Atayal lands in northern Taiwan through generating current for anti-personnel electric fences along the advancing line of Japanese invasion. Capturing hydroelectric sources shaped military strategy in ways that did not last—large-scale war ended in 1914—but anticipated later developments in the realms of flood control, water conservancy, and dam management.

Chapter II argues that flooding became a paramount concern in Taiwan following serious successive storms in the summers of 1911 and 1912. Widespread damage prompted calls for integrated flood control policy from diverse quarters. Many of these focused on lowland infrastructural solutions such as levees and retention ponds, but foresters emerged as an important constituency who pointed towards highland erosion as a cause of flooding. Scientific surveys, often conducted in the wake of military campaigns, reveal how foresters constructed Atayalic and Bunun environmental knowledge as a useful reference for managing mountain ecologies but ultimately



threatening to larger watersheds. Floods helped these ideas to gradually permeate through scientific and official discourse. Chapter III explores one of their most insidious consequences: the mass relocation of highland indigenes. I highlight the ways in which Japanese officials justified these violent dispossessions on the basis of native environmental practice, which they took to be not just backwards but threatening to downstream areas. I further explore how the design of relocation settlements and related denial of native ecological knowledge brought about outbreaks of dysentery and malaria. This allows an understanding of the environmental ideology—and material failures—that went into making indigenous peoples Japanese imperial subjects.

In Chapter IV, the above tripartite of hydroelectricity, conservationist forestry, and indigenous relocation collide at Sun Moon lake. Here, near the geographical center of Taiwan, the Japanese colonial government oversaw the construction of a sprawling hydroelectric complex. This both directly forced the eviction of Han, Thao, and Bunun peoples from inundation zones and focused scrutiny on the Atayalic peoples who lived in the central highlands that fed the Sun Moon lake power plants with water. I describe these dispossessions as a foundation upon which Taiwan made great leaps in electrification, industrialization, and eventually contributions to Japan's growing war machine. I next look more broadly at debates over "highland development" (山地開發) that took place as industrialists and military planners sought new sources coal, timber, and hydroelectricity. The wartime political climate, I argue, constrained the ability of foresters to respond to what they saw as threats to watersheds by powerful interests. Instead, they focused their criticism on Han foothill farming of crops such as bananas and particularly highland indigenous shifting cultivation. Chapter V shifts to the period after the Second World War, when the Republic of China took control of the island from Japan and—after 1949—some one million mainland Chinese associated with the Republican Party (GMD) settled on the island. I use the case of Taiwan's first massive multipurpose dam, the Shimen Dam, to analyze how the Republican regime constituted a

new form of colonial conservation. Japanese colonial precedents were important here, but so too were pre-WWII experiences in China and input from American consultants. I argue that disastrous flooding late in the dam's construction in 1963 laid bare the limitations of flood control, the environmental violence of relocation, and the depth of the threat posed to water management in Taiwan by sedimentation. 1963, like flooding in the early 1910s, amplified scrutiny on Atayal land use in streams high in the newly-created Shimen reservoir watershed. Such scrutiny continues to this day and remains embedded in the Republic of China's system of ethnicized environmental rule.

## Chapter I—Hydropower and Electric Fencing in Japan’s Conquest of Highland Taiwan

Taipei entered the electric age in great style in October of 1905. On a massive arch near the city’s west gate, workers from the newly-formed municipal electric utility installed some 800 bulbs which, when illuminated, astonished onlookers with their intense glare. As a journalist on the scene wrote, “Taipei’s night, which had seemed to be slumbering in mist, suddenly opened its great eyes, revealing a multitude of beautiful sights in dazzling light.”<sup>1</sup> The current that powered this flamboyant display flowed from Taiwan’s first power plant, a hydroelectric station located in the hills to the south of Taipei at a place called Guishan (龜山). Alongside illuminating homes, businesses, and government institutions in Taipei, Guishan also enabled industrial applications of electricity for everything from milling rice to making ice. As this moment came at the dawn of Japan’s second decade of colonial rule over Taiwan, many at the time and since have looked towards this moment in 1905 as the crucial first step in Taiwan’s electrification, which in turn fed the island’s eventual industrialization and advance into modernity.

The Guishan hydroelectric station presaged future developments by exhibiting tight links between the power of Taiwan’s rivers and technological transformation. While there had been previous attempts on the island to generate electricity through burning coal or diesel, these relied on expensive imported fuels and were all limited in scale. Hydroelectric generation, by contrast, held great promise. Japanese colonial engineers, entrepreneurs, and officials saw in hydropower the potential to convert the tumult of the island’s unruly rivers into consistent flows of power for lowland cities, factories, and farms. Across the Japanese period and beyond, many hydroelectric power plants would follow Guishan, most notably the massive station completed at Sun Moon Lake

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<sup>1</sup> “Dentō no sōkan” [The spectacle of electric lamps], *Taiwan nichinichi shinbō*, October 31, 1905; “Taihoku no dentō” [Taipei’s electric lamps], *Taiwan nichinichi shinbō*, November 1, 1905.

(日月潭) in 1934. By the middle of the twentieth century, hydroelectricity accounted for over eighty percent of Taiwan's 321,855 kilowatts of installed electrical capacity.<sup>2</sup>

Relating Guishan's development as an episode in energy and economic history would trace this expansion of electrical development, alongside ways that lessons from Taiwan proved portable elsewhere in the Japanese imperium. Such a narrative, however, would risk missing crucial context about the Japanese colonial electrification of Taiwan. That context was war: a brutal invasion of Taiwan's interior with the purpose of establishing complete Japanese control over the highlands and the indigenous people who lived there. This chapter approaches Guishan not as the vanguard of Taiwan's inexorable industrialization through lowland electrification but instead as the origin point for the electrification of the militarized highlands. I argue that the latter process can be best understood through the technology of electrified anti-indigenous fencing and the temporary hydroelectric plants that joined Guishan to support this system.

In insisting that electricity was inextricably linked to the violence undergirding its production, my interpretation follows from environmental histories that describe the material co-production of city and hinterland, such as Andrew Needham's *Power Lines* and William Cronon's *Nature's Metropolis*.<sup>3</sup> What distinguishes the early twentieth in northern Taiwan from these cases was its state of active war. Japan's drive to weaponize hydroelectricity, along with an alignment between conflict zones and steep streams, explains why the first major electrical supply in Taiwan proved important for both urban industry and the military frontier. By the 1920s, the cessation of large-scale warfare for the purposes of "aboriginal pacification" rendered the hydropower/electric fence system

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<sup>2</sup> Taiwan Power Company, "Rehabilitation of the Electric Power System of Taiwan," paper presented at the World Power Conference, the Hague, Netherlands, September 1947, 1-2.

<sup>3</sup> Andrew Needham, *Power Lines: Phoenix and the Making of the Modern Southwest* (Princeton: Princeton University Press, 2014); William Cronon, *Nature's Metropolis: Chicago and the Great West* (New York: W.W. Norton, 1991). Particularly germane to this chapter are Needham's attention to native power and Cronon's understanding of the frontier.

that had originated at Guishan in 1905 obsolete. Precisely because this stands in contrast to other aspects of electrification—such as urban illumination—that remain with us today, it is easy to neglect what appears to be a technological dead end. Indeed, such a neglect is evident in both historical and recent accounts of Taiwan’s electrical development. Meanwhile, the burgeoning field of Taiwanese indigenous history has had little intersection with histories of technology and the environment. This chapter suggests that viewing the hydroelectric plants as frontier infrastructure and anti-indigene electric fences as innovative technologies can illuminate violent processes that lay at the heart of Taiwan’s transformation under Japanese colonialism.

Such processes, this dissertation argues, drew literal and rhetorical force from Taiwan’s rivers. Below, I begin by situating Guishan geographically and historically. How did colonial rule transform the river that flowed through this hinterland of Taipei? Why was it that hydroelectricity, the most modern of technologies at the turn of the century, first arrived in Taiwan so near to the “savage border,” a place that Japanese viewed as the very edge of civilization? How was hydroelectricity put to work in the unification of lowland and highland? Answering these questions highlights confluences of economic, military, and technological interests in early colonial Taiwan.

### *Guishan as Frontier and Foothold*

Taiwan’s geography is dominated by high mountains. Of the world’s islands, only Hawai’i contains higher mountains within a smaller land area. Craggy peaks and deep gorges mean that easily arable land is in short supply, being largely limited to plains on the northern and western sides of the island. Expanding and intensifying crop production was thus a key task for the Japanese colonial government, particularly as it envisioned Taiwan as an “agricultural appendage” to supply the growing Japanese empire with products such as sugar and rice.<sup>4</sup> Certain colonial officials, however,

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<sup>4</sup> Harry J. Lamley, “Taiwan Under Japanese Rule, 1895-1945: The Vicissitudes of Colonialism,” in *Taiwan: A New History, Second Edition*, ed. Murray A. Rubinstein (Armonk, NY: M.E. Sharpe, 2007), 209.

saw productive possibilities in uncultivable land of the highlands. As office of public works head Nagao Hanpei (長尾半平) put it in a 1904 lecture, “although their volume is usually small, Taiwan’s rivers flow steeply and are nearly waterfalls (瀑布), so it naturally goes without saying that they pose great benefits for the production of hydroelectricity.”<sup>5</sup>

Japan’s first hydroelectric plants began operating in Sendai in 1888 and Kyoto in 1891, so national hydropower development was still in an early stage when Japan took control of Taiwan in 1895. With no robust pre-existing efforts to take over from the Qing, suitable sites needed to be identified by close study. In 1898, the Japanese colonial government began population and land surveys: exhaustive investigations of the island’s human and natural conditions that, according to historians, produced hydroelectric plants as one of many “byproducts.”<sup>6</sup> As shown in the introduction, Japanese naturalists worked with interpreters and local informants to quantify Taiwan’s geographic and meteorological character. Of particular note were steep topography and intensely seasonal precipitation, both of which held both promise and peril for hydroelectric development. Such features were similar to, although more extreme than, conditions in the Japanese home islands. The far greater difference with the metropole was political. Taiwan was divided into “normal” and “aboriginal” administrative zones, the latter typically called the “savage territory” (蕃地) and comprising roughly half of the island. The difficulty from a hydroelectric perspective was that the highland “savage territory” contained the sources and upper branches of nearly all of the island’s major rivers (see Figure 1.1 on the next page). As a result, any venture that sought to exploit areas along or within the frontier—the “savage border”—was liable to become a military matter.

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<sup>5</sup> “Taiwan no denryoku kyōkyū” [Taiwan’s electrical supply], *Taiwan jibō*, August 1904, 151.

<sup>6</sup> Xia Shengli et al, *Hyakunen sōsō: Dogura Ryūjirō to Taihoku Kizān suiryoku hatsudensho* [One hundred years of transformations: Dogura Ryūjirō and the Taipei Guishan hydroelectric power plant] (Ikeda, Osaka: Dogura Masao, 2006), 13.

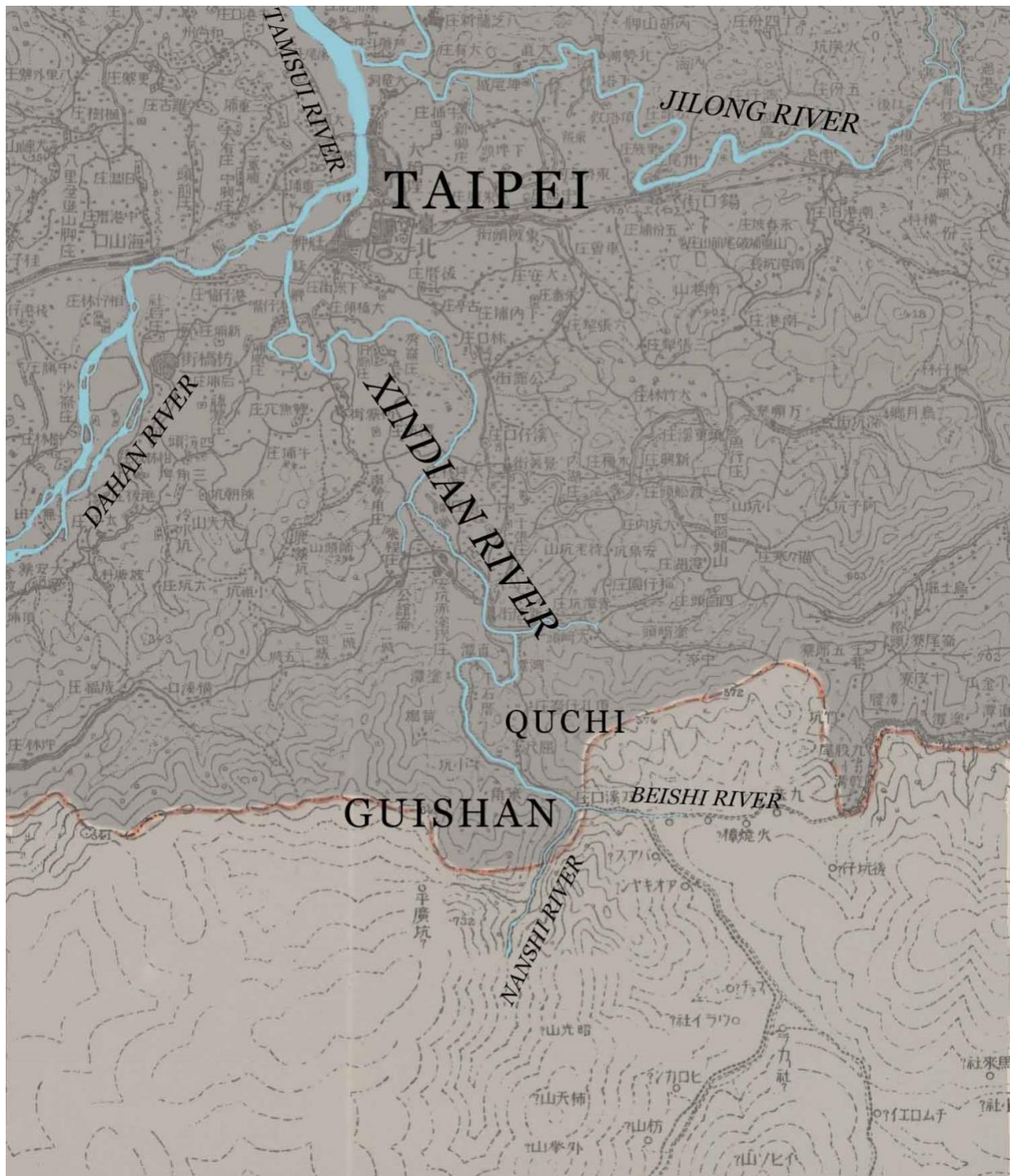


Figure 1.1—The riverine and political geography of Taipei and its hinterlands in an 1897 Japanese military map. Guishan is located near the point where the Nanshi and Beishi rivers converge to form the Xindian river, which then converges with the Dahan in Taipei to form the Tamsui river. Guishan is also near the “savage border” marked in red. This boundary divides the Han- and Japanese-dominated Taipei basin in grey from the Atayal-dominated highlands—the “savage territory”—in tan. Note the contrast between dense geographic information north of the border and the paucity south of it, where question marks accompany place names and river courses are unclear. Because of this uncertainty, Guishan’s labeled location is accurate relative to certain geographic features but skewed relative to others.<sup>7</sup>

<sup>7</sup> “Taiwan kasei 20,000 bun 1 zu” [Taiwan 1:200,000 Scale, Sheet 1], (Tokyo: Rikuchi sokuryōbu, 1897), cropped. From

Taiwan's foothills and mountains also contained what was, at the time, the island's greatest treasure: its camphor laurels (*Cinnamomum camphora*). Camphor crystals and oil found diverse uses across the world but most important among these was the production of celluloid. Capturing, conserving, and creating camphor became the key motivation for many state and private ventures in Taiwan's highlands across the late Qing and early Japanese colonial periods. Scholars have argued that camphor capitalism became the engine driving Japan's brutal conquest of highland indigenous Taiwanese in the early colonial period.<sup>8</sup> Without gainsaying camphor's importance, this chapter argues that these histories have overlooked the ways that linked efforts to capture hydroelectric sources in or near the aboriginal administrative zone also shaped Japan's conquest. Nevertheless, the trade in woodland products—especially but not exclusively camphor—predated highland electrical development, and in doing so, opened up space for it. This was true in Guishan as elsewhere. Describing Japanese entrepreneurial advances up the Xindian river demonstrates the important role of private capital in the early years of Japanese rule and its cooperation with the colonial state, along with its animating logic of exploitation.

The most important entrepreneur at Guishan was Dogura Ryūjirō (土倉龍次郎 1870-1938). Dogura was the scion of a wealthy logging family in present-day Nara Prefecture and came to Taiwan in search of adventure and riches in 1895. Born in 1870, Dogura had studied with Joseph

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Stanford University Digital Repository, <https://purl.stanford.edu/wc958mv2300>. Cropping, labels, shading, and highlighting by author.

<sup>8</sup> The most comprehensive work in English is Tavares, "Crystals from the Savage Forest"; the strongest argument for camphor's singular importance can be found in the work of Toulouse-Antoin Roy, including "'The Camphor Question is in Reality the Savage Question': Indigenous Pacification and the Transition to Capitalism in the Taiwan Borderlands (1895–1915)," *Critical Historical Studies* 6, no. 1 (2019): 125-158; "'The Camphor Question is in Reality the Savage Question': The Japanese Empire, Indigenous Peoples, and the Making of Capitalist Taiwan, 1895-1915" (PhD diss., UCLA, 2020). For a comparative approach, see Faizah Zakaria, "Camphor, Celluloid, and Colonialism: The Dutch East Indies and Colonial Taiwan in Comparative Perspective," in *The Cultivated Forest: People and Woodlands in Asian History*, ed. Ian M. Miller et al. (Seattle: University of Washington Press, 2022); see also Zakaria, *The Camphor Tree and the Elephant: Religion and Ecological Change in Maritime Southeast Asia* (Seattle: University of Washington Press, 2023).



Hardy Neesima at Dōshisha University in Kyoto and been deeply inspired by Neesima's transformative experiences overseas. On the occasion of his graduation from Dōshisha in 1892, Dogura wrote a letter to his father in which he breathlessly declared his desire to “endure the winds and waves of ten thousand leagues, voyage across the skies of the southern seas, and realize [my] ambition” (萬里の風波を凌ぎ南洋の天に航し志を遂げんこと). Dogura wrote that he was best suited towards becoming an entrepreneur, and he invoked the specter of domestic overcrowding in Japan and competition with the white race to declare that the future for many Japanese, including him, lay in the South Seas.<sup>9</sup> His father denied him permission on account of the danger of tropical diseases.<sup>10</sup> It is not clear what destination Dogura had in mind when he dreamt of venturing to the “South Seas” (南洋), an ambiguous term that could refer to much of the South Pacific and Southeast Asia. Regardless of his exact goal, Dogura would gain his chance for a venture to the south in 1895, when Japan acquired Taiwan from Qing China. Before the year was out, family connections had helped Dogura arrive in Taiwan in the company of four family employees. Traveling through the mountains across the island from Jilong in the north to Tainan in the south, Dogura sought locations for development.<sup>11</sup>

Dogura seemed particularly interested in both the large tracts of land and the romantic frontier available just inside the aboriginal administrative zone. Acquiring land here did not involve having to purchase land from indigenes, since the Japanese Empire's self-serving legal logic held that

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<sup>9</sup> Xia et al, *Hyakunen*, 238-241. On the relation of overseas migration to fear of overcrowding in Japan, see Sidney Xu Lu, *The Making of Japanese Settler Colonialism: Malthusianism and Trans-Pacific Migration, 1868-1961* (Cambridge: Cambridge University Press, 2019), especially chapter 2.

<sup>10</sup> Xia et al, *Hyakunen*, 68.

<sup>11</sup> Xia et al, *Hyakunen*, 69-71. On the “South Seas” and their connection to Japanese imperialism in Taiwan, see Shirane, *Imperial Gateway*.

everything in the aboriginal zone was *terra nullius* and thus possessions of the state.<sup>12</sup> In practical terms, however, occupying areas along the frontier required both state approval and the compliance of local peoples. Eventually Dogura settled upon major plot of land around the settlement of Quchi, located in Taipei's southern hinterlands along the Xindian river (see Figure 1.1). After several failed attempts, he gained official Government-General approval for a 300-year lease beginning at the start of 1899 to establish forestry plantations.<sup>13</sup> Having secured official assent and plentiful capital, Dogura also required amenable local intermediaries to work with.<sup>14</sup> Assisting Dogura in this were Japanese interpreters Kiyama Yoichi (木山与一), Ogata Masaki (尾形正基), and Ogata's Atayal wife, whose name is recorded as Wasetsuku.<sup>15</sup> It is clear from the recollections of Dogura's partner Tsuge Montarō (津下紋太郎) that Dogura forestry and later hydroelectric ventures were predicated on violent coercion. When meeting with Atayal near Quchi, Kiyama's initial appeals to allow forestry operations that could improve native livelihoods were met with a flat refusal. Kiyama then turned to threats. If the Atayal were unwilling to negotiate, Kiyama said, then the only option left was war. And if the Japanese side won the war, he menaced, "we will burn your houses to the ground" (汝等の棲家を焼払ふまでのことだ). The Atayal relented, allowing forestry work in the immediate area.<sup>16</sup>

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<sup>12</sup> Yamaji Katsuhiko, *Taiwan no shokuminchi tōchi: "mushu no yabanjin" to iu gensetsu no tenkai* [Colonial rule of Taiwan: the development of the discourse of the "masterless savage"] (Tokyo: Nihon tosho sentā, 2004).

<sup>13</sup> Xia et al, *Hyakunen*, 71.

<sup>14</sup> Dogura Mikio, *Sofu Dogura Ryūjirō* [My grandfather Dogura Ryūjirō] (Self-published, 2004), 1-4. For Quchi's status as a trading post in the late Qing and early Japanese periods, Paul Barclay, *Outcasts of Empire*, 79.

<sup>15</sup> Tsuge Montarō, *Tsuge Montarō jiden* [Tsuge Montarō autobiography] (Tokyo: Tamagawa University, 1982), 65-66. Such marriages between Han and later Japanese men and indigenous women were common and crucial in a variety of contexts. See Paul Barclay, "Cultural Brokers, and Interethnic marriage in Colonial Taiwan: Subalterns and Their Aborigine Wives, 1895-1930," *Journal of Asian Studies* 64, no. 2 (2005): 323-360. Barclay also notes the role of Japanese intermediary Jiku Shō Min, who had married into a local Atayal family, in assisting Dogura: *Outcasts of Empire*, 216.

<sup>16</sup> Tsuge, *Tsuge Montarō*, 67. The precise location of this interaction is unclear, but the indigenes met with were almost certainly Taranan, an Atayal subgroup also referred to as the "Quchi Atayal."

Dogura's operation drew directly from earlier Han efforts to colonize and commercialize the area. In the 1880s, Han settlers established hamlets at Quchi and places deeper in the mountains along the Xindian. The hilly terrain was better suited to tea plantations than rice paddies, and beyond tea many settlers also made their living by logging wood to make charcoal or harvesting camphor. This required venturing deep into Taranan Atayal territory, however, which invited attacks by Atayal that in turn drove Han settlers away from these remote homesteads back towards the plains. By 1897, Japanese officials noted wistfully that vast fields of tea bushes were entirely covered in thistles. They placed the blame for this neglect squarely with the "savages" who "robbed" the land from the Han who had improved it. This had produced social problems as well, as destitute Han became anti-Japanese "bandits" (土匪) following the Japanese assumption of control in 1895; even if they were temporarily reformed, poverty quickly led many of the same quickly back towards banditry.<sup>17</sup> Others had continued to make incursions into the mountains, risking violent clashes so that they might harvest timber. Attempting to control the market and suppress the potential of both violence and subversion stemming from interethnic contact, Japanese police prohibited this crossing of Han into the aboriginal administrative area, but this similarly left few options to make a living. One solution some Han near Quchi and further downstream tried their hand at was fishing: using nets, traps, weirs, and poison to catch carp, mullet, and sweetfish in the Xindian river and its tributaries. Techniques that involved blocking off the entire river to entrap prey were particularly effective in targeting young sweetfish, which fetched greater and greater prices due to the influx of deep-pocketed and fish-hungry Japanese settlers to Taipei. The result was a precipitous decline in fish

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<sup>17</sup> "Seiban fukin ni okeru sanrin batsuboku kyoka no gi bunsanbo musho shuri Tani Nobunori yori shutsugan ni tsuki Kusshaku chihō jikkyō shisatsu, gishi Arita Masanori fukumeisho" [Report by technician Arita Masanori following observation of conditions in Quchi region in relation to application from Mr. Tani Nobunori of Wenshanbao regarding logging of mountain forests near raw savages], 1897, 00000219009, Taiwan Historica, Nantou, Taiwan, 145-149, 153.

stocks, leading in 1898 to the Government-General promulgating fishing regulations that banned blocking rivers, using poison, or targeting young fish.<sup>18</sup>

Managing ecology, economy, and society along the frontier was thus a delicate enterprise, one for which the Government-General did not provide consistent coordination or funding. In the first years of Japanese rule, the government Pacification-Reclamation Bureau (撫墾署), which operated through eleven posts located just outside of the aboriginal administrative zone and adapted the policies of the similarly-named Qing institution of the Pacification-Reclamation Office (撫墾局).

In 1898, Gotō Shinpei, the first Government-General Minister of Civil Affairs, transferred responsibility for aboriginal affairs from the Pacification-Reclamation Bureau to regional governments. Between 1898 and 1903 there was little central aboriginal policy planning: private camphor concerns took a range of approaches to the indigenes with whom they came in contact, some more conciliatory and vocational and others more violent.<sup>19</sup> Dogura's plantations were one example of this. They promised to provide vocational training for destitute Han while also employing, and thus transforming, the indigenous peoples whom they described as "raw savages." Dogura himself declared his goal to be "the gradual acculturation (化用) of the raw savages" and identified one method to be charcoal manufacture. Japanese staff would teach Atayal in the area how to make charcoal out of timber from the nearby mixed stands of forests, imitating how Han had previously used the area. In addition to clearing ground for Japanese cypress and *cryptomeria*, the productive Atayal would thereby become integrated in the local exchange of goods and money.<sup>20</sup>

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<sup>18</sup> "Taihoku-ken kasen gyogyō torishimari ni kan suru ken" [Item regarding fishing industry regulation on rivers in Taihoku prefectures], February 10, 1898, 00000301002, Taiwan Historica, Nantou, Taiwan, 64.

<sup>19</sup> Li Wenliang, "Nihon tōchi shoki Taiwan ni okeru 'riban seisaku'" ["Aboriginal policy" in Taiwan under early Japanese rule], in *Sekai sensō to kaijō: 1910-nendai* [World War and renovation: the 1910s], ed. Wada Haruki et al. (Tokyo: Iwanami Shoten, 2010), 169-176; Roy, "The Camphor Question," 76-80.

<sup>20</sup> "Dogura Ryūjirō Taihoku-ken Bunsan-ho Kusshaku okurinchi shokurin no tame kashisage kyōka sono ta no ken" [On approval for lending woodland in inner Quchi, Wenshanbao, Taipei state to Dogura Ryūjirō for silviculture and other

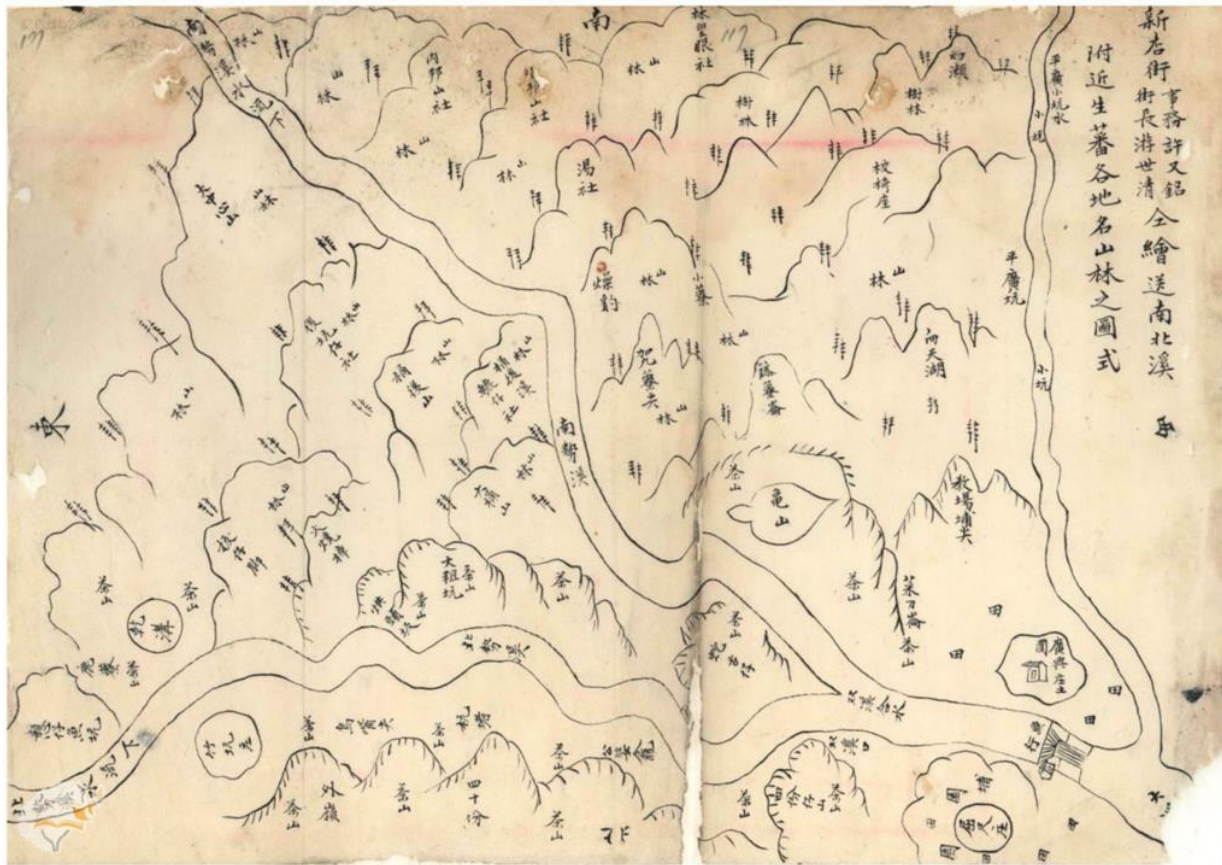


Figure 1.2—This 1897 map shows Quchi in the bottom right-hand corner, just northwest of the point where the Beishi and Nanshi rivers meet. Along the Nanshi is Guishan. There are rice paddies, gardens, and a fishing weir marked near Quchi. Besides some tea plantations around Guishan, nearly the entire area surrounding the Nanshi river is forested.

This Han map suggests greater familiarity with the interior than Figure 1.1, a Japanese map from the same year.<sup>21</sup>

The area around Quchi remained relatively sedate for the first few years of Dogura operations. Before beginning silvicultural work, Dogura first established a new trading post for commerce with indigenes and built lodgings for traders coming from far away. He next brought in Han “coolies” from downstream and also employed local Atayal to build massive nurseries and grow hundreds of thousands of saplings therein.<sup>22</sup> In late 1901, Dogura led six Atayal notables on a

matters], 1898-1904, 00000986001, *Taiwan Historica*, Nantou, Taiwan, 16. Tsuge makes clear that zelkova were also planted, *Tsuge Montarō*, 78.

<sup>21</sup> “Seiban fukin ni okeru sanrin batsuboku.” Courtesy of *Taiwan Historica*.

<sup>22</sup> “Kusshaku ni asobu” [Enjoying time in Quchi], *Taiwan nichinichi shinpō*, May 16, 1902.

sightseeing trip to the Japanese home islands, which included stops in Osaka and the Dogura homestead in Nara prefecture for the 60<sup>th</sup> birthday of Shōsaborō, the family patriarch. Joining on this trip were the interpreter Ogata and Shi Youqing (世游清), a local Han elite who had experience in the Pacification-Reclamation Office in the late Qing years and served as a councilor (參事) for the regional Japanese government.<sup>23</sup> Reports of this sightseeing tour emphasize Atayal awe at the wonders of Japanese civilization, but the inclusion of military training grounds in the itinerary (typical of such tours at the time) make clear that military power was one feature of Japanese might that Dogura sought to impress on his companions.<sup>24</sup> When Dogura led Government-General leaders Gotō Shinpei and Nitobe Inazō on a tour in 1902, a journalist remarked that thanks to Dogura's efforts, the indigenes "didn't seem like savages at all."<sup>25</sup>

The relentless expansion of camphor harvest into the mountains, however, meant that the fragile peace enjoyed by initial operations around Quchi would not last. By 1900, the Government-General granted permission for camphor harvesting both locally and in areas higher up in the watershed. As Tsuge later recollected, this harvesting took the form of small and widely dispersed stills. Wherever at least a half-dozen or so camphor laurels were found to be growing, the company would build a hut and send ten laborers to harvest the camphor. This meant felling the trees and chopping them into small chips, which would then be placed in a retort that steam would be passed through on its way to a cooling vessel, where the camphor-laden steam would condense and, upon exposure to air, form crystals. Occupying land that various Atayal groups had long used and lived

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<sup>23</sup> Xia et al, *Hyakunen*, 75-76, 146-149; "Dogura Ryūtarō-shi no kaikon jigyō" [Mr. Dogura Ryūtarō's (sic) reclamation projects], *Taiwan nichinichi shinbō*, July 11, 1899; Taiwan sheng wenxian weiyuanhui bianzuan zu, *Taiwan sheng tongzhi gao di7: renwu zhi* (2) [Taiwan province gazette, volume 7: historical figures (2)] (Taipei: Academia Historica, 1962), 41.

<sup>24</sup> Barclay, *Outcasts of Empire*, 247.

<sup>25</sup> Xia et al, *Hyakunen*, 148.

on, these stills were frequently sites of conflict.<sup>26</sup> Among the personnel supporting this camphor business there were 182 watchmen and guardsmen, each of which, upon the company's request, was given ammunition and lent a Snider-Enfield breeching rifle from the Government-General free of charge.<sup>27</sup>

It was at one such still near Guishan in the fall of 1905 that a group of indigenes attacked a group of sleeping camphor workers, killing ten and wounding one before they cleaning out valuables from the hut.<sup>28</sup> This attack came into response to brutal Japanese police reprisals following a previous Atayal raid earlier in the year. Because these violent cycles revolved around the expansion of camphor extraction, this incident might seem to be another instance giving evidence of how, as one historian put it, “a single commodity violently transform[ed] the lands, forests, and mountains of Taiwan’s Indigenous peoples into a site of colonial conquest.”<sup>29</sup> To be sure, Tsuge reports that as Dogura camphor operations expanded, the Government-General began to equip the mountainside stills with defenses and gradually incorporate them into the expanding “guard line” (隘勇線), a system of guard posts, barricades, cleared land, and defenses that will be explored in depth below.<sup>30</sup>

Such a narrow focus on camphor, however, does not fit all the facts of the 1905 incident. First of all, as this section has shown, conifer silviculture—not camphor extraction—was the initial focus of Dogura’s ventures around Quchi. Hints of other contextual factors can be found in the details of the incident. The hut at night was a conspicuous target because its residents had left an

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<sup>26</sup> Tsuge, *Tsuge Montarō*, 77-81; a more detailed description of Qing distillation that accords with Tsuge’s can be found in Tavares, “Crystals,” 169-170

<sup>27</sup> Dogura, *Sofu Dogura Ryūjirō*, 26-27.

<sup>28</sup> Dogura, *Sofu Dogura Ryūjirō*, 30.

<sup>29</sup> Roy, “The Camphor Question,” 126.

<sup>30</sup> Tsuge, *Tsuge Montarō*, 81.

electric lightbulb on when they slept. An electric fence guarded the area around hut, but the raiding party had either climbed over or tunneled under the fence.<sup>31</sup> How was it that such a remote outpost was using electricity for illumination and protection alike? The following section answers this question through the history of the Guishan hydroelectric plant, initially a Dogura venture. Doing so will make clear that while absent in Dogura Ryūjirō's earliest plans for the region, hydroelectricity under private and state management quite literally pushed Japanese power deeper in Taiwan's mountains and quickly played a vital role in supporting and shaping colonial conquest.

*Electric Colony: Establishing the Guishan Hydroelectric Plant*

How did the Dogura corporation come to generate the first hydroelectricity in Taiwan? Family histories credit Dogura's classmate and employee Shimizu Taijirō (清水泰次郎) with being inspired by the gushing rapids around Quchi to first propose a hydroelectric plant. Shimizu was a fellow Dōshisha graduate who taught English and was involved with a number of translation projects between Japanese and English. He also apparently had experience working in mines in the United States and would later patent a method for refining sulfur. This background allowed Shimizu to perceive possibilities for generating electricity in the voluminous flow and steep drop of the Nanshi river near the main Dogura company office.<sup>32</sup> In late October 1902, the company requested permission from the Government-General to begin construction on a hydroelectric plant.

Several attempts at electric generation in Taiwan had taken place in the previous decade but all were abortive or limited in scale. Around 1885, Qing governor Liu Mingchuan retained the services of a Danish electrician and oversaw work to install electric lights on the Taipei city wall and

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<sup>31</sup> Dogura, *Sofu Dogura Ryūjirō*, 29-30.

<sup>32</sup> Dogura, *Sofu Dogura Ryūjirō*, 7; Keimatsu Shōzaemon and Nishida Hirotarō, *Jikken kagaku kōgyō* [Experimental chemistry and industry] (Tokyo: Kagaku kōgyō hakkōjo, 1921), 866.



major street. While they provided an arresting spectacle, maintaining these lights and the coal to power them was too expensive, and after a few months electric illumination was confined to the governor's residence (*yamen*), where it continued until at least 1893. In recent decades in Taiwan it has become common for authors to claim that Liu also proposed harnessing the Nanshi for hydroelectric purposes, as Dogura and his associates would later, but as Jen-shen Wu has argued there are no primary sources to support this claim and little reason to think that Liu would have sought water power in Quchi, then an inaccessible and dangerous frontier zone.<sup>33</sup> Japanese naval forces in Jilong used a diesel generator for illumination in 1895, and in 1897, the Government-General pharmaceutical factory began running coal-fired generators to assist in the production of opium and provide illumination for institutions including the Governor-General's residence and a nearby hospital.<sup>34</sup>

Expanding electrical supply promised to spread illumination beyond this small area and open up industrial opportunities. Following the 1883 establishment of the Tokyo Electric Light Company and the first hydroelectric power plants for industrial and utility purposes in 1888 and 1891, respectively, electrification proceeded rapidly in Japan. As early as 1896, some of the first major Japanese investors to move to the colonial capital formed the "Taihoku Electric Lamp Company" (臺北電燈株式會社), but amidst a failure to raise funds and weak government support, the venture collapsed without realizing its plans to build an alternating-current coal-fired power plant.<sup>35</sup> An appetite for electricity continued to grow, however, and by the time the Guishan proposal reached the Government-General in 1902, another competing proposal had beat it there. One month prior,

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<sup>33</sup> Jen-shen Wu 吳政憲, *Fan xing dian dian: jindai Taiwan diandeng fazhan, 1895-1945* [A starry sky: the development of electric light in modern Taiwan, 1895-1945] (Taipei: Taiwan shifan daxue lishi yanjiusuo, 1999), 29-35.

<sup>34</sup> Xia et al, *Hyakunen*, 12; Wu, *Fan xing*, 263-270.

<sup>35</sup> Wu, *Fan xing*, 164-200.

Japanese entrepreneur Arai Taiji had applied for approval to build a hydroelectric plant in Tianmu (then Sanjiaobu) and use water from one of several small streams in the vicinity, which flow down from Mt. Datun north of Taipei and eventually empty into the Tamsui river. Arai had the support of several other investors, but Government-General officials viewed geography as being in Dogura's favor. The Tianmu streams were small and relatively flat, possessing little potential energy. Moreover, their origin in the volcanic Mt. Datun area means they carry significant amounts of sulfuric acid; one is even named "sulfur creek" (磺溪). Fearing that this sulfuric acid would rust metallic components of the power plant, the Government-General sought to merge the two proposals. This would bring their collective financial wherewithal to bear on the Dogura proposal, assuring that Taipei's electricity would originate in Guishan's clear, rushing waters on the edge of the "savage territory."<sup>36</sup>

Thus came the founding of the "Taihoku Electrical Company" (臺北電氣株式會社) in early 1903 and official orders to commence work at Guishan. Dogura Ryūjirō was president and majority shareholder, Tsuge Montarō chairman, with Arai and other wealthy Japanese investors—many of them involved in the failed electric lamp venture—coming to own many shares. Han Taiwanese shareholders held 8.7% of the company stock and included both trade brokers and sociopolitical elites such as You Shiqing.<sup>37</sup> The Japanese settlers who financed Taiwan's initial electrification were able to raise capital and focus on infrastructural development in ways that the early Government-General was not, focused as it was on establishing military control and carrying out surveys to understand the territory now under its control. Men like Dogura and Arai formed an important, and sometimes overlooked, force within Japanese colonial processes. This was possible

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<sup>36</sup> Xia et al, *Hyakunen*, 17-19; Wu, *Fan xing*, 213-217.

<sup>37</sup> Xia et al, *Hyakunen*, 18-19.

because they held both close personal relationships and allied goals with officials. Thus, they did not quite form an “independent vector of influence,” as Jun Uchida describes the larger and more diverse group of Japanese settlers in Korea, though this such a description might reasonably apply to other Japanese in colonial Taiwan.<sup>38</sup>

The Government-General, which had steered Taiwan’s electrical development from the outside, soon took on a much more central role. While Dogura Ryūjirō’s was building businesses in Taiwan, his older brother Dogura Tsurumatsu (土倉鶴松) had taken on a coal mining project in Xuancheng, Anhui, China. By the autumn of 1903 this venture had failed spectacularly, and the family had lost so much of their investment that Ryūjirō sold all of his electrical company shares. The family retained control of their camphor and timber concerns in Taiwan through 1907, when they sold all holdings and property to the Mitsui conglomerate for 200,000 yen.<sup>39</sup> Dogura’s withdrawal afforded the Government-General the opportunity to take full control of the Guishan project, which it did by purchasing the Taihoku Electrical Company and reforming it as the Taihoku Electrical Station (臺北電氣作業所). Tsuge later lamented that since they ran a “puritanical company” (清教徒的会社) that made no effort to squeeze a profit out of the Government-General, he and the other directors received a mere pittance of 200 yen each out of the sale. On the part of the colonial state, it gained the ability to sell electricity to individuals and businesses at cheaper prices than a private company would (even a puritanical one). This takeover also enabled more efficient coordination of the work of building roads and conducting “aboriginal pacification”

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<sup>38</sup> Jun Uchida, *Brokers of Empire: Japanese Settler Colonialism in Korea, 1876-1945* (Cambridge: Harvard University Asia Center, 2011), 3.

<sup>39</sup> Xia et al, *Hyakunen*, 19-20; Dogura, *Sofu Dogura Ryūjirō*, 30-31. For Tsurumatsu’s agreement with the Qing government, see Tōa dōbunkai, ed., *Toa kankei tokushu jōyaku isan, shōban* [East Asia-related special agreement collection, first edition] (Tokyo: Maruzen, 1912), 613. Tsurumatsu was also involved in other frustrated business schemes in Manchuria and Korea.

that went along with building the hydroelectric station.<sup>40</sup>

Ownership changing hands did not greatly alter the plans for the hydroelectric station itself. A key individual here was Ōkoshi Taizō (大越大蔵), a recent Tokyo Imperial University graduate who arrived in Taiwan in the summer of 1903 to survey the site at Guishan. Ōkoshi's design for Guishan involved building a wooden weir approximately two kilometers upstream from the generating station. From this point, some of the Nanshi's water flowed over the weir and continued downstream while another portion was diverted into an intake (also known as a penstock) and through pipes that ran for 1800 meters downstream to the station. While the piping initially followed the course of the river, at one bend it cut across the riverbed (where it was buried shallowly) to go through a tunnel and approach the generating station from above. With a head, or vertical drop from the point of intake of approximately 15 meters, the water emerging from the tunnel moved with sufficient pressure to turn turbines and generate electricity. Having run through the turbines, the water then flowed back into the Nanshi river. Most key machinery—turbine, generator, and exciter—was purchased from Westinghouse and S. Morgan Smith in the United States. Over sixteen kilometers of electric line, suspended from thousands of poles, connected Guishan to a transformer in Taipei located in Guting.<sup>41</sup> This ambitious undertaking, which required hundreds of laborers and huge a huge volume of material, was originally scheduled to be complete by the fall of 1904. The outbreak of the Russo-Japanese War, however, held up shipments of generating equipment from overseas and pushed estimates of completion back to spring 1905.<sup>42</sup>

Because much of the Guishan power plant's construction required so many laborers and

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<sup>40</sup> Xia et al, *Hyakunen*, 20-23; Tsuge, *Tsuge Montarō*, 82-83.

<sup>41</sup> Xia et al, *Hyakunen*, 26-27, 43-63.

<sup>42</sup> "Taihoku dendō jigō no kanseiki" [Completion period for Taipei electric light project], *Taiwan nichinichi shinbō*, September 28, 1904.

took place along or near the Nanshi river rather than high in the mountains, it was often not as exposed or vulnerable as small, individual camphor stills. Nevertheless, as it cemented Japanese and Han Taiwanese presence in the area it fomented new conflicts with various Atayal groups. The most dramatic of these came to a head in the early dawn hours of February 20, 1905. A group of some 36 Gogan Atayal attacked a laborer hut at a point near the power plant, which was at that point nearly complete. Favoring swords and spears over guns so as to avoid raising alarms, they killed 14 of the laborers in the hut: three Japanese husband-and-wife couples, five single Japanese men, one Japanese woman whose husband survived, and two single Han men. Newspaper articles found the likely cause of this attack in beatings that Guishan laborers had inflicted upon Gogan Atayal in the recent past. Journalists noted that the massacre had driven away many other laborers at the site, who decamped the following day back to their homes in the Taipei basin. This delayed both new construction and repairs on a tunnel section that an earthquake had damaged just days before the attack.<sup>43</sup>

This sort of attack on laborers was not unusual. Nor was it particularly remarkable for Japanese men and women to be among the dead—one such attack had happened roughly a month before.<sup>44</sup> Nevertheless, that the attack came on the island’s fervently-awaited first power plant, which had been granted greater protection by a recent expansion of the guard line, made it shocking. In a gesture that was not offered in the case of the deaths of camphor workers, the Meiji Emperor himself dispatched a functionary to Guishan to pray for the dead.<sup>45</sup> The attack was also an impetus

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<sup>43</sup> All from *Taiwan nichinichi shinbō*: “Kusshaku no daizansatsu” [Great massacre in Quchi], February 22, 1905; “Dentō kōji no hakai” [Damage to electric light construction], February 22, 1905; “Kusshaku no daizansatsu yobun” [Pieces of information on the great massacre in Quchi], February 23, 1905; “Kyōban shūrai no genin” [Reason for the fierce savage attack], March 2, 1905.

<sup>44</sup> “Kusshaku no bangai to seinō” [Quchi savage attack and camphor production], *Taiwan nichinichi shinbō*, January 19, 1905.

<sup>45</sup> Xia et al, *Hyakunen*, 28.

for further police and military deployments to protect Guishan itself and close the “great gate” (大門口), a gap in defensive positions that the Gogan group had come through.<sup>46</sup>

Setbacks continued in the form of, for example, a typhoon that choked the station’s intake with debris.<sup>47</sup> But by the summer of 1905 experimental electric transmission had commenced and by October the Guishan hydroelectric plant had begun regular service. Thousands of private homes in Taipei and dozens of businesses were soon connected to the system. By 1907, a journalist made the exaggerated but telling claim that “it is safe to state definitively that within the city walls, Taipei competes for first or second brightest among all city streets in Japan.”<sup>48</sup> Electricity did not immediately displace other forms of illumination. Frequent blackouts meant that even subscribers to the system had to keep oil lamps readily available.<sup>49</sup> Guishan’s location on a free-flowing, mountainous river made it vulnerable to flooding, one cause of these blackouts. Rather than temper enthusiasm for electrification, however, such disruptions increased demand for building more power plants.

After the February 1905 Gogan Atayal attacks, the Government-General responded with such alacrity and force that Guishan ceased to face the threat of such incursions. The foothold for Japanese control that Dogura Ryūjirō had played such an important role in establishing was firmly entrenched. Nearby Wulai would soon become a tourist destination for consumption of indigenous goods and spectacles, as Paul Barclay has described, but the Guishan Hydroelectric Plant and the electricity it brought to the Taipei basin would rarely be associated with the military frontier it was

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<sup>46</sup> “Kusshaku,” February 23, 1905; “Kusshaku no bōban setsubi” [Quchi anti-aborigene protective measures], *Taiwan nichinichi shinbō*, March 12, 1905.

<sup>47</sup> “Dentō no jiko” [Electric light accident], *Taiwan nichinichi shinbō*, August 31, 1905

<sup>48</sup> “Taihoku no dentō” [Taipei’s electric lights], *Taiwan nichinichi shinbō*, November 29, 1907.

<sup>49</sup> Xia et al, *Hyakunen sōsō*, 29-30. On blackouts, see David E. Nye, *When the Lights Went Out: A History of Blackouts in America* (Cambridge: MIT Press, 2010).

built along.<sup>50</sup> The above has argued that Taipei's electrification is inextricable from the private entrepreneurship and state policy that drove Dogura ventures and accelerated the Japanese occupation along the Nanshi river. The power lines stretching downriver towards Taipei were not the only way in which Guishan was part of Japan's war of conquest. Through wires extending into the mountains, Guishan also transformed military strategy and gave hydroelectric development in Taiwan a distinct trajectory.

*Currents of Conquest: Electric Fencing in Highland Taiwan*

Included in the defensive structures erected at Guishan was a wire fence. Once the plant started generating electricity in the summer of 1905, one of the first orders of business was to run current through this fence. Exact voltage and amperage figures do not survive, but electrifying the fence was intended to scare away attacking—or even merely curious—indigenes with a sharp shock. Were this merely a local modification it might not warrant attention, but Guishan in fact powered a range of electric fences that bolstered the guard line separating the regular and “special” (aboriginal) administrative areas. The initial allotment of electricity from Guishan included power for illumination, making ice, refining sugar, polishing rice (all taking place in Taipei), and “aborigine protection” (防蕃用), a reference to electric fencing.<sup>51</sup> While the fence at Guishan itself seems to have been designed to deliver a jolt and nothing more, Japanese colonial engineers sent current through fencing in other locations at such high amperage so as to kill anyone who touched it.

This lethal anti-personnel electric fencing became an important technology of colonial war. While Japanese officials often described these barriers in terms of “protection,” it would be a mistake to conceive of them in purely defensive terms. As mentioned above, vocational efforts,

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<sup>50</sup> Barclay, *Outcasts of Empire*, 229.

<sup>51</sup> Dogura, *Sofu Dogura Ryūjūō*, 17-18.

uncoordinated camphor competition and confrontation, and the informal, alcohol-lubricated interactions of what Paul Barclay calls “wet diplomacy” characterized late Qing and early Japanese interactions with highland indigenes in northern Taiwan.<sup>52</sup> Around 1903, Government-General policy shifted towards a focus of establishing firm military control over and ensuring submission from people in northern interior. In this context, the guard line was less a protective perimeter than an advancing front to allow steady conquest. By the fall of 1905, as crews were hooking up homes, businesses, and prisons in Taipei to the new electric grid, workers—largely Han Taiwanese “coolies”—were driving posts and stringing wire for the island’s first long-distance electric fence between Shengkeng, southeast of Taipei, and nearby areas of Yilan that are now within New Taipei City. In four short months, they laid over 31 kilometers of fence along guard line positions, all fed by current from Guishan.<sup>53</sup> Electricity transformed daily life and industry for thousands in the Taipei basin in the years that followed. Data from the end of 1910 lists uses for electricity in the state of Taipei, including everything from casting and printing to box-making and refrigeration. Out of the eighteen uses, the fifth largest consumer of electricity, behind only rice polishing, waterworks, brick manufacture, and communications, was “aborigine protection” (蕃人防潔).<sup>54</sup> Guishan sat at the technological vanguard of the transformation of not just Taipei but Japan’s military frontier in Taiwan’s mountains as well.

Live electric wire would soon become a defining feature of the Japanese guard line, one that an American newspaper, under the flamboyant headline of “Hunting Head Hunters with Live

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<sup>52</sup> Barclay, *Outcasts of Empire*, 44-48.

<sup>53</sup> “Tetsujōmō no kasetu” [Wire fence installation], *Taiwan nichinichi shinbō*, December 21, 1905. *shinbō*; “Bankai tetsujōmō no kōseiseki” [The good results of the savage border wire fence], *Taiwan nichinichi shinbō*, March 2, 1906.

<sup>54</sup> “Denryoku shiyōsū” [Electricity usage numbers], *Shōkō geppō* 22, March 1911, 9. This list notably excludes electric lights and fans.



Electric Wires,” termed “the most startling innovation in modern methods of warfare.”<sup>55</sup> Inspiration for this innovation likely came from Japan’s experience in the Russo-Japanese War, where Japanese soldiers laying siege to Port Arthur (now Dalian, China) encountered live wires amongst barbed wire fences surrounding the city. Accounts of the battle celebrated how Japanese destroyed these crafty Russian defenses on their way to victory, assuring wide awareness of the military possibilities of electric fencing in the Japanese empire.<sup>56</sup> It was less than a year after the fall of Port Arthur in January, 1905 that live current electric fences began to protect Guishan and mark the guard line’s military perimeter. While the Russian fence had only stood eight kilometers in length, anti-indigene fences would come to stretch for hundreds of kilometers across major portions of the Taiwan.

Electric fencing was installed or extended from places with existing guard line infrastructure, so the major constraint on its growth was not construction materials or labor but rather electric supply. Conserving electricity helped: guardsmen often only flipped the switch to send current through the wiring when reports indicated an active threat nearby. Implementing the technology in new locations across the island, however, required the means to generate electricity on site. This was the purpose of building Taiwan’s second power plant, located at a height of over 900 meters at Fanshekeng (蕃社坑), a tributary of the Luodong river in Yilan, northeastern Taiwan, and completed by 1908. Electric fencing here was installed in 1906 and initially powered by diesel generators until construction finished on the Fanshekeng hydroelectric plant.<sup>57</sup> A preference for hydro over diesel likely related to the difficulties of keeping remote outposts provisioned with fuel,

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<sup>55</sup> “Hunting head hunters with live electric wires,” *Detroit Free Press*, April 4, 1909.

<sup>56</sup> “Denryū tetsujōmō” [Electrified wire fencing], *Taiwan nichinichi shinpō*, September 22, 1904. Interest was not limited to Japan, W. H. Rose, “Electricity in the Work of the Corps of Engineers,” *The Military Engineer* 1 (1909): 274.

<sup>57</sup> “Yilan fangfan ji kaituo,” *Taiwan nichinichi shinpō*, August 18, 1906; “Giran bankai no tetsujōmō,” *Taiwan nichinichi shinpō*, October 11, 1906; Taiwan Government-General, *Taiwan shashin-chō* (Taipei: Taiwan sōtokufu sōtoku kanbō bunkaka, 1908), 26. I owe this final source to blogger Taine Ko, see “Fanshekeng shuili fadiansuo,” *Taine* (blog), July 26, 2014, [https://kotaine.blogspot.com/2014/07/blog-post\\_26.html](https://kotaine.blogspot.com/2014/07/blog-post_26.html)

particularly during times of conflict. In May 1908, minister secretary Saitō Sankichi (齋藤參吉) codified this preference in an aboriginal policy documented submitted to the Governor-General, in which he proposed that hydroelectricity ought to power both new electric fence construction and cable cars used to provision high, mountainous locations.<sup>58</sup>

Evidence from Neiwan (內灣) hydroelectric plant (along the Youluo river, a tributary of the Touqian river in northwestern Taiwan) demonstrates that through the specific potential for generating electricity, highland riverine geography began to shape military strategy. In the summer of 1909, police authorities in Xinzhu state formed an advance company with the goal of pushing the guard line deeper into the interior. Recalcitrant Atayal settlements in the mountains continued to pose a threat and were too distant to be easily monitored or controlled. The campaign's official record described the two purposes of this campaign to be cutting off Atayal routes of attack and “the goal of encircling high-quality headwaters sufficient for generating electricity [to power] an electric fence.” Over nearly two months of fighting, Japanese forces fought skirmishes and called in reinforcements to accomplish this goal. By the time that the objectives (including the prospective power plant site) were captured in late September, 70 members of the invading force were killed and 168 were injured. The casualties included dozens of mostly Japanese policemen alongside Han Taiwanese guardsmen and laborers.<sup>59</sup> Atayal deaths resulting from this campaign are unknown but were likely significant. By 1910, the Neiwan plant was generating current that flowed through nearby fencing and bolstered the guard line, helping to propel the next assault, aimed at the top of the Youluo river's watershed—the strategically important Mt. Dongshan, nearly 2,000 meters above sea

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<sup>58</sup> *Riban shikō dai-ichiben dai-niben* [Aborigine pacification chronicle, volume 1 and 2], (Taipei: Taiwan sōtokufu keimukyoku, 1921), 609.

<sup>59</sup> *Riban shikō dai-ichiben dai-niben*, 705-706. While there were some indigenous guardsmen at this time, it would not be until later that large numbers would be recruited to replace Han guardsmen, whose presence came to be seen as a dangerous (that is, potentially Sinicizing) influence on nearby indigenes: Li, “Nihon tōchi,” 174.

level. Once Japanese forces captured the mountain and built a fort on its peak, they surrounded it with electric fencing. Reliance on highland hydroelectricity was perilous, however: a major typhoon arrived at the end of August, 1911 flooding the Youluo, damaging the Neiwan plant, and cutting off the electric supply. As one Atayal oral history had it, “After that, Atayal attacked the fort during storm. They took over the cannon and pushed it down to the stream.” Japanese forces would eventually force down opposition from Marqwang and other Atayal, but only after bitter, deadly battles—in which streams and hydroelectricity played a major role.<sup>60</sup>

The typhoon on August 31, 1911 that rendered the Neiwan plant temporarily inoperable caused devastation all across northern Taiwan. Guard line posts in the region would begin making meteorological measurements in 1912, but the lack of any data for 1911, in addition to a dearth of surviving detail about the Neiwan plant, makes it difficult to analyze this flooding in detail. That the storm hit all of Taiwan with great force is clear. It is worth noting, however, the likelihood that the very advance of the guard line up the Youluo watershed had exacerbated local erosion and flooding. As one British traveler wrote,

The guard-line was made by cutting a track through the forest, called the guard-road. It usually followed the summit of a range of hills, the trees being felled for some distance on the native side, to make it possible to give warning of the approach of any aborigines and to afford a field of fire. At strategic points guard-houses, of which there are now over 800, were established and garrisoned, the average distance between each being a quarter of a mile. They were constructed from material on the spot—wood, bamboo, earth, and stone; the walls were loop-holed and surrounded by trenches and palisades.<sup>61</sup>

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<sup>60</sup> Da-Wei Kuan, “A River Runs Through It: Story of Resource Management, Place Identity and Indigenous Knowledge in Marqwang, Taiwan, Phd Diss., (University of Hawai’i, 2009), 168; *Riban shikō dai-sanben* [Aborigine pacification chronicle, volume 3], (Taipei: Taiwan sōtokufu keimukyoku, 1921), 741-763; “Lidongshan zhan yi” [The Mt. Lidong campaign,” in *Taiwan yuanzhu minzu lishi yuyan wenhua dacidian* [Glossary of history, language, and culture of Taiwan’s indigenous peoples], <http://citing.hohayan.net.tw/> (as of early 2023 this website is only accessible through the Internet archive).

<sup>61</sup> Owen Rutter, *Through Formosa: An Account of Japan's Island Colony* (Manchester: Camphor Press, 2014 [1923]), 235-236. Barclay has also noted how cartographic representations of a straight line understates the scorched-earth damage done to wide sections of the landscape in order to establish the guard line: *Outcasts of Empire*, 105-106.

Clearing land, both for visibility and for soil, stone, and vegetation removal, would have rapidly incurred erosion. This was especially true on the exposed ridges and slopes that the line cut across as it linked one summit to another (see Figure 1.3 and 1.4). As will be explored—along with the August 1911 floods—in Chapter II, certain military officials recognized the deleterious effect this was having on watersheds, even as they disclaimed any responsibility to address it. What was true generally along the guard line was likely true at Neiwan as well, which supported deployments of thousands of troops over several years in the campaign to capture and hold Mt. Dongshan. As at Guishan, the Neiwan hydroelectric plant itself was a small, run-of-the-river construction that did not rely on impounding a river and creating a reservoir in order to generate electricity. Its ecological consequences had to do with the way that it powered guard line expansion, which in turn rebounded back towards the plant in the form of flooding that threatened to compromise its function. Beyond electrical interruptions, floods at places such as Neiwan also posed major complications for telephonic communications, a crucial logistical component of the guard line.<sup>62</sup>

If capturing prime sites for hydroelectric generation could drive military strategy, a lack of control over such sites also limited hydroelectric development. In 1913, a group of Japanese entrepreneurs in the major East coast city of Hualian proposed a plan to build a hydroelectric plant along the nearby Mugua river with an eye towards refining sugar, illuminating the city, electrifying the railroad, and powering electric fencing in the area. Upon surveying the area, Government-General technician Shōno Kanji took a dim view of the plan. In the area near the coast, he reasoned, the river had too gentle of a drop to produce the amount of electricity that might be desired. He added, though, that “in the future once the fight against the barbarians has proceeded, it might be

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<sup>62</sup> On this topic, see Jen-shen Wu, *Tongxun yu shehui: Rizhi shiqi Taiwan “Jingcha zhuanrong dianhua” xitong de jian li (1895-1945)* [Communication and society: The establishment of the “police exclusive telephone” system during the period of Japanese rule in Taiwan (1895-1945)] (Taipei: Daoxiang chubanshe, 2011). Telephone lines were also vulnerable to intentional sabotage during Atayal counterattacks: *Riban shikō dai-ichiben dai-nihen*, 370.

possible to find a better-suited site in the upper reaches of the same river.” Jen-Shen Wu interprets this instance as demonstrating the power of Government-General technicians to steer private ventures and suggests that Shōno’s influence led industry in Hualian to turn to thermal generation in the short term.<sup>63</sup> What it also shows is that even when demand for hydroelectricity was concentrated along the coast, government technicians often identified the best sources for that electricity in highland indigenous areas.

Wresting highland control away from indigenes involved projecting power along the guard line. Once the wires were live, police took pains to impress electricity’s lethal force upon people in the area. In 1909, Chief of Police Ōtsu Rinpei (大津麟平) instructed guard line personnel to gather Han Taiwanese headmen and the head of every Japanese household and issue stern warnings about the risk for electrocution should anyone approach the fence. All government employees also needed to be informed. Indigenes residing near the line were to also be assembled in large numbers and given a demonstration in which a policeman would induce a pig or water buffalo to approach and contact the fence.<sup>64</sup> The gruesome, instant death of such a large mammal was intended to demonstrate the terrible power of electricity. In another instance, police tested a newly-installed diesel generator and section of line by using it to electrocute a dog.<sup>65</sup> Accidental animal deaths along the fence were also common, as when a surveyor recounted the “unexpected and sumptuous delicacy” of pork *sukiyaki* from an electrocuted pig.<sup>66</sup>

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<sup>63</sup> “Tōbu hatsuden keikaku” [Electric generation plan for the east], *Taiwan nichinichi shinpō*, October 17, 1913; Wu, *Fan xing*, 305.

<sup>64</sup> *Riban shikō dai-ichiben dai-niben* 796, 805-807.

<sup>65</sup> *Ibid.*, 805.

<sup>66</sup> “Tōbu suigen chōsa (5)” [Eastern water source survey, pt 5], *Taiwan nichinichi shinpō*, February 3, 1919.

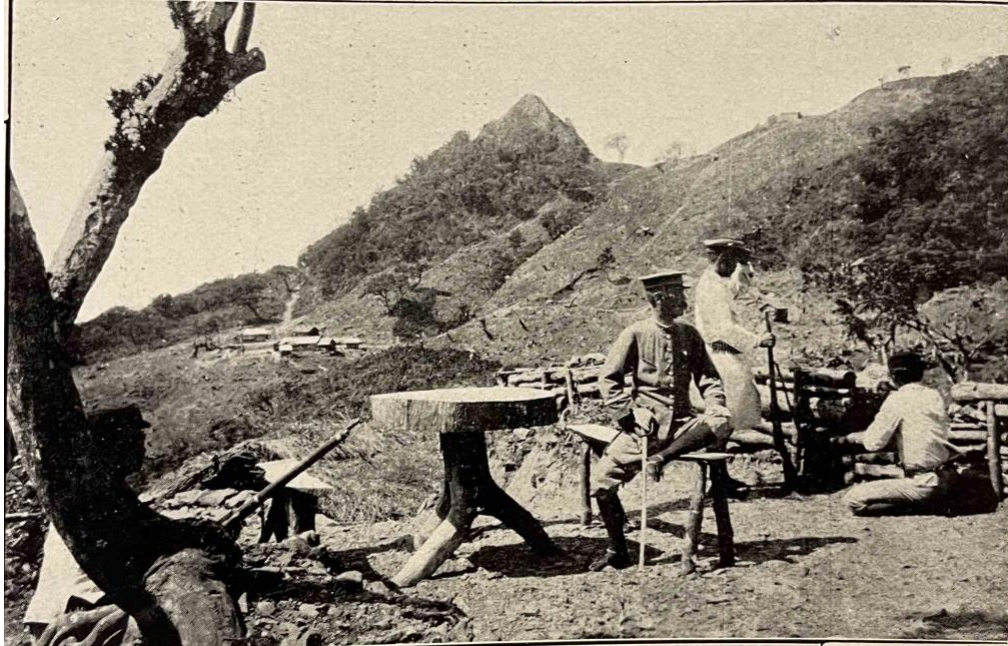


Figure 1.3: A guard line section with clear evidence of recent tree-clearing, both in the background and in the trunk crosscut being used as a table. The hillside in the background, following this sort of deforestation, would have been very vulnerable to erosion.<sup>67</sup>

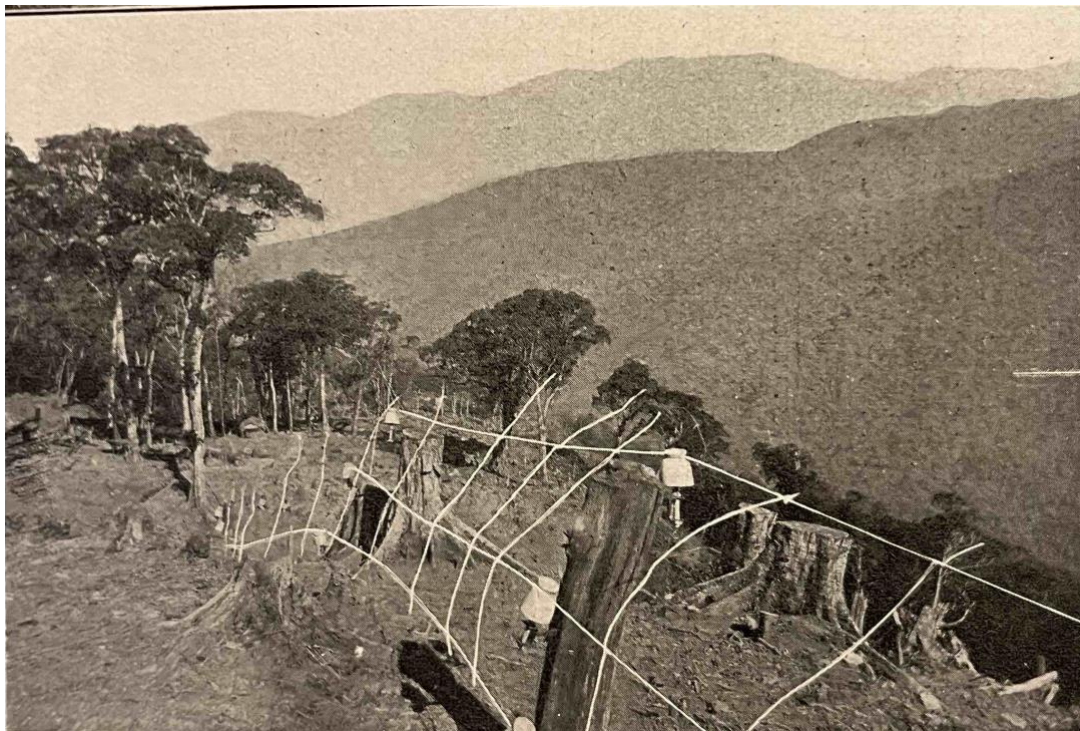


Figure 1.4: Electric fencing amidst tree trunks on the guard line. Source same as above.

<sup>67</sup> *Taiwan seiban shuzoku shashin-chō* [Taiwan raw savage tribe photograph book] (Taipei: Narita shashin seibanjo, 1912). Courtesy of Waseda University Library.

Part of the power of the fences derived from their mysterious workings. A newspaper article on Atayal views of the fence described a general impression that electricity was “equivalent to magic” (魔力に等しき) and recorded a “superstition” (迷信) that those killed by the fences were first transformed into idiots, and thus died with a smile on their faces.<sup>68</sup> While blind fear and stupefaction does not seem to have been the only Atayal reaction to the fences, insofar as this source describes puzzlement it reflects a success of Japanese strategy. Police, while informing local residents that the fences were dangerous, were under strict instructions not to explain anything about how they functioned. Similarly, any discussion of the “structure of the power plants and fences and or principles of electricity” with anyone besides supervisors was strictly forbidden for power plant staff—even if their interlocutor was a fellow government employee. The hydroelectric stations themselves were to not be marked with signs identifying them from the outside.<sup>69</sup>

Fencing proved a dangerous weapon. Late at night on January 28, 1907, an Nan’ao Atayal man whose name is not recorded was electrocuted and died, likely instantly, when he touched the electric fence near Fanshekeng. The next morning, an Atayal group gathered to recover his body, but a few were injured or themselves killed by coming into contact in the fence, and guard line personnel who heard a disturbance soon sighted the group and fired on them. A short skirmish ensued, and the Atayal band eventually retreated upstream to their home village, which has a name recorded in Japanese as Matsutobera.<sup>70</sup> Comprehensive statistics are not available, but electrocutions of people and animals along the guard line became a common occurrence. What is slightly atypical

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<sup>68</sup> “Tetsujōmō to banjin no kansō” [Wire fences and aboriginal thoughts], *Taiwan nichinichi shinpō*, May 4, 1906. Although the term 鐵條網 refers simply to a wire fence, in this context it usually indicated the presence of live electrified wire. Although sometimes misleadingly translated into English as “barbed-wire fence” in scholarship on the guard line, the wire on these fences was not typically barbed.

<sup>69</sup> *Riban shikō dai-ichiben dai-niben* 796, 807.

<sup>70</sup> “Kyōban no setsuden shinshi” [Fatal electrocution of a fierce barbarian], *Taiwan nichinichi shinpō*, February 6, 1907.

about the above example is the fighting surrounding the electrocution. Surreptitious attempts to break through the guard line occasionally brought death by electrocution, but these events rarely escalated into conflict, and many—perhaps even a majority—of electrocutions happened by accident. Japanese police reported and recorded these instances, giving some insight into the ways that the electrification of Taiwan’s highlands introduced the risk of death into a variety of situations. Such deaths in 1921, for instance, included on-duty accidental deaths of two Han police assistants and one Japanese soldier, a Han camphor collector, and a 21-year old Atayal youth gathering water.<sup>71</sup> Marqwang Atayal oral tradition puts the violence of electrocution at the center of the sudden Japanese turn to conquest after an initial period of relative peace, telling of a boy from the Gogan Atayal who, when playing, accidentally touched and was killed by the live wire.<sup>72</sup>

That Japanese and Taiwanese forces “within” the guard line (that is, on the lowland side) may have been just as likely to suffer death from the electric fence as indigenes outside of it shows a willingness to pay a human cost to maintain the cordon. For all their danger, though, the fences were far from insurmountable. Within short order, indigenes developed techniques to overcome the fences. In southern areas where diesel generators powered the fences, indigenes learned that smoke from the generators indicated live current. In the absence of smoke, wire could be pushed out of the way without risk. (It is possible that Japanese knowledge of this counterintelligence spurred efforts to power fencing with hydroelectricity). And even when wire was live, bamboo ladders could overcome it.<sup>73</sup> As American traveler Harry A. Franck wrote in 1927, “They have for many generations build very clever bamboo bridges across the torrents and chasms of their mountains, so

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<sup>71</sup> *Riban shikō dai-goben* [Aborigine pacification chronicle, volume 5], (Taipei: Taiwan sōtokufu keimukyoku, 1938), 122-126, 134.

<sup>72</sup> Kuan, “A River Runs Through It,” 166-167.

<sup>73</sup> Nagasawa Kurakichi, *Tōbu Taiwan ōdanki* [Chronicle of crossing eastern Taiwan] (Tokyo: Meibunsha, 1916), 22.



now they build a stile over the electrified fence, or dig a tunnel underneath it.<sup>74</sup> Indigenous workarounds may have drawn from the animal-killing demonstrations, as it is reported that some learned that they could short-circuit the wire by herding dogs or other animals into the wire: neutralizing fencing's lethal force by way of animal death.<sup>75</sup>

Despite its limitations and danger, electric fencing—often powered by highland hydroelectric stations—was an important part of the Japanese military arsenal. Other weapons in this arsenal included land mines, the clear-cutting of forests, aerial bombing, and naval artillery. Together these helped Japan succeed in broad terms in its goal of “pacification.” By 1915, a full 20 years after the Japanese won nominal control of the island, the massive Atayal subjugation campaign led under Governor-General Sakuma Samata had concluded. This brought to an end the last major colonial rebellions that would occur until the Wushe incident in 1930. For all the pomp associated with this victory, much of the day-to-day work of “aboriginal pacification” continued, even as large-scale warfare ended. For a time, fencing continued to be a defining feature of the guard line, particularly in areas in the south and east that were excluded from Sakuma’s campaign. Some Japanese writers used “wire fence” as a metonym for the border between the lowland regular administrative zone and the highland “savage territory.”<sup>76</sup> In 1917, the fencing reached its greatest extent, with a total length of over 393 kilometers. The deaths listed above show that current was still pulsing through live wire and claiming lives in areas all across the island in 1921. Yet perhaps these unwitting deaths were a factor, alongside the secession of warfare and swelling maintenance costs, in the gradual decommissioning of the fencing. In 1922, Taipei was the first state to remove its fencing, followed

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<sup>74</sup> Harry A. Franck, *The Japanese Empire: A Geographical Reader* (Dansville, NY: F. A. Owen Publishing Company, 1927), 164. See also Franck, *Glimpses of Japan and Formosa* (New York, NY: The Century Co., 1924), 222.

<sup>75</sup> E. H. de Bunsen, “Formosa,” *The Geographical Journal* 70, no. 3 (1927), 270.

<sup>76</sup> “Tōbu suigen chōsa (1)” [Eastern water source survey, pt 1], *Tawain nichinichi shinpō*, January 28, 1919.

by Xinzhu, Taizhong, and Hualian. By 1926 only the southern states of Gaoxiong and Taidong were still operating live wire fencing, which was expected to be removed soon.<sup>77</sup>

*Conclusion: Taiwan's Distinct Course of Electrical Development*

The project of aboriginal pacification (理蕃) was intended to be temporary. That the aboriginal zone and an entirely separate administrative apparatus for the indigenous people residing therein persisted throughout the colonial period reflects, as Paul Barclay and others have argued, compromise and cost-cutting by the Government-General.<sup>78</sup> As a weapon of aboriginal pacification, however, electric fencing was truly temporary. While it was once a major use of electricity in Taiwan and a crucial military technology, by the late 1920s it had all but disappeared from the island. Also temporary were the hydroelectric stations built to power the fence network. Fanshekeng and Neiwan, located high in the mountains, were abandoned as they outlived their usefulness. In other places, the diminishing needs of the guard line freed up electricity to be used for other sources. By 1925, the “energy surplus born out of extreme calm in aboriginal issues” was being offered for sale to agricultural and industrial concerns in Lilong (里壠), Hualian, where businessmen welcomed the opportunity to bring about the “mechanization and electrification of the countryside” (農村の機械化電化).<sup>79</sup>

The author of the very same article described the uses of electricity as taking roots in urban areas and “gradually branching out” into the countryside.<sup>80</sup> This is a common way of viewing

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<sup>77</sup> MT sei, “Riban no bōbi jūnen wo kaerimite” [Looking back on ten years of aboriginal pacification defenses], *Taiwan keisatsu kyōkai zasshi*, June 1926, 69-70.

<sup>78</sup> Barclay, *Outcasts of Empire*, 13, 246.

<sup>79</sup> Hyōdō sei, “Hontō yuitsu Rirō denki no riyō kumiai ni tsuite” [On the Lilong electricity use cooperative, the only one on this island], *Taiwan no sangyō kumiai*, September, 1927, 31, 33-34.

<sup>80</sup> Hyōdō sei, “Hontō yuitsu,” 31.

electrification, a process which has taken place across most of the globe since the late 19<sup>th</sup> century. What is noteworthy here is that the author would rely on this model in spite of firsthand knowledge of Taiwan's deviation from this pattern—electricity arrived along remote stretches of the guard line before it lit up most of the island's cities. Nagao Hanpei highlighted this distinctiveness for readers of the *Tōyō Jihō*, a journal distributed across Japan's formal and informal empire, when he introduced the uses of electricity and Taiwan and wrote, “somewhat extraordinary and absent in the home islands is the use of this for protection against aborigines, that is, sending high-tension current to the wire fencing along the savage border, where it takes on the role of an automatic guardsmen (自働隘勇).”<sup>81</sup> People across East Asia—even across the world—knew about the electrified guard line and the fact that hydroelectricity powered it. Fencing was always meant to be temporary, however, and police sought to keep the means of electric production obscure. That places such as Neiwan hydroelectric plant existed was no secret, but as seen above, their precise location and method of operation was confidential information. Given that obscurity and impermanence, it is not so odd that electrification in Taiwan might come to appear as more or less the same process that had taken place in metropolitan Japan and elsewhere.

This also helps explain why accounts of Taiwan's electrification omit both fencing as a major use class and guard line stations as some of the first hydroelectric stations. A standard Government-General narrative that first emerged as early as 1912 continued to reappear in extremely similar forms in subsequent publications in Taiwan and metropolitan Japan, including several written by industry insiders.<sup>82</sup> Versions of this narrative have survived in the official corporate history of

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<sup>81</sup> Nagao Hanpei, “Taiwan in okeru suiryoku denki no genkyō oyobi shiroari no gai” [The current situation of hydroelectric power in Taiwan and termite damage], *Tōyō jihō*, April, 1910, 22.

<sup>82</sup> *Taiwan tokei yoran* [Taiwan statistical summary] (Taipei: Taiwan sōtokufu, 1913), 252-256; *The Statistical Summary of Taiwan* (Taipei: Taiwan sōtokufu, 1917), 259-260; *Meiji kōgyō-shi denki-ben* [Meiji history of industry, electricity edition] (Tokyo: Kōgakkai Meiji kōgyō-shi hakkojo), 541; “Taiwan no denki jigyō” [Taiwan electrical projects], *Taiwan nichinichi shinbō*, May 2, 1928; Akashi Shotarō, “Jichigetsutan suden kōji kansei wo mae ni shite” [Facing the completion of

Taiwan Power Company, the state-owned electric utility since 1946.<sup>83</sup> These accounts invariably began at Guishan, where entrepreneurs formed a company to use the Nanshi river, and the Government-General, “in view of the existence of many rivers of high gradient in the Island, happened to have under consideration projects to take advantage of them in developing industries.”<sup>84</sup> Electric fencing never appeared in these accounts, which situated industrial, agricultural, and urban needs—not highland war—as the driving force behind hydroelectric development. Similarly, lists of power plants excluded guard line stations such Fanshekeng or Neiwan. This was true even for other-wise exhaustive catalogs, such as one from the 1930s that listed 36 different electric-generating stations built on the island between 1905 and 1934.<sup>85</sup>

Works of history generally reproduce this division, keeping the history of technology, agriculture, and industry in Taiwan separate from military conquest. But these processes clearly were vitally interlinked. It was only through Dogura’s entrepreneurial forestry that Japanese capital and police power gained a foothold around Quchi. This in turn enabled the establishment of the Guishan hydroelectric plant under private and later public auspices, which both cemented the local Japanese presence and came to power the first deadly electric fences on the island. These expanded alongside highland electric generators, particularly hydroelectric ones, and shaped the Japanese military cordon of highland indigenes. While the guard line cut across valleys and gullies across the island, hydroelectric live wire is an important way in which Japanese colonialism followed and harnessed Taiwan’s rivers to rule the island.

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construction on the Sun Moon Lake hydroelectric plant], *Taiwan denki kyōkai kaibō*, March 1933, 71.

<sup>83</sup> Taiwan Power Company, *Taiwan dianli chuangye baizhounian* [100-year anniversary of the electrical industry in Taiwan] (Taipei: Taiwan Power Company, 1988), 20.

<sup>84</sup> *Statistical Summary of Taiwan*, 259.

<sup>85</sup> *Taiwan no dōryoku shigen* [Energy resources of Taiwan] (Taipei: Taiwan sōtokufu kōtsūkyoku teishinbu, 1935), 39-41.

## Chapter II—The Turn to the Highlands: Flooding, Forestry, and Indigenous Environments in Japanese Taiwan, 1911-1919

Every spring in East Asia, a stationary front known in various languages as the “plum rain” brings months of humidity and persistent precipitation. It swells rivers, softens soil, and nurtures plants. Rice paddies overflow with water, and the frogs that live within in them fill the air with their croaks. All over the region, a large share of a year’s rainfall falls in these few months. This season of gentle rains, however, rarely sees the sort of violent downpours that cause hillsides to collapse and rivers to burst their banks. It is rather after the rainy season, during summer and early fall, that tropical cyclones (typhoons) form in the western Pacific and wreak havoc.

This weather pattern was as familiar to Japanese officials in the early years of Japanese rule in Taiwan (1895-1945) as the basic features of colony’s rivers—short, steep, and swift, much like their Japanese counterparts. These rivers were small most of the time, but a typhoon could rapidly transform them into destructive deluges. Since towns and prime farmland were mostly located near rivers, flood control thus became an existential question. In 1901, Japanese engineer Takahashi Tatsujirō (高橋辰次郎) conducted a survey of several of Taiwan’s rivers and reported that they were all “violent streams” (暴流). Back in Japan, a conventional two-pronged approach utilized locally available lumber and gravel to build levees on both the plains and the mountains and stave off the worst flooding. In Taiwan, however, the lowland area of many rivers was distressingly short; Takahashi wrote that “rivers gush straight out of the mountains into the sea.” This meant that any downstream solution could only address a small part of the problem: flood control would have to focus on upland areas. In his journeys into foothills, Takahashi did find some levees built by Han Taiwanese under Qing rule the mid-19<sup>th</sup> century that mirrored Japanese methods and earned his

respect. Nevertheless, geography posed formidable obstacles.<sup>1</sup>

Part of the geographic trouble Takahashi saw was logistical. Without decent roads into the mountains, there was no easy way to transport labor and material to riverbanks to prevent or contain upstream flooding. Another geographic hurdle was political. The mountains, where all the island's rivers originated, were the province of Taiwan's indigenous peoples. As Takahashi put it, "the difficulty for flood control in Taiwan is that river sources are all located in the savage mountains, and the rivers are therefore fundamentally difficult to control."<sup>2</sup> Although Japan declared dominion over Taiwan in 1895 following the First Sino-Japanese War, it took many years—well into the 20<sup>th</sup> century—before the Japanese army invaded and consolidated control over the whole of the island's interior. At the turn of the century, Japanese military forces were still fighting a brutal war to "pacify" indigenous Taiwanese, and concerns Takahashi and other engineers had about flood control were secondary to the imperatives of military conquest.

In 1901, then, Japan's colonial government in Taiwan had neither the capacity nor the inclination to prioritize flood control in its dealings in the mountains. Nevertheless, certain Japanese officials already recognized that trying to control a river along its entire course would by necessity link the ethnically, administratively, and environmentally distinct "savage mountains" to settlements in foothills and cities by the sea. In the years to follow, lowland cities expanded alongside agricultural and industrial growth, meaning each flood had the potential to be more destructive than the last. As geographer Gilbert White famously observed in 1942, "floods are 'acts of God,' but flood losses are largely acts of man."<sup>3</sup> In Taiwan, the fact that floods were causing greater and greater economic damage reflected to a significant extent an ever-thickening

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<sup>1</sup> "Hontō chisuinan" [This island's flood control difficulties], *Taiwan nichinichi shinbō*, March 10, 1901.

<sup>2</sup> "Hontō chisuinan"

<sup>3</sup> Gilbert White, *Human Adjustment to Floods: A Geographical Approach to the Flood Problem in the United States*, Research Paper No. 29 (Chicago: University of Chicago Department of Geography), 1945 [1942], 2.



Figure 2.1: In this 1911 map produced by the colonial government, the dotted line demarcating the “savage districts” roughly follows the border between mountain and plain. Rivers transect both of these boundaries.<sup>4</sup>

concentration of value near rivers. Yet nobody in a position of power within the colonial apparatus took this view. That is not to say that they viewed floods as inevitable or natural. Instead, colonial officials searching for someone to blame first looked to the foothills, where they saw Han Taiwanese

<sup>4</sup> Government of Formosa [Taiwan Government-General], *Report on the Control of Aborigines in Formosa* (Taihoku: Bureau of Aboriginal Affairs, 1911), inset. From “Formosa Nineteenth Century Images,” Reed College, <https://rdc.reed.edu/i/20fbf9b9-78d5-41b2-b807-bffca39c62f1>.

recklessly harvesting timber and clearing land. Looking further upstream, their gaze eventually settled upon mountain-dwelling indigenes. Forestry scientists described a variety of indigenous (chiefly Atayal and Bunun) environmental practices, including hillside cultivation and the use of fire to clear farmland or hunt, as a threat to soil stability and river health for the whole island. Today, scientific understandings hold that Taiwan's most severe erosion, flooding, and landslide events result from natural conditions that are only slightly mediated by human land use in headwater areas.<sup>5</sup> Tracking how a different conclusion became consensus opinion offers a case study of colonial science in action.

This chapter argues that a series of particularly destructive floods in 1911 and 1912 both heightened the importance of flood control for the colonial government and inaugurated a paradigm shift in flood control methods. Chapter I highlighted the importance of Taiwan's rivers' steepness in generating hydroelectricity for highland military conquest and lowland industry and urbanization. That same steepness, as scientists and officials saw it, helped make floods dangerous. Parties inside and outside of the Government-General, from Han Taiwanese villagers to Japanese capitalists and bureaucrats, all lobbied authorities to protect towns and farmland through establishing levees, revetments, retention ponds, and riparian woodlands. Infrastructural upgrades followed and saw some success in limiting damage but could not halt the near-annual swelling of rivers. Forestry scientists formed a key constituency arguing that the continuing scourge of floods proved the necessity of interventions in far upstream areas. Most important among these interventions were afforestation and the reform of native ways of life.

Beginning in the 1910s, flood control (*chisui* 治水) gradually expanded to emphasize erosion and flood control (*chisan chisui* 治山治水). Through technical reports and the popular press, scientists

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<sup>5</sup> J.D. Cheng et al., "Influences of forests on water flows from headwater watersheds in Taiwan," *Forest Ecology and Management* 165 (2002): 11-28.



articulated a vision of a normative highland landscape that featured large, productive forests and was largely devoid of people. In this conservationist view, woodlands needed to be protected and expanded both for the timber they had to offer and also for the ways that they ensured stable water supplies. Up in the mountains of central and northern Taiwan, indigenous peoples had their own long-established strategies for managing resources. Japanese scientists evinced some interest in these systems of what might now be called Traditional Ecological Knowledge (TEK), and native use of the Taiwanese alder (*alnus Formosana*) in particular left a lasting mark on Japanese forestry and landscapes alike. These scientists, however, ultimately condemned indigenous environmental practice as part of a lifestyle that was uneconomical and threatened the supply of resources for the empire. Such a perspective was hardly limited to Taiwan within the Japanese empire, or to the Japanese empire within the broader world. The contours of Taiwan's physical and human geography shaped science and policy in distinctive ways, however, and these are crucial to understanding the dispossessions of indigenous Taiwanese elaborated in later chapters of this thesis. Below, I introduce the problem of "upstream thinking" as a central one in Japanese environmental history before proceeding to first describe the 1911 and 1912 storms that laid the island's vulnerability to flooding bare, and next investigate the notion of "upstream thinking" in flood control science across the first quarter-century of Japanese colonial rule.

### *The Problem of Upstream Thinking*

Running through the course of Japanese environmental history is a concern with the ways that comprehensive flood control required governing conditions in the mountains as well as the plains. Written with the four-character compound *chisan chisui* (治山治水), the operative phrase translates word-by-word as "control mountains, control waters." This compound did not enter common circulation until the 1910s, but not long afterwards commentators began identifying the underlying

philosophy as possessing deep roots in Japanese history.<sup>6</sup> In 1937, flood control officials in colonial Taiwan wrote that timber merchant Kawamura Zuiken and Neo-Confucian thinker Kumazawa Banzan embodied this ideal as early as the seventeenth century. Such an identification with early modernity has continued in recent Anglophone scholarship. Conrad Totman gives both a literal translation for *chisan chisui* as “management of mountains and waters” and a broad translation as “protection forestry” in his analysis of the ruling shogunate’s widely integrated environmental management systems from the seventeenth century onwards.<sup>7</sup> Others pinpoint a more recent origin. In his book *Toxic Archipelago*, Brett Walker writes of famed Meiji-era environmental leader Tanaka Shōzō, “Tanaka had, over the course of decades of conflict, condensed his philosophy to two words that later, though not in his lifetime, developed into a new global epistemology: *chisan chisui*, or ‘care for mountains and forests, care for rivers and streams.’ It was the birth of modern conservationism.”<sup>8</sup>

Although scholars might disagree over the contours of *chisan chisui*’s development and its proper translation into English (I prefer the simple “erosion and flood control”), there is a consensus about its crucial place within Japanese environmental history. In presenting Tanaka Shōzō

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<sup>6</sup> The same compound, read in Mandarin as *zhishan zhishui*, did not enter wide use in Chinese until the 1940s. Japanese commentators occasionally pointed to philosophical underpinnings from Chinese classics as well: see *Chisan jigyo gojunenshi* [Fifty years of flood control projects] (Tokyo: Nihon chisan chisui kyōkai, 1960), 87-88. Important English-language works on flood control in early modern Japan include: Philip C. Brown, “Constructing Nature,” in *Japan at Nature’s Edge*, 90-114; Brown, “Floods, Drainage, and River Projects in Early Modern Japan: Civil Engineering and the Foundations of Resilience,” in *Environment and Society in the Japanese Islands*, 96–113; Patricia G. Sippel, “Chisui: Creating a Sacred Domain in Early Modern and Modern Japan,” in *Public Spheres, Private Lives in Modern Japan, 1600–1950: Essays in Honor of Albert M. Craig*, ed. Andrew Gordon et al. (Cambridge: Harvard University Asia Center, 2005), 154-184; Conrad D. Totman, “Preindustrial River Conservancy: Causes and Consequences,” *Monumenta Nipponica* 47, no. 1 (1992): 59-76; Roderick I. Wilson, *Turbulent Streams: An Environmental History of Japan’s Rivers, 1600-1930* (Leiden: Brill, 2021). One recent work particularly attendant to upstream-downstream connection and conflict is Joanna Morgan Linzer, “Iron Archipelago: Environment and Industry in Early Modern and Modern Japan” (PhD diss., Yale University, 2021).

<sup>7</sup> *Shinrin to chisui* [Forests and flood control] (Taipei: Taiwan sōtokufu shokusanryoku shinrinchisui jimusho, 1937), 4-5; Conrad Totman, *The Green Archipelago: Forestry in Pre-Industrial Japan* (Berkeley: University of California Press, 1989), 93. Tessa Morris-Suzuki also links what she calls “the management of mountain and water resources” to Kumazawa Banzan: Tessa Morris-Suzuki, *Re-inventing Japan: Time, Space, Nation* (Armonk, NY: M. E. Sharpe, 1998), 40

<sup>8</sup> Brett Walker, *Toxic Archipelago: A History of Industrial Disease in Japan* (Seattle: University of Washington Press, 2010), 106.

as precociously anticipating modern conservation writ large, Walker also makes an argument for global significance. It is certainly true that within the past couple of decades, the field of ecosystem management has increasingly used the watershed—a river’s entire catchment basin—as the basic unit for both assessing natural conditions and prescribing interventions.<sup>9</sup> Any claims for Japanese precedence are more difficult to sustain, not least because, as the above scholars note, of a long history of antecedents in China.

Where this common celebration of upstream thinking truly falls short is in its failure to ask what the implications of such a conservationist outlook were to those who articulated it and to those who fell under its power. Walker celebrates Tanaka’s precocity in anticipating Aldo Leopold, yet he does not extend this parallel to suggest that in the Japanese empire as in the United States, conservation entailed the dispossession of less privileged classes of people at the hands of elites and the state. Louis Warren, Mark David Spence, and Karl Jacoby were vital in spreading this understanding of conservation in American history, while S. Ravi Rajan’s account of forestry science uncovers similar dynamics in the British Empire. Most recently, David Fedman has linked Japan’s colonial empire to global environmental history through an emphasis on intertwined projects of environmental and social control in colonial Korea.<sup>10</sup>

This chapter both extends and bends this line of inquiry. A simplistic binary of colonizer and colonized peoples, common in imperial history, does not obtain in Taiwan, where conservation was wrapped up in racializing discourses that alternately collapsed or distinguished indigenous and Han Taiwanese on the basis of their purported relationships to the land. Although both of these diverse

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<sup>9</sup> David Grant et al, “Watershed Analysis as a Framework for Implementing Ecosystem Management,” *Water Resources Bulletin* 31, no. 3 (1995): 369-386. In modern technical parlance, *chisan chisui* is best translated as “integrated watershed management.”

<sup>10</sup> Warren, *The Hunter’s Game*; Spence, *Dispossessing the Wilderness*; Jacoby, *Crimes against Nature*; Rajan, *Modernizing Nature*; Fedman, *Seeds of Control*.

groups constituted colonized populations, Han Taiwanese settler colonialism continued to structure economic and environmental relations under Japanese rule, particularly in foothills and other Han-indigene contact zones.<sup>11</sup> Taiwan is thus a fruitful setting for unraveling the complexity of Japanese conservation in a colonial setting. This matters for the broader field of Japanese imperial history because Taiwan was Japan's first major overseas colony, and developments on the island shaped Japanese imperial ventures elsewhere. One example touched on below is that of Japanese bureaucrat and businessman Kada Naoji (賀田直治). Historians including Fedman and Carter Eckert have described Kada as an influential force in environmental and industrial policy in colonial Korea, including in regards to Korea's relationship to Manchuria, but do not mention the early formative years that Kada spent on the ground in Taiwan.<sup>12</sup> This gives the impression that the empire operated on a hub-and-spoke model, where practices, technologies, and people moved between metropole and colony but not between the colonies themselves. Kada, by contrast, exemplifies hitherto-neglected lateral flows and illustrates how aspects of Japanese colonialism first developed in Taiwan later circulated throughout the rest of the empire.

A holistic view of watershed conservation with its attendant commitment to control was not pre-ordained to gain prominence in colonial Taiwan. At the dawn of Japanese rule in 1895, flood control of any sort was a marginal concern for the Government-General. Explaining how erosion and flood control wound its way through scientific discourse into the mainstream of government policy requires an account of the arresting floods that visited Taiwan in the summers of 1911 and

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<sup>11</sup> On settler colonialism in Taiwan, see Katsuya Hirano, Lorenzo Veracini, and Toulouse-Antonin Roy, "Vanishing Natives and Taiwan's Settler-Colonial Unconsciousness," *Critical Asian Studies* 50, no. 2 (2018): 196-218.

<sup>12</sup> Fedman, *Seeds of Control*, 176; Carter J. Eckert, *Offspring of Empire: The Koch'ang Kims and the Colonial Origins of Korean Capitalism, 1876-1945* (Seattle: University of Washington Press, 1991), 165-168. Until 1907, Kada was known by his birth name, Ichijima (市島)Naoji. When historians connect colonial Taiwan to Japan's continental empire, it is often through reference to Gotō Shinpei, an architect of empire who occupied important offices in Taiwan, Manchuria, and metropolitan Japan. One creative exception is Xu Xueji 許雪姬, *Rizhi shiqi zai "Manzhou" de Taiwanren* [Taiwanese in Manchuria during the Japanese period], (Taipei: Zhongyang yanjiuyuan jindaishi yanjiusuo, 2002). One recent work that foregrounds both lateral connections and Taiwan's importance is Shirane, *Imperial Gateway*.

1912. In the following pages, I move from the floods and the response they occasioned to a broader discussion highlighting the intersection of these events with the scientific discourse of upstream thinking, popular understandings of water, and the imbrication of indigeneity and ecology.

*Two Sixty-year Floods in Two Years*

The first cluster of storms began on August 26, 1911, and over the course of several days made its way northwest across Taiwan, growing in intensity as it neared Taipei. Rivers swelled and flooded, in some places by as much as seven meters above their normal levels. An account in the Chinese-language section of the *Taiwan Jihō*, the most important monthly publication in colonial Taiwan, stated that the disaster was “the worst in the past fifty years.” People died all across the island, from Taipei in the north to Gaoxiong in the south, for a total of 432 fatalities and 133 missing people. Thousands of livestock were killed and hundreds of thousands were missing; nearly thirty thousand homes were entirely destroyed and even more hectares of farmland were washed away or laid to waste. Amidst widespread flooding in Taipei, newspapers reported that electricity and municipal water service were cut off, and outbreaks of typhoid fever, dysentery, and cholera were likely to happen.<sup>13</sup> For over a month following the disaster, the major Japanese metropolitan newspaper *Asahi shinbun* printed appeals every single day asking for donations to disaster relief in Taiwan. Beyond reconstruction costs, economic damage also included huge losses of revenue: the Government-General estimated its loss of tax revenue from sugar and other industries at over 2.26 million yen.<sup>14</sup>

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<sup>13</sup> “Baofeng shuihai” [Explosive winds and floods], *Taiwan jihō*, September 1911, 60-61; “Tensaigo no eisei” [Post-disaster hygiene], *Taiwan nichinichi shinpō*, Sep. 4, 1911.

<sup>14</sup> See “Taiwan fūsuigai gien” [Taiwan wind and flood disaster donations], *Asahi shinbun*, Sep. 13 to Oct 23, 1911; “Taiwan no zaisei” [Taiwan’s finances], *Asahi shinbun*, Feb. 2, 1912. Government-General expenditures in 1910 totaled approximately 26.6 million yen: Samuel P. S. Ho, *Economic Development of Taiwan, 1860-1970* (New Haven: Yale University Press, 1978), 34.

In the aftermath of the flood, calls came from every quarter for thoroughgoing disaster relief and flood control measures. A petition from the village of Houlong (後龍) illustrates the existential threat that flooding posed to certain communities. When the typhoon struck this port city—located near the mouth of the Houlong River in present-day Miaoli Province—on August 31, 1911, it tore the river’s levees into pieces, causing widespread flooding and sweeping away hundreds of houses. Two months after the flood, the village chief and seven headmen banded together to submit a petition to Governor-General for disaster relief. This document, filed away with a report on the storm, provides a rare glimpse into how Han Taiwanese enlisted the colonial government on issues of flood control, infrastructure, and disaster relief.



Figure 2.2: this photo suggests some of the devastation and dislocation of 1911’s floods in Taipei. The caption reads: “Yesterday’s house is today’s raft—an extreme tragedy”<sup>15</sup>

In their petition, the villagers stressed the pride they had in their city, which despite its small

<sup>15</sup> *Shingai bungetsu Taito fūsuigai shashinshū (Meiji 44nen)* [Xinhai wenyue Taipei wind and water disaster photo collection (1911)] (Taihoku: Narita Takeshi, 1911), 0748. National Taiwan Library.

size served as a center of trade between Taiwan and the broader world for more than three hundred years. And though Houlong's convenient location recommended it as a port, it also exposed it to flooding from rivers to both the north and the south. In the late years of Qing rule, then-governor of Fujian Cen Yuying (岑毓英) built stone levees along the river and planted grass all along its banks to moderate the flow of water. When floods did happen during the Qing years, officials were magnanimous and granted monetary aid to those in need; all shared in the largesse of such benevolent governance, and communities were thereby revived.<sup>16</sup>

Contrasting with this rosy view of bygone days was an alarming description of recent conditions. When the Houlong River overflowed in August 1911, the villagers wrote, it formed a deluge that destroyed the levees that had stood since the 1880s, swept away city walls and houses, and in a rush of water and mud transformed the city into a “land of swamps” (澤國). More than four hundred houses were destroyed, and the headmen listened in anguish to the cries of those who were left without food or shelter. Recognizing just how perilous Houlong's location was, residents with the means to do so were already moving away. Saving the village from further misery and decline would thus require speedy, broad dispensation of relief funds and a comprehensive flood control policy. Otherwise, the petition warned, “only a few years hence the houses in the countryside will entirely become gravel” (向後不出數年田園第宅悉為砂礫)<sup>17</sup>

Although the authors couched their request in the language of humbly beseeching the Governor-General for assistance, the criticism stands clear. In terms of both protecting Houlong from floods through building levees or planting vegetation and in terms of providing succor to villages once disaster had occurred, the colonial government fell short of its Qing predecessors. That

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<sup>16</sup> Ishiwatari Eikichi Kōryūshō suigai chōsa fukumeisho [Ishiwatari Eikichi Houlong village post-inspection report], 1912, 00005551009, Taiwan Historica, Nantou, Taiwan, 229.

<sup>17</sup> Ishiwatari Eikichi fukumeisho.

colonized peoples would hold such a view may not come as a particular surprise, but Japan's colonial archive rarely gives voice to them. In response to this petition, Governor Ienaga Taikichirō (家永泰吉郎) of Xinzhu state acknowledged that Qing rulers had indeed made several attempts at riparian construction to control the river. Nevertheless, he contended that a lack of proper maintenance beginning in the Qing years was what doomed Houlong to flooding. Ienaga did endorse the villagers' call for repairs to be done and, only days after receiving the petition, authorized emergency funding to build new levees along the riverbanks. The call for individual disaster relief, however, went unanswered.<sup>18</sup> This suggests that requests from Han Taiwanese for infrastructural improvements, rather than direct monetary relief, were likely to be met with speedy action on the part of the colonial government. Indeed, a later tabulation by the Government-General found that 88 such petitions had been submitted by 1927 but described them solely in terms of popular enthusiasm for riparian construction. It noted that with villagers providing land and labor and the colonial government funding, such infrastructure could be expanded and help with disaster prevention, but it made no mention of disaster relief.<sup>19</sup>

In a related survey investigating the Houlong Flood, Ishiwatari Eikichi (石渡榮吉) of the Government-General's Department of Civil Administration (*Minseibu*) lamented the growing scourge of flooding and found blame in patterns of Chinese colonization. Ishiwatari wrote that early migrants from China cleared land with abandon: they felled trees alongside riverbanks and headwaters, which decreased the capacity of the riparian environment to absorb water and sediment, forcing riverbeds to grow in height year after years, and in turn meaning that even a constant flow of water from upstream flow and precipitation would lead to increasingly destructive floods. Myopically

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<sup>18</sup> Ishiwatari Eikichi fukumeisho, 225-226.

<sup>19</sup> *Taiwan sōtokufu naimukyoku shukan doboku jigyo gaiyo sbōwa 2nen 1gatsu* [Taiwan government-general home bureau public works project summary, January 1927] (Taipei: Taiwan sōtokufu naimukyoku, 1927), 37.



fixated on profits to be made in the short term, these settlers kept cutting and planting, without any thought that alongside rice they were also sowing seeds of their own destruction. Ishiwatari's use of racist tropes that linked greed, shortsightedness, and reckless deforestation was quite typical among colonial Japanese commentators describing Taiwan's Han residents in both the present and the past. What was more distinctive in his framing, however, was that he saw this act of environmental self-sabotage as resulting from a "lack of any concept of national land" (國土の概念なるものなく).<sup>20</sup> The very understanding of land, down to soil and roots and moisture, as part of one's country was to Ishiwatari a necessary part of patriotic stewardship. There was a slippage between Ishiwatari's analysis of historic settlement under Ming or Qing rule and present-day circumstances in the Japanese empire: could there be a durable concept of territory as "national land" when the controlling power changed? What was significant for him, though, was the presumed absence of any such consciousness among Han Taiwanese. This, the argument went, caused environmental degradation that threatened both Han communities themselves and the integrity of Japan's imperial geo-body.

References to "national territory" or "land" (*kokudo*) would become central to the vocabulary of flood control articulated by scientists and, increasingly, bureaucrats and journalists as well. In a column on "the river problem," printed in late September 1911, the major daily newspaper *Taiwan nichinichi shinbō* called for a flood control measures commensurate with the scale of disaster the island had just endured, declaring "certainly, the fate of a nation must eternally go hand in hand with protection of its national land." Within a month, plans were in place for a major, five-year survey of flood control and river conditions across the island, with an annual budget of 200,000 yen secured from the Government-General. There was a marked lack of urgency, however, in the fact that this

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<sup>20</sup> Ishiwatari Eikichi fukumeisho, 211.

flood control survey would not begin until the following fiscal year began in April 1912. And even calls warning against complacency characterized the 1911 floods as the worst in fifty, sixty, or eighty years and predicted that another flood of similar severity would not have to be endured for another century.<sup>21</sup>

Instead, it took hardly over one year for disaster to strike again. On September 1 and 2, 1912, a typhoon swept across northern Taiwan and brought deluges that once again caused devastating flooding. Although more geographically limited to northern areas and claiming fewer lives, building losses were such that the *Taiwan nichinichi shinpō* declared that in Taipei, the 1912 floods were even worse than those of the previous year.<sup>22</sup> It did not escape commentators' attention that Taipei had experienced two "sixty-year floods" in two years, and calls followed for far larger levees and stricter control over riverside building construction. One journalist denounced the "primitive" state of Taiwan's rivers, which were free to flow wherever the water wished to flow, with no levees, revetments, or dredging to keep them in check. This was why the Tamsui River flooded two times in as many years—it wasn't the same river in 1912 as it had been in 1911. "Obvious to even the layman's eye" was the fact that the riverbed was higher than it had been the previous year, precisely because the massive volume of rock and soil washed down in 1911 had settled at the bottom of the river.<sup>23</sup>

Dredging to clear debris from riverbeds would follow, along with new levees and revetments, both in Taipei and eventually across the island. These measures helped temper the wild changes in course that made Taiwan's dynamic rivers so dangerous.<sup>24</sup> There were also surveys of riparian

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<sup>21</sup> "Kasen mondai" [River problems], *Taiwan nichinichi shinpō*, Sep. 30, 1911; "Chisusi to kasen chōsa" [Flood control and river surveys], *Taiwan nichinichi shinpō*, Oct. 24, 1911.

<sup>22</sup> "Sakunen to honnen no kōzui" [Floods last year and this year], *Taiwan nichinichi shinpō*, Sep. 6, 1912.

<sup>23</sup> "Suigai zetsumetsuhō" [Methods to eliminate flood disasters], *Taiwan nichinichi shinpō*, Sep. 4, 1912; "Taihoku no kakon" [The root of Taipei's disaster], *Taiwan nichinichi shinpō*, Sep. 5, 1912.

<sup>24</sup> Itō Taieimon, *Taiwan Ringyōshi Dai-2 kan* [History of Taiwan's forestry, volume 2] (Taipei: Taiwan Sōtokufu

vegetation in the plains and the foothills intended to protect from the supposed scourge of Han overcutting that Ishiwatari had identified.<sup>25</sup> Yet no less significant was the emergent sense of threat from upstream erosion and flooding. From the first years of colonial rule, scientists had been energetic proponents and popularizers of this type of “upstream thinking,” which implicated upland Han and indigenous environmental practice in lowland disasters and promoted an integrated vision of Taiwan held together by its watersheds and the idea of “national land.” In the following section, I examine how these visions were articulated in limited spaces in the early colonial period and, by the late 1910s, how they began to permeate colonial discourse and policy more broadly. Doing so both reveals important shifts in governance and offers a look at the encounter between Japanese colonial science and indigenous ecological management.

### *Highland Erosion in Colonial Forestry Science*

Transforming the scarcely-mapped and forbidding interior of Taiwan into Japanese territory was accomplished in theory with one fell stroke of the pen at the outset of colonial rule. Exercising effective military control over this vast expanse of land and taking stock of the resources it contained was another matter entirely, one that dominated the attention and finances of the colonial government in the early years of its rule.<sup>26</sup> One facet of this effort was sweeping surveys of Taiwan, including an 1896 expedition to the tallest peak in the Empire, Yu Shan (Mt. Morrison), undertaken by professional foresters Saitō Otosaku (齋藤音作) and Honda Seiroku (本多静六) along with a

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Shokusankyoku, 1929), 40. In southwestern Taiwan, a third typhoon in July 1913 contributed to crop devastation, peasant immiseration, and a major anti-Japanese uprising in 1915: Paul Katz, “Governmentality and Its Consequences in Colonial Taiwan: A Case Study of the Ta-pa-ni Incident of 1915,” *The Journal of Asian Studies* 64, no. 2 (2005), 401.

<sup>25</sup> Furukawa Yoshio, *Dakusuikei ryūiki hoanrin chōsa fukumeisho* [Zhuoshui river watershed forest preserve survey report] (Taipei: Sōtokufu shokusankyoku rinnuka), 1913, 0000567001, Taiwan Historica.

<sup>26</sup> Kondō Masami, “Taiwan sōtokufu no ‘riban’ taisei to Musha jiken” [Taiwan Government-General aboriginal policy and the Wushe incident], in *Iwanami Kōza Kindai Nihon to Shokuminchi II: Teikoku Tōchi no Kōzō*, ed. Ōe Shinobu et al. (Tokyo: Iwanami Shoten, 1992), 35-37.

supporting cast of Japanese policemen and assistants, indigenous porters, and a journalist from the *Asahi Shinbun*. In a recent article about this trek, Komeie Taisaku and Takemoto Tarō focus on the environmental degradation that the foresters observed in aboriginal lands. For Saitō and Honda, the widespread use of fire in hunting and agriculture was particularly odious. Not only did it complicate their efforts to map potential natural vegetation—what plants would grow where in the absence of human intervention—it also ran counter to their belief in scientific forestry that could both describe conditions and prescribe sustainable harvesting methods. In setting fire to the woods aborigines were disrupting the local climate, and as a result inviting disaster through mudslides, disruptions in river courses and associated transport, degradation of water quality, and downstream flooding.<sup>27</sup>

Saitō and Honda gathered evidence for swidden agriculture from informants on the ground and observations of their surroundings. Of the latter, denuded or “bald” mountains were the most obvious example, but there was also mountaintop grasslands or groves of specific fire-resistant trees. Chinese cork oak (*Quercus variabilis*) was the most prominent of these trees that Honda observed in the savage territory, and for him it demonstrated that natural succession was failing to take place.<sup>28</sup> This was a deviation from the land’s natural state, one that Honda understood as resulting from destructive hunting and farming practices, which in turn threatened the integrity of entire upland ecology. Honda mostly conceived of this as a local environmental problem, and although he mentioned flooding, he did not speculate in detail about how swidden lifestyles in the mountains might transform landscapes downstream.

Similar concerns about highland watersheds appear in an 1899 report by Mochiji Rokusaburō (

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<sup>27</sup> Komeie Taisaku and Takemoto Tarō, “Teikoku Nihon no kindai ringaku to shinrin shokubutsutai: 19-seikimatsu Taiwan no chōsa tōzan to shokusei ‘kōhai’” [Modern forest science in Imperial Japan and forest species zones: mountaineering surveys in late 19<sup>th</sup>-century and ecological “decay”], *Arina* 21 (2018), 141-144.

<sup>28</sup> Komeie and Takemoto, “Teikoku Nihon no kindai ringaku,” 143-145. The classic work on “bald mountains” is Chiba Tokuji, *Hageyama no bunka* [The culture of bald mountains] (Tokyo: Gakuseisha, 1973).

持地六三郎) on the “aboriginal problem.” Mochiji at this point was at the beginning of a ten-year stint moving between various high-ranking bureaucratic offices in Taiwan’s Government-General; he would later become chief of public works in the Korean Government-General. Quite likely drawing from Saitō and Honda’s writings, Mochiji described indigenous Taiwanese as predisposed to capricious slashing and burning, which laid mountain woodlands to waste and thereby threatened forest growth, watershed stability, and “national land security” (國土の保安). Mochiji found manifest evidence of this in despoiled rivers and the lack of irrigation to be found in the mountains. His solution to this was decisive and speedy establishment of highland forestry policy. Only by restoring watersheds to health, and thereby safeguarding the nation’s land, could downstream communities truly be protected. Otherwise, he warned, riparian engineering and irrigation work in the lowlands would amount to a Sisyphean effort that would never stop the floods from coming.<sup>29</sup>

Although these instances of highland thinking came from politically and academically significant figures, they were not widely shared and cannot be taken to reflect typical views. Saitō and Honda published on their findings back in Japan, but there is nothing to indicate that they found a readership of any significant size in Taiwan. Mochiji’s report was initially kept internally within the Government-General. By contrast, a broad audience read the monthly journal *Taiwan jibō*, which in 1910 printed selections from a lecture that Tokyo University forester Kawase Zentarō (川瀬善太郎) had delivered on the causes of floods. Starting from the observation that rain, having fallen, gradually makes its way down through leaves and branches through brush and into the soil, Kawase underscored the importance forests have for understanding floods. He then asked what causes the most damage in floods—soil or water? Recent cases from Shizuoka to Switzerland showed that far more soil was being transported in debris flows than water, suggested that the real

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<sup>29</sup> Mochiji Rokusaburō, *Bansei mondai ni kan suru torishirabesho* [Report regarding the aboriginal problem] (Taihoku: unpublished pamphlet, 1899), 37-38.

menace was sediment. Water was a necessary component, of course, but the addition of soil is what gave floodwater such strong force.

Therefore, Kawase wrote, “for flood prevention, forests are more necessary than levees.” By *forests* Kawase didn’t just mean trees, but rather the entire complex of shrubs and grasses that kept soil in place. Accordingly, old-growth forests and the rich variety of plant life contained therein ought to be preserved, even if only partially in areas where logging is taking place. Once logging was completed afforestation was also necessary, but Kawase cautioned that man-made coniferous forests typically had a much sparser understory that would not retain as much moisture. Interestingly, he described the precise relationship between forests and floods as an open question, writing that the conventional view of forests as moisture retainers had been challenged by a theory that forests actually dried out soil. Either way, Kawase’s focus was on soil retention, and he saw it as manifestly clear that vegetation would function to keep soil from doing damage downstream.<sup>30</sup>

In 1910, the segment of Taiwan’s population that could read Japanese was still fairly small. Following the flood-soaked summers of 1911 and 1912, the same periodical that had carried Kawase’s speech printed a Chinese-language article entitled “If one wants to rule the waters, one must first rule the mountains” (欲治水必先治山)—a slight reconfiguration of the characters in the four-character compound for “erosion and flood control.”<sup>31</sup> We can surmise that of all the expressions of upstream thinking described here, this one, written in the language read by the Taiwan’s Han Chinese majority, found the largest audience. The author, Yang Yupan (楊玉盤), was a native of Zhanghua and had trained at the Government-General’s experimental farms. Some of his explanations paralleled Kawase’s, while at the same time remaining steeped in classical Chinese

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<sup>30</sup> Kawase Zentarō, “Kōzui no genin” [The causes of floods], *Taiwan jibō*, November 1910, 34.

<sup>31</sup> Yang Yupan, “Yu zhishui bi xian zhishan” [If one wants to control floods, one must first control the mountains], *Taiwan jibō*, September 1912, 68.

references.

Yang began from the premise that all life relies on water, and while ordinary people use water every day they little understand it. Water's origin remains hidden, like a tree's roots, and thus most give it little thought. Yet it is significant that water comes from mountains, and here Yang quoted from the 2<sup>nd</sup>-century BCE *Artificers' Record* (考工記): “wherever there is space between two mountains there will be a river” (兩山之間必有川). This fact of topography was true in the mythical mountains of Kunlun and in the Japanese imperial outpost of Karafuto (southern Sakhalin). Deserts lacked both mountains and water, and therefore any way for people to make a living, while mountains created water sources both through basic topography and through the presence of forests. Anyone wanting to enrich water supplies would need to plant forests, Yang explained, which was why the Government-General was establishing regulations to protect forests and to plant them around the headwaters of rivers. He described highland nourishing of forests as the first step in a virtuous cycle that would regulate both the flow and the quality of water. As trees dropped rainwater onto the ground, soil absorbed it, thereby replenishing sources of water in the earth. With this, rivers would run clear and provide an inexhaustible supply of water while never threatening to spill their banks. Plentiful groundwater would ensure that wells stayed full, and that new ones could be drilled and new fields plowed.<sup>32</sup> Yang presented the logic of watershed protection as universal and grounded in support from the canon of classical Chinese texts, but his call for water and woodland conservation ultimately urged compliance with the colonial government's directives. Its upbeat view of the future failed to explain how exactly rivers might provide bountiful water without ever running muddy or overflowing, and Yang did not acknowledge the existence of indigenous Taiwanese residing in the mountains slated for afforestation. Nevertheless, this article

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<sup>32</sup> Yang, “Yu zhishui,” 68.

demonstrates that channels of communication about highland flood control were expanding after the floods of the early 1910s.

Although the devastation of 1911 and 1912 was not soon repeated on such an awesome scale, flooding continued to pose a perennial threat. Furukawa Yoshio of the Government-General's forestry division wrote with frustration in 1913 that the survey he had been tasked with completing on the Zhuoshui river focused only on its lower and middle reaches, and thus failed to address both natural and human erosive forces high in the mountains. The former had to do with fragile slate and massive volumes of precipitation, while the latter referred to what he referred to as the “primitive, plunderous clearing of land” (原始的掠奪開墾) over centuries by Bunun people. Furukawa both echoed Saitō and Honda and suggested that their warnings had proved prescient: native shifting cultivation had contributed to the raising of riverbeds and resultant floods in recent years. Yet this assessment was not based on first-hand observations: ongoing hostilities in the highlands and the limited purview of Furukawa's department prevented this sort of upstream thinking from taking form in actual surveys or concrete policy prescriptions.<sup>33</sup> A few years later, visiting forestry professor Koide Fusakichi (小出房吉) did have the opportunity to survey the upper Zhuoshui, and what he found left him stunned. Despite having traveled to mountains all over the world, Koide wrote in 1916 that he “[had] never before seen exposed rock faces so thoroughly laid to waste as those along the upper reaches of the Zhuoshui river.” Abetted by steep topography and sudden, violent storms, wanton destruction along the Zhuoshui and other turbid rivers located across the island was naturally “extending its poisonous reach down to agricultural and residential land in the plains below.”<sup>34</sup>

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<sup>33</sup> Furukawa, *Dakusukei hoanrin chōsa*, 7-8. For the conclusion of hostilities in the upper Zhuoshui watershed, see the section on Kada Naoji below.

<sup>34</sup> Koide Fusakichi, “Hontō rinseijō no shokan” [Thoughts on this island's forestry policy], *Taiwan nōjibō*, September 1916, 1.



Driving the ruination of the land, as Koide saw it, were a variety of practices that implicated all races in Taiwan, colonizer and colonized alike. Part of the problem he diagnosed was development pressure: the recent conclusions of the wars of pacification against indigenous Taiwanese meant that both Japanese and Han Taiwanese were beginning to open more and more of the “savage mountains” for cultivation. Meanwhile, in the highlands, swidden agriculture was widespread, with certain indigenes ploughing dry rice fields on slopes over 48 degrees. Senseless fires burned everywhere, Koide wrote, and landslides occurred on rainless days. The result was a “wasteland unequalled in the world” (世界無比の荒廢地) which could only be ameliorated through corresponding “great erosion control projects that earn our pride as being unequalled in the world” (世界無比として誇るに足るべき大砂防工事). Koide was a student of famous erosion control ventures in the Alps but argued that direct application of Western methods had no chance of success in Taiwan. The island’s unique natural conditions demanded thorough study to formulate specific solutions. And because the scale of these problems was so large, solutions would be both a source of esteem and a reference point for Taiwan to share with the world.<sup>35</sup>

What Koide termed “upstream mountainous management” (上流山地の経営) was the erosion control half of “erosion and flood control”: *chisan chisui* or what I broadly term upstream thinking. In this, Koide was echoing longtime Government-General bureaucrat Koyama Saburō (小山三郎), who had written earlier in the year that “levees are only an attempt to passively resist the force of nature; if one wants to prevent floods from happening in the first place there is no suitable route besides afforestation.” Koyama also inveighed against minor arable land gains made through reclaiming marginal mountain land, which doomed far better land downstream to floods, which in

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<sup>35</sup> Koide, “Hontō rinseijō,” 1-3.

turn drained away money for relief and public works. Local Japanese authorities were responsible for Han and Japanese reclamation in their purview, but also to blame was indigenous shifting cultivation.<sup>36</sup>

When Japanese foresters in the first two decades of colonial rule spoke of a need for “protection,” they were typically referring to forests or timber yields. Koide instead focused on protecting something more fundamental: the nation’s soil. For Koide, hillsides, gullies, and mountains all consisted of soil, and so long as these fell within the borders of the Japanese empire, degrading them was tantamount to threatening national stability. Mochiji had used similar language in 1899, but he offered far less specificity about the dirt itself. Koide’s analysis was so granular that although he used the same noun as Mochiji to refer to “national land” (國土), which was also used by Ishiwatari to demean Han Taiwanese settlement practices, it might be better translated as “national soil.” “Territory” is another possibility, and tellingly Japanese foresters and agronomists referred (and still refer) to erosion prevention in the same terms as those tasked with protecting claimed territory from foreign threats. Imbrications of conservation and military logic were particularly clear in discussions about protecting the land from the colonized people who lived on it. Such discourse revolving around indigenous environmental practice grew in urgency and importance as forestry scientists cast Taiwan’s highlands and their people as the ultimate source of flooding.

Before proceeding to describe the ways in which upstream thinking constructed and pathologized indigenous environmental practice, it is important to stress that not all Japanese colonial scientists accepted its logic. Public works engineers in the Government-General’s Public Works Bureau (土木局) and Home Bureau (内務局) in particular focused on their purview of downstream infrastructure—what was called “river works” (河川工事)—as *the* method for

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<sup>36</sup> Koyama Saburō, “Taiwan sanchi wa kaikon subeki ka shokurin subeki ka” [Should Taiwan’s mountains be cleared or afforested], *Taihō geppō*, Jan. 1916, 48-50.

addressing downstream flooding. Engineer Yamagata Yōsuke (山形要助) exemplified this approach.<sup>37</sup> He viewed the ultimate cause of landslides and floods in Taiwan as having to do with the steep gradient in mountain valleys that streams flowed through, which lent great destructive force to high volumes of water during storms, triggering erosion of riverbank sediment that was then funneled downstream. Building protective structures that could stand up to flood-stage waters in steep mountain canyons was, he wrote in 1921, “in financial and technical terms, nearly impossible.” Another factor that could conceivably exacerbate flooding, Yamagata allowed, had to do with human-caused deforestation near rivers. He held, though, that most river headwaters in Taiwan’s were covered in thick, virgin forest, and that a small number of widely dispersed highland indigenes practicing shifting agriculture—not logging—could not appreciably affect flooding. The fires they set, according to Yamagata, would only clear land briefly before revegetation occurred, and “their extent is so slight that it does not reach the level of laying waste to the forest.”<sup>38</sup>

Each flood brought sediment, and that sediment, Yamagata wrote, had to go somewhere. The goal ought to be to transport it to the ocean and prevent it from raising riverbeds or clogging up irrigation works. Building levees at a breadth calculated according to a river’s measured flood stage would funnel water downstream and also prevent it from spilling into “useless” distributaries that served no economic purpose. This would prevent damage to life and property and, moreover, allow valuable riparian land to be reclaimed for agriculture and eventual taxation. Yamagata’s set of prescriptions aligned with downstream engineering solutions, as seen in Figure 2.3 below.

Yamagata’s point about the hydrological insignificance of highland indigenes targeted forestry

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<sup>37</sup> For a study on flood control in colonial Taiwan that explores such approaches in depth, see Ma “Rizhi shiqi Taiwan hechuan zhengce.” Ma includes biographical information on Yamagata on p. 114.

<sup>38</sup> Yamagata Yōsuke, “Tokushu no kōzuikoku taru hontō no chisui hōshin” [Flood policy for this island, a peculiar land of floods], *Taiwan shinbun*, April 5, 1921.

discourse and served to draw a contrast between Japan and Taiwan. He quoted Kumazawa Banzan's "wise saying 'to govern water, one must govern mountains'" (水を治めんとせば山を治めよの金言)—the touchstone of upstream thinking—only to dismiss its applicability to Taiwan's mountains, which were not being despoiled by human forces and in any event could not be tamed.<sup>39</sup> Several years earlier, Yamagata had told a reporter that "some call for establishing forest reserves upstream, but this is mistaken—just because forest reserves are established does not mean that floods can be prevented." Solutions from Japan were not appropriate in Taiwan, which had considerably shorter rivers, higher mountains, and greater volumes of precipitation.<sup>40</sup>

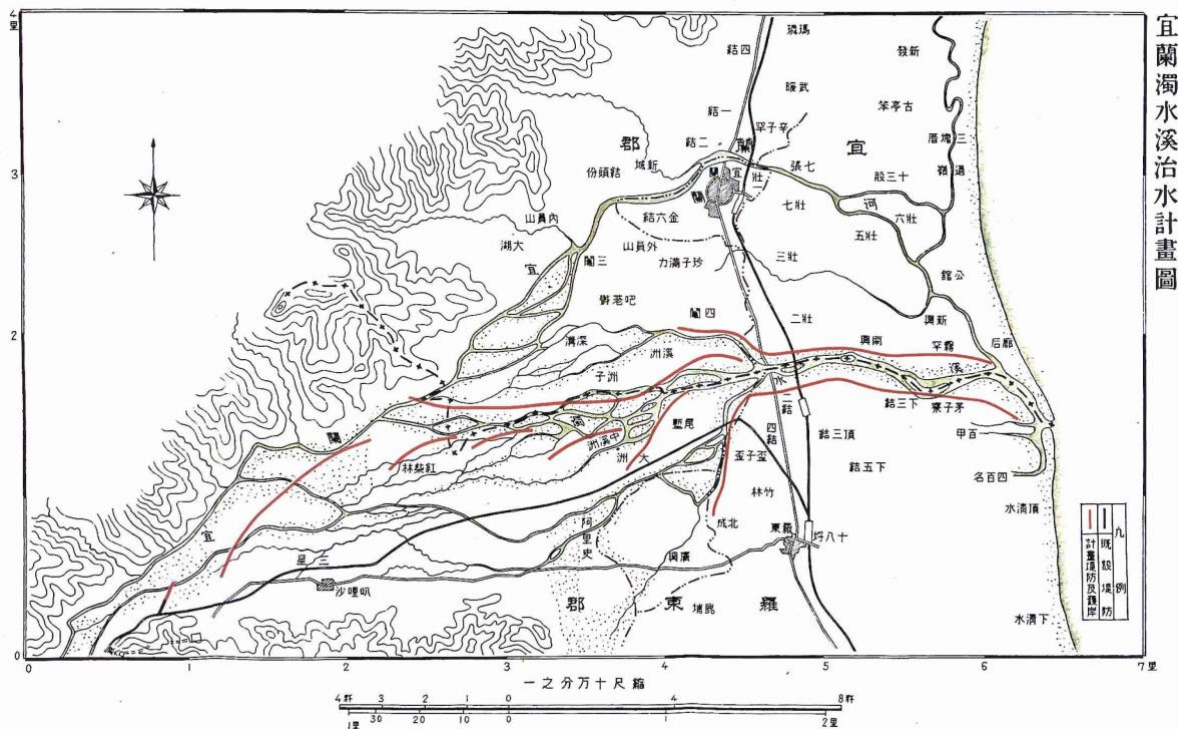


Figure 2.3: "Yilan Zhuoshui river [Lanyang river] flood control plan diagram." The red lines mark planned levees, which are situated in a way that they will contain the river and block off flooding and the creation of additional distributaries. This has the added benefit of allowing the reclamation of riparian land.<sup>41</sup>

<sup>39</sup> Yamagata, "Tokushu no kōzuikoku."

<sup>40</sup> Yamagata Yōsuke, "Taiwan no kasen wa naze ni hanran suru ka" [Why do Taiwan's rivers overflow], *Taiwan nichinichi shinpo*, October 23, 1919.

<sup>41</sup> *Giran dakusui-kei chisui jigyo gaiyo* [Summary of flood control projects on the Yilan Zhuoshui (Lanyang) river] (Taipei: Taiwan sōtokufu naimukyoku, 1931), inset. Held by Faculty of Agriculture Library, Kyoto University. Chu-Chiang Ma

Yamagata was not opposed to conservationist regulation *per se*, and he did envision a future in which “peace in the savage territory” could bring in large-scale reclamation and logging that would need to be restricted via law. But in that scenario the problem would be Japanese and Han industry, not indigenous agriculturalists.<sup>42</sup> Yamagata was not unusual in warning about erosion brought on by the advance of lowland industry into the mountains. In 1925, anthropologist Mori Ushinosuke (森丑之助), a prominent skeptic of government policy, wrote “many people say that savages lay mountain forests to waste, but the bad influence exerted by the reckless reclamation of cultured peoples (文化人) is far more severe.”<sup>43</sup> “Cultured peoples” here referred both to Japanese and Han intruders into the mountains, who threatened both natural beauty and the cultural integrity of the native peoples whom Mori wished to study. At the same time, Mori explicitly disagreed with Yamagata’s proportional argument. Small and scattered though indigenous settlements might be, underestimating their environmental impact on that basis would be to make a “huge mistake” (大なる誤謬).<sup>44</sup> This is where Yamagata’s position was unusual. Flood control plans that focused only on the lowlands may have implicitly held that upland solutions were unnecessary or unfeasible, but when Japanese authors described swidden in the context of water conservancy it was almost always to denounce it. Mori and Yamagata’s divergent positions on this issue illustrate a lively area of Japanese colonial discourse, one that variously valorized or denigrated indigenous peoples in terms of their relationship to their natural surroundings. Analyzing this discourse makes clear how deeply tied understandings of indigeneity were to knowledge production about Taiwan’s highlands.

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describes this flood control approach extensively in “Rizhi shiqi Taiwan hechuan zhengce.”

<sup>42</sup> Yamagata, “Tokushu no kōzuikoku.”

<sup>43</sup> Mori Heisei [Ushinosuke], “Banjin to shinrin no kankei ni tsuite (1)” [On the relationship of savages and forests (1)], *Tainan shinpō*, August 8, 1925.

<sup>44</sup> Mori, “Banjin to “Banjin to shinrin no kankei ni tsuite (3)” [On the relationship of savages and forests (3)], *Tainan shinpō*, August 10, 1925.

*Environmental Profligacy and Probity*

Richard Drayton introduced the term “environmentally profligate native” to describe a myth first formulated by French engineers and agronomists for conservationist ends, one that held growing local populations and the abuse they inflicted on forests responsible for all manner of ills, from landslides to declining agricultural productivity. S. Ravi Rajan later adapted this term to describe the British colonial state’s attitude towards colonized peoples in India.<sup>45</sup> From the perspective of Japanese foresters in the colonial period, Taiwan had several distinct populations of natives, all of whom could be environmentally profligate in different ways. In this way, judgments about Han and indigenous Taiwanese colored Japanese assessments of Taiwan’s natural environment and its productive prospects from the outset of colonial rule.

Saitō Otosaku and Honda Seiroku’s reports on their 1896 trek were typical in the ways that they presented the departure from an environmental ideal as owing entirely to mismanagement by local people. Particularly odious to them was the specter of fire. Highland indigenous Taiwanese used fire to clear land for planting and to flush animals into open areas for hunting; both were anathema for Honda. His prescribed solution to this problem was not to remove Taiwanese from the highlands altogether, as would happen in the 1920s and 30s (and is the subject of the following chapter), but rather to redirect their energies towards Japanese-directed logging enterprises. In 1900, Honda wrote, “Using raw savages and regular laborers in mountain forestry would not only suit them, it is necessary for forest protection, as their values differ greatly from ours. They burn highland forests and do nothing to protect them at all. If things are allowed to follow their current course, I fear that precious trees will be burnt to ashes for naught.”<sup>46</sup>

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<sup>45</sup> Rajan, *Modernizing Nature*, 48, 193-196. Rajan adapted this term from an unpublished paper of Drayton’s; *Modernizing Nature*, 48, 95.

<sup>46</sup> Honda Seiroku, “Taiwan no sugi to seiban” [Taiwan’s cedars and raw savages], *Taiwan kyōkai kaibō*, October 1900, 2.

Ethnic differences in environmental values were also described by Koide Fusakichi, who proposed a wholesale reform in environmental ethics alongside advances in public works. Koide's own ethnography was different from Honda's: he grouped Han and indigenous Taiwanese together as "highland dwellers" (山地の住民), who lacked almost any notion of "love of forests" (愛林思想). The implication was that such a notion resided, at least in Taiwan, solely with Japanese colonizers. What could be done to transform "highland dwellers" and their relationship with their natural surroundings? Because these colonized populations made their living amidst thick and proliferating forests, it would not be easy to convince them to lay down their hatchets and plows. Bringing down the power of the law to force a sudden change would only trigger opposition. True reform, Koide wrote, would require fundamental, long-term education, beginning with inculcating care for forests in classrooms and continuing through careful guidance from forestry and agriculture officials. Koide hastened to make clear that there was nothing wrong with making use of land *per se*. The problem was rather that forcing a measly harvest out of strips of land squeezed between mountains meant consigning more productive fields far downstream to destruction. Direct damage from floods was his primary concern, but he also noted the ways that erosion frustrated irrigation and drainage efforts as well.<sup>47</sup>

The "ecologically profligate native" is a common trope in global conservation history and was widespread in colonial Taiwan and the Japanese empire more broadly. Recent work by Komeie Taisaku makes clear that a fear of shifting cultivation haunted Japanese forestry in the home islands and the broader empire: a discourse about the evils of slash-and-burn agriculture was shared from Seoul and Shikoku to Sapporo and Xinzhu.<sup>48</sup> At the same time, romantic portrayals of local

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<sup>47</sup> Koide, "Hontō rinseijō," 2.

<sup>48</sup> Komeie, *Mori to hi no kankyōshi*.

communities—and indigenous inhabitants within settler societies in particular—often foreground exactly the opposite traits: environmental probity rather than profligacy. The notion of the “ecological Indian” has deep roots and generates contentious discussion to this day.<sup>49</sup> Parallel images are present in Taiwan today, where they depict indigenous livelihoods through idealized descriptions of a frugal lifestyle that did nothing to upset the biotic community and is therefore worthy of emulation.<sup>50</sup>

In colonial Taiwan, views of either indigenous or Han Taiwanese as environmentally profligate dominated Japanese discourse without being hegemonic. Especially outside of scientific writings and speeches, there was space for understanding Taiwan’s indigenes as notably—even uniquely—connected to the natural world. In the understanding of Japanese entrepreneur Nasu Yoshitada (奈須義質), for example, care for the environment was a quality that characterized Taiwan’s indigenes in contradistinction to Chinese settlers. It was precisely their “love of forests” (愛林心) had that had enabled aborigines to weather centuries of Chinese incursions and environmental destruction. This same virtue, Nasu wrote in 1902, would make them ideal workers in forestry enterprises dedicated to both felling and regenerating forests.<sup>51</sup> While this is a discourse of environmental probity, it is distinct from the “ecological Indian” we might be familiar with today. Nasu and Honda took opposite views of the native relationship to nature but shared a concern over how to best turn trees into timber.<sup>52</sup> Nasu’s commentary is emblematic of the ways in which colonial Japanese noted

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<sup>49</sup> Shepard Krech, *The Ecological Indian: Myth and History* (New York: W. W. Norton, 1999); Gregory Smithers, “Beyond the ‘Ecological Indian’: Environmental Politics and Traditional Ecological Knowledge in Modern North America,” *Environmental History* 20, no. 1 (2015): 83-111.

<sup>50</sup> Ming-tu Yang, “Going Back into a Future of Simplicity: Taiwan Aborigines’ Sustainable Utilization of Natural Resources,” in *Ecocriticism in Taiwan: Identity, Environment, and the Arts*, ed. Chia-ju Chang and Scott Slovic (Lanham: Lexington Books, 2016), 3-16.

<sup>51</sup> Nasu Yoshitada, *Taibansaku zen* [Aboriginal policy—full], (Taipei: Self-published, 1902), 25-27.

<sup>52</sup> Nasu here anticipates themes in debates over “savage territory” or “highland” development, which will be touched upon in Chapter III and treated at length in Chapter IV.



praiseworthy aspects of indigenous environmental practice in order to subordinate those very same practices to colonial goals. This was true not just for the general environmental ethic discussed above but for soil conservation as well, and no plant better captures this dynamic than the alder tree.

*Nitrogen-fixing Natives and the Alder Tree*

Even after brutal winds battered the island in 1912, there was one species of tree that stood tall. It was the Formosan alder (*Alnus formosana*, hereafter “alder”), which grows from near sea level to heights of several thousand meters all over the island. Alder resilience came from an extensive and sturdy root structure, which also made it particularly adept at holding soil in place and thus also useful for flood control afforestation. What attracted particular comment from a number of forestry scientists, though, was its use in indigenous environmental management. While the previous section detailed the ways in which colonial flood control science and policy condemned the ways that Han and indigenous Taiwanese made a living on the land, the alder provides a counterpoint. It suggested that shifting cultivation as practiced in Taiwan’s highlands could be both sustainable and adaptable, and in doing so it challenged the dominant trope of environmental profligacy. If occasional and begrudging recognition of native environmental wisdom is a hallmark of colonial science, then alders fulfill this role in Taiwan. At the same time, alders also illustrate the limits within the Japanese empire of what is now called traditional ecological knowledge (TEK).<sup>53</sup>

As mentioned above, Honda Seiroku was focused on the species that he imagined would

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<sup>53</sup> On TEK broadly, see Fikret Berkes, *Sacred Ecology: Traditional Ecological Knowledge and Resource Management* (Philadelphia: Taylor & Francis, 1999). In contemporary Taiwan, Daya (Da-Wei) Kuan has pioneered this field, see, e.g. “Yuanzhumin shengtai zhishi yu dangdai zaihai guanli—yi shimen shuiku shangyou jishuiqu zhi Taiyazu buluo wei li” [Indigenous Ecological Knowledge and Contemporary Disaster Management: A Case Study on the Tayal Communities’ Experience in the Watershed of Shih-Men Reservoir], *Dili xuebao/Journal of Geographical Science* 76 (2015): 97-132. His work will be revisited in Chapter V. For an ethnohistorical exploration of Atayal land use that documents the survival through the late twentieth century of alder swiddening, see Nakamura Masaru, *Taiwan kōchi senjūmin no rekishi jinrui-gaku* [Historical anthropology of Taiwan’s highland native peoples] (Tokyo: Ryokuin shobō, 2003), 59-107.

flourish in a proper, undisturbed state of nature. Thus, although he observed alders growing on stream banks when he visited Taiwan in 1896, he described them as prevalent on disturbed sites where landslides or floods had occurred. These may have been caused by human interference, which made alders opportunistic interlopers and not the original representative species that Honda venerated.<sup>54</sup> Komeie and Takemoto have argued that Honda established a foundation for forestry science in Taiwan that was important for foresters such as Kada Naoji who followed him. Being rather less concerned with idealized plant distributions and more interested in plant utility, however, Kada differed from Honda in finding much to admire in alders. It was only a few months after the destructive summer storms of 1912 that wrote an article in the *Taiwan nichinichi shinpō* about everything that made alders well-suited for forestry in Taiwan. Not only had their strength been proved by their survival in storms, but they were also extremely adaptable—capable of growing quickly in land that was either too damp or too dry for most other species. Anyone who knew how to nurture the main Japanese silvicultural varieties—Cryptomeria and cypress—could easily take an alder from seed to sapling to timber in the span of ten years. With light and flexible wood, it was useful in everything from sandals and toothbrushes to railroad ties and gunpowder.<sup>55</sup>

The alder's most remarkable quality, however, lay in a process that occurred below the surface and at a scale far too small to see with the naked eye. Its root nodules turned out to provide an agreeable habitat for certain bacteria. These bacteria took in nitrogen from the air and shared it with the alder, which not only helped the tree grow quickly but also deposited nitrogen in the soil. This meant that they had the power to restore fertility to poor-quality soil, and Kada suggested that they be the first tree planted in plantations on marginal, eroding land. By enabling a return of vegetation,

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<sup>54</sup> Komeie and Takemoto, "Teikoku Nihon no kindai ringaku," 145.

<sup>55</sup> "Hontō tekishu no hannoki: Kada gishi no danwa" [Alders, a species suited to this island: Technical expert Kada discusses], *Taiwan nichinichi shinpō*, Dec. 8, 1912.

they could thus arrest the progress of deterioration and ameliorate erosion and flooding. As a point of fact, the people actually *using* alders in such a way at this time in Taiwan were not Japanese foresters or Chinese colonists. It was rather various groups of indigenous Taiwanese who made use of alders as a part of shifting cultivation. In 1912, Kada described highland Bunun tribes planting alders after a given plot of land had lost its capacity to support a good harvest (likely of millet, rice, or sweet potato). Ten years later, they would cut the alders for fuel, and once again plant the plot with food crops. Alders additionally functioned as windbreaks around Bunun homes and fields. Kada recognized this as a “cyclical” method that could be repeated over and over again, and it appears that Bunun practice was the source both of his prescription to harvest alder timber after ten years and to use them to regenerate degraded soil.<sup>56</sup>

It is unclear how precisely Kada came to this understanding of Bunun farming, but less than two years later he had the opportunity to observe similar practices first-hand. During the anti-indigene Truku War of 1914, Kada, who worked in the Government-General’s Production Bureau (殖産局) from 1903 to 1917, joined an expedition that followed in the wake of the army’s advances. Leading this group was Uchida Kakichi (内田嘉吉), who at the time led a population survey department but had served as Chief of Civil Affairs and would go on to be Governor-General in the 1920s. Writing shortly afterwards, Uchida cast the Truku War as proof that aboriginal suppression was coming to an end; this was the last step of consolidating rule over Taiwan and was “in one sense an expansion of our national territory” (或意味に於て我國土の擴張なり).<sup>57</sup> As stated above, this term for territory—*kokudo*—in other contexts is more appropriately rendered as national land or soil. Both were concerns for Kada on the trek, which consisted of a 26-day overland journey from

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<sup>56</sup> “Hontō tekishu no hannoki.”

<sup>57</sup> Kada Naoji, *Taiwan chūō sanmyaku ōdanki* [An account of crossing Taiwan’s central mountain range] (Tokyo: Takushoku Shinpōsha, 1914), ii.

Puli (埔里) in Taizhong County to Xincheng (新城) in Hualian County, on the East Coast. This traversed the drainage basins of the Zhuoshui River (濁水溪) on the west and the Liwu River (立霧溪) on the east. Risks from deforestation were thus severe, especially around Hehuanshan (合歡山), the mountain straddling these two watersheds, and Kada noted the important role the area's majestic forests played in protecting the "national soil." This function would be bolstered, Kada opined, if Hehuanshan were to be made into a national park like Yellowstone in the United States or Mt. Fuji back in metropolitan Japan.<sup>58</sup> War against Truku rebels had enabled an effective expansion of Japan's territory, and Kada's comments illustrates that conservationist claims on that territory—down to its very soil—followed almost immediately.

Despite the fact that the war was ongoing, Kada wrote little of fighting in his account. His list of the ills responsible for downstream flooding—overlogging and reckless land reclamation—omitted the war itself, in which (as described in chapter I) Japanese forces regularly clear-cut forests to establish new sections of the guard line. Far more interesting to Kada were the alders. On a clear morning around the guard line post of Mukiraushi (ムキラウシ), he saw hillside fallows thick with alders and charcoal trees (*Trema orientalis*), which helped secure the soil and restore it to fertility. In Truku and Toda areas, the techniques were much as those he described among the Bunun, though the time until the trees were harvested was somewhat shorter at 7-8 years. Even after the trees were felled, the nitrogen-fixing bacteria survived for a time in the root nodules left in the ground, and this helped aborigines achieve some level of "intensive" cultivation.<sup>59</sup>

Kada's elevation of indigenous alder use helped give the trees fame among colonial scientists. Botanist Tashiro Yasusada was particularly effusive in his description of alder planting in a 1921

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<sup>58</sup> Kada, *Taiwan chūō sanmyaku*, 6. This area would indeed become a national park in 1937. See Kate McDonald, *Placing Empire: Travel and the Social Imagination in Imperial Japan* (Oakland: University of California Press, 2017), 128-132.

<sup>59</sup> Kada, *Taiwan chūō sanmyaku*, 26, 32.

guide to silviculture in Taiwan, writing that although the method may seem “primitive,” its effectiveness in producing both timber and restored soil with a minimum of labor meant that it in fact “was in accord with the true principles of forestry management” (林業經營上の眞理に適い). Through traditional methods, indigenes had created “model forests” (模範林) that everyone in the lowlands should take note of. Tashiro went so far as say that foresters, including himself, whose imprecise management often produced failures ought to feel abashed when beholding “far superior” indigenous silviculture.<sup>60</sup> By 1932, a writer in the aboriginal affairs trade journal *Riban no Tomo* (“Aboriginal Affairs Friend”) was able to assume that his audience, largely policemen, were all already familiar with native nitrogen fixation through alders.<sup>61</sup> The reach of the Taiwanese alder in the Japanese empire reached beyond Taiwan and beyond scientific discourse as well. In 1910, the Kunigami Agricultural School (國頭農學校) in northern Okinawa imported alder seedlings, which soon escaped the confines of the experimental nursery and spread, flourishing in moist areas across the region. Today, the Taiwanese alder is widespread and treated as an invasive species in Okinawa’s Yanbaru National Park.<sup>62</sup>

The academic interest that those such as Tashiro would come to find in alders certainly resonated with Kada. Yet while Kada may have reserved some admiration for native use of alders, his practical interest did not lay in preserving the practice. Unlike Tashiro, Kada did not view native environmental techniques as efficient, much less superior to Japanese forestry management. Kada

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<sup>60</sup> Tashiro Yasusada, *Taiwan zōrin shumoku kakuron zenpen* [Essays on each chief tree for silviculture in Taiwan, Part I] (Taipei: Taiwan sōtokufu shokusan-kyoku, 1921) 26, 66, 300.

<sup>61</sup> Matsumoto Kaku, “Banjin no ryokuhi ni tsuite” [On aboriginal green fertilizer], *Riban no tomo*, July 1932, 7-9.

<sup>62</sup> Takara Tetsuo and Amano Tetsuo, *Okinawa doshokubutsu kenkyū shi* [A history of research on Okinawa animals and plants] (Naha: Okinawa dōbutusu kenkyū shi kankōkai, 1977), 93; Amano Tetsuo, *Ryūkyū Rettō yūyō jumoku shi* [Useful trees of the Ryūkyū archipelago] (Naha: Ryūkyū Rettō yūyō jumoku shi kankōkai, 1982) 13; Okinawa Prefecture, *Okinawa-ken shizen kankyō saisei shishin shiryō-ben* [Okinawa prefecture guide for regeneration of the natural environment, material edition] (Naha: Okinawa prefecture, 2015), 38.

did not endorse, for example, the rehabilitation of low-fertility Truku areas through a sort of broad alder-planting program. Alders could continue be one silviculture crop among many, but agriculture, Kada wrote, needed to be focused on wet rice cultivation. What was useful about indigenous planting of trees, including alders, *Trema orientalis*, bamboo, and fruit trees, was that it gave indigenes a set of skills that could be easily transferred to regularized, profit-driven, and Japanese-managed silviculture.<sup>63</sup>

In Kada Naoji's view, indigenous environmental practices could be sustainable and even laudable, but they were not productive enough, and did not present a serious alternative to regularized intensive agriculture. At best, they could be usefully subsumed into colonial plans for Taiwan's mountains and the people who lived there. When a Government-General forestry report incorporated Kada's findings in 1915, it incorporated this philosophy. It noted alder use and held that the lack of native capacity for industrial-scale forestry combined with a need to retain hunting grounds led some indigenes to be "rich in respect for protecting and preserving forests." At the same time, it gestured towards a fear that "savage agriculture" (蕃的農業) could, through topsoil loss, become the source of flooding in the plains.<sup>64</sup> The authors did not offer any evidence to substantiate this connection, suggesting instead that it ought to be investigated through further study of the newly-conquered highlands.

*Forest Hydrology in the Highlands: the 1919 Upper Zhuoshui Survey*

When forestry officials undertook a survey of the upper reaches of the Zhuoshui River in the autumn of 1919—filling out gaps from Furukawa's 1913 survey—they traveled through areas slightly to the south of Kada's route and observed similar Atayal and Bunun farming practices that

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<sup>63</sup> Kada, *Taiwan chūo sanmyaku*, 32-36.

<sup>64</sup> *Taiwan hoanrin chōsa hōkokoku: Taiwan shinrin-zu setsumeisho* [Taiwan forest preserve survey report: Taiwan forest illustrated explanation] (Taipei: Shokusankyoku, 1915), 15.

served to protect and restore soil (Figure 2.4). Continuity with earlier surveys was no coincidence. The survey team included Furukawa among its members, allowing him to fulfill his earlier ambition of venturing farther upstream the Zhuoshui. Its leader, Yamazaki Yoshio (山崎嘉夫), had worked with Kada on a coastal erosion survey and served as his successor in several Production Bureau



Figure 2.4: “Zhuoshui river watershed location map.” In brown is the area surveyed by Yamazaki and colleagues in 1919. Note that this map depicts a large area of central Taiwan from one coast to the other, including many streams and rivers not part of the Zhuoshui watershed. It communicates a thoroughly hydraulic understanding of territory. The surveyed area is all upstream of the planned Sun Moon Lake intake (see Chapter IV).<sup>65</sup>

forestry leadership positions after 1915.<sup>66</sup> At the same time, the study marked a new intensity in the study of highland hydrology. Its official name gives a hint of this, as “Upper Zhuoshui Region

<sup>65</sup> Yamazaki Yoshio, *Dakusukei joryū chūki chisui shinrin chosasho* [Survey report on forest hydrology in the upper watershed of the Zhuoshui River] (Taipei: Taiwan sōtokufu eirinkyoku, 1920), inset. National Taiwan Library.

<sup>66</sup> *Taiwan hoanrin chōsa hōkoku: toku ni bisa bōbirin ni tsuite* [Taiwan forest preserve survey report: with particular reference to coastal protection forests] (Taipei: Shokusanryoku, 1915); *Fubō* (Government-General gazette) #756, May 19, 1915.

Forest Hydrology Survey” was one of the first instances of the word “forest hydrology” (治水森林 or 森林治水) in an official context. Inherent in this very term was an assumption that hydrology and flood control were fundamental to the study and management of forests, and vice versa.<sup>67</sup>

Taiwan’s Government-General enshrined this relationship in the colonial legal code in 1919 with the promulgation of the “Forest Regulation” (森林令), which consolidated woodland management and expanded the category of “forest reserves.” Of the criteria prescribed for designating woodland as forest reserves, nearly all related to erosion control and water conservancy.<sup>68</sup> Yamazaki stated that such upland regulations were gravely needed to prevent the flooding that menaced lowland plains and, increasingly, foothill hydroelectric plants.<sup>69</sup>

Protecting the woods required knowledge of them, so Yamazaki and his colleagues set out for the highlands. On hillside fields, they found that slate, rocks, and logs were all scrupulously deployed to build terraces that held the earth in place and prevent mudslides; when fallow, these fields regained fertility through the alders and cherry trees (*Prunus serrulata*) that natives planted on them. Yamazaki saw this as evidence, at best, of a “tacit” (暗黙) understanding held by Atayal and Bunun of nitrogen fixation. Other noteworthy features of local environmental practice included cherry trees, valued because they grew quickly, unlike Japan, where they were widely cultivated as ornamentals for their blossoms. Taiwan paulownia and fruit trees, also grown around highland villages, attested to the presence of “silvicultural thought” (造林思想) in the upper Zhuoshui

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<sup>67</sup> There is no study I am aware of detailing the origin of this term in Japanese. One possible derivation is from the Italian “idraulico forestale” (hydraulic forestry), which was enshrined in Italian law in 1912. The modern-day Japanese term for forest hydrology is 森林水文学. On the Italian law, see Marcus Hall, *Earth Repair: A Transatlantic History of Environmental Restoration* (Charlottesville: University of Virginia Press, 2005), 73.

<sup>68</sup> Forests could also be designated as reserves if they were necessary for “public hygiene” or served a scenic function for religious or historical sites. *Fubō* (Government-General gazette) #1961, November 4, 1919.

<sup>69</sup> “Shinrin-rei to Akashi sōtoku: Yamazaki rinmu kachō dan” [The Forest Regulation and Governor-General Akashi: Forestry section chief Yamazaki speaks], *Taiwan nichinichi shinpō*, November 5, 1919.



watershed. Even if this was neither as advanced as in Japan nor integrated with broader understandings of economy, Yamazaki held that it could be useful in transforming Atayal and Bunun into entrepreneurial silviculturalists.<sup>70</sup> This framing echoed the ways that Japanese discourses of environmental profligacy and probity alike were ultimately oriented towards subsuming indigenous labor and practices for colonial goals.

Even as they wrote with some admiration of fallow alder planting, Yamazaki and his co-authors condemned the broader system of shifting cultivation that it was part of as inefficient. The survey recorded that each household had around 8.5 hectares of land. Depending on the amount of time that fields were allowed to lie fallow while alders grow in them, this left only around a single hectare that could be farmed in any given year. Moreover, maintaining a robust stock of seeds required that some alders be allowed to grow for much longer, at least fourteen years. On these small plots of land, careless farming methods and cultivation of crops such as millet, sweet potato, hemp, and bean meant that this could barely sustain a household—in 1917, the Government-General had to spend thousands of yen to disburse rice to aborigines and keep them from starving. The report did not ask to what extent the chaos of Japanese pacification wars may have contributed to the immiseration of indigenes. Instead, it described with concern their hunting customs: residents of the area depended to a great extent on hunting for their diet, eating monkeys, mountain goats, deer, muntjac, and pangolin. But hunting, like shifting cultivation, involved setting fires. Not only did this keep the land as grasslands, preventing it from progressing to a more “natural” woodland state, it also threatened topsoil loss and flooding downstream.<sup>71</sup>

Sediment discharge lends the Zhuoshui its name—literally “turbid water”—and presented a

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<sup>70</sup> Yamazaki, *Dakusukei jōryū*, 82-92, 101.

<sup>71</sup> Yamazaki, *Dakusukei jōryū*, 89-90.

particular problem because muddying the waters compromised their utility for irrigation and, it was planned, electric power generation. In 1917, Ōkoshi Taizō, designer of the Guishan hydroelectric plant, submitted a design for building of a far huger plant at Sun Moon Lake. By the time of the 1919 flood control survey, construction had already begun on this project, which relied on diverting water from the Zhuoshui through underground tunnels to expand Sun Moon Lake into a hydroelectric reservoir. Locating the diversion site in the Atayalic Sediq area known as Shimaigahara (姉妹ヶ原) meant transforming native land use from an issue that might affect spatially remote downstream areas to one that threatened local repercussions on a very expensive Japanese investment.<sup>72</sup> This background can help explain the strong tone the foresters took in the conclusion of their report:

In summary, landslides and sediment runoff are viewed as holding the utmost importance for flood and erosion control—naturally in Germany, Austria, and France, but also in the home country [Japan] as well. However, while the [Taiwan] Government-General spends vast sums year after year on downstream rivers and coastal erosion prevention, it must be said that it has not yet used [these funds] to touch upon the fundamental meaning of flood and erosion control (治山治水の根本義). In our opinion, the root of the Zhuoshui river's troubles is located in the faraway savage border.<sup>73</sup>

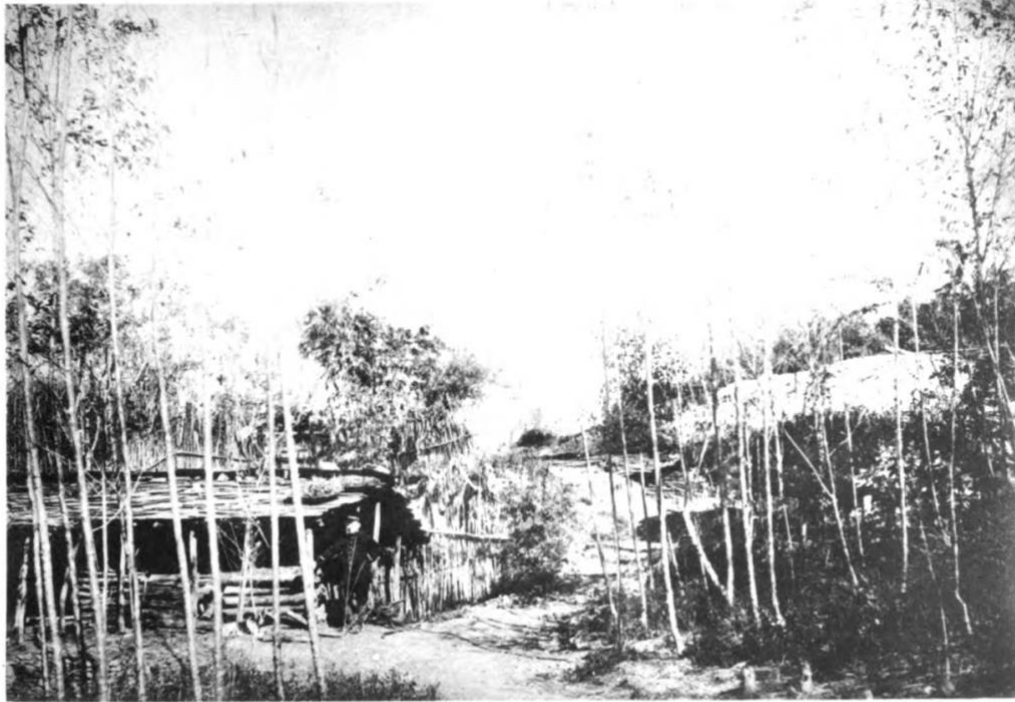
Methods to attack the problem at its source, as the authors saw it, included designating vast areas of the watershed as forest preserve, where it could be managed through planting new trees and strategic cutting in places where the stock had become overgrown. Gaining a clearer understanding of meteorological and hydrological conditions was also important, which required better roads and a network of monitoring stations. Finally, social management was paramount: indigenes ought to be

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<sup>72</sup> Shimizu Misato, *Teikoku Nihon no "kaibatsu" to shokuminchi Taiwan: Taiwan no Kanan taishū to jitsugetsutan batsudensho* [Imperial Japan's "Development" and Colonial Taiwan: Taiwan's Jianan Irrigation System and Sun Moon Lake Electric Plant] (Tokyo: Yūshisha, 2015), 132; Yamazaki, *Dakusui jōryū*, 102. Just as the Russo-Japanese War complicated plans at Guishan, so too did World War I and subsequent economic turmoil complicate the Sun Moon Lake project, which was put on hold and not completed until 1934. The intake site was eventually moved from Shimaigahara to Wujié (武界); see Chapter IV.

<sup>73</sup> Yamazaki, *Dakusuikei jōryū*, 104.

provided with vocational training and incentives to comply with conservation directives. Giving up hunting and swidden for fenced-in livestock husbandry and wet-rice agriculture would protect woodlands, soil, and water, and help transform natives into “cultured subjects” (文化の民).<sup>74</sup>



「ホアロン」社(約4,500尺)附近ノ赤楊造林 (蕃屋ノ屋根ノ上ニ籠ニ  
入レアルモノハ赤楊ノ種子ヲ採集セルモノナリ

Figure 2.5: This image from the 1919 survey report shows alder silviculture in Alang bwalung (廬山部落), a Sediq (Atayalic) settlement around 1360 meters in elevation. Though difficult to discern, the baskets on top of the roof contain, according to the caption, gathered alder seeds.<sup>75</sup>

Reading this 1919 survey as a manifesto of colonial conservation reveals the ways in which Japanese foresters cast Atayal and Bunun land use as an obstacle to optimal landscape management. Drawing from Kada’s work and a discourse of ecological probity, they described practices such as terracing and alder planting as containing certain virtues but ultimately components of a primitive, non-economic, and environmentally destructive lifestyle. As seen in Yamagata’s example above, river

<sup>74</sup> Yamazaki, *Dakusui jōryū*, 97-103.

<sup>75</sup> Yamazaki, *Dakusukei jōryū*, inset. National Taiwan Library.

engineers did not necessarily agree that these factors made any difference to downstream outcomes. The trope of the ecologically profligate native, however, was a powerful one. As erosion and flooding moved downstream to the plains and infrastructural projects such as the Sun Moon Lake hydroelectric plant moved into the mountains, indigenous lifestyles would become subject to greater and greater scrutiny.

*Farther Upstream: Towards Relocation*

Speaking to the *Asahi shinbun* soon after the 1912 floods, Motoda Hajime (元田肇), director of the Colonization Bureau (拓殖局) within the Home Ministry in Tokyo, identified the “two great projects” confronting Taiwan as flood control and aborigine pacification. The former would require great study and investment to steer the island’s rivers, and the latter demanded constant alertness to keep bellicose indigenes at bay. In Motoda’s telling these two undertakings were largely unrelated to each other: flood control took place near towns and farms, while protecting the militarized “guard line” was work for the mountains. In detailing the construction of the guard line, however, he did allow for one connection. When Japanese military forces advanced the guard line through remote territory, they clear-cut huge swaths of forest—as mentioned in Kada’s 1914 travelogue. This practice, according to Motoda, had at times “helped create large floods,” but he held that such a result simply could not be helped.<sup>76</sup>

Identifying a highland cause of flooding as Japanese military operations rather than Han deforestation or indigenous slash-and-burn agriculture might seem rather atypical given the viewpoints presented in this chapter. In 1912, however, the continuing focus on military conquest helps explain why a high-ranking Tokyo bureaucrat such as Motoda would be much more concerned and informed about guard line construction than the environmental practices of peripheral

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<sup>76</sup> “Taiwan no ni daijigyō” [Taiwan’s two great projects], *Asahi shinbun*, Oct. 22, 1912.

colonized people. Equally notable is the fact that Motoda discussed the two great endeavors of flood control and aboriginal pacification as discrete issues. The vision of upstream management promoted by forestry scientists and disseminated broadly across the 1910s and beyond broke down this division, so that flood and erosion control invariably intersected with policies towards the peoples indigenous to Taiwan's mountains.

The following chapter describes the most important and most devastating aboriginal policy initiative of the 1920s and 30s: the forced relocation of nearly half of the aboriginal zone's indigenous residents—over 40,000 people. Existing literature does not do justice to the scale and violence of this large-scale dispossession. It also fails to describe the environmental logic that lay at its heart. For the Government-General, indigenes posed a persistent security threat through armed rebellion *and* an environmental threat to Taiwan's forests and rivers. The colonial state sought to settle them in mountain valleys and foothills where they could be reformed—steered away from environmental profligacy towards a Japanese ideal of sedentary, intensive wet-rice agriculture. This understanding relied upon the integrated view of flood control, with its particular attention towards the highland, described in this chapter. In the process of relocation, condescending denials of indigenous knowledge of the environment meant that fears of malaria initially dismissed as “superstition” came to be recognized as accurate knowledge only after deadly outbreaks attended the trauma of relocation. Writing these alternative epistemologies into the history of colonial science is crucial for making the analytical point that Taiwan's riverine geography was not destiny.

### Chapter III

#### Down from the Mountains: Water, Rice, Dispossession, and Disease, 1920-1936

When leading Taiwan's first hydraulic forestry survey in 1919, Yamazaki Yoshio was distressed both by what he saw as the physical tumult of the mountains and the civilizational backwardness of their native people. Although a forester primarily tasked with protecting and improving the island's woodland stock, Yamazaki did not hesitate to opine on methods of indigenous uplift.

As long as highland Atayal and Bunun practiced shifting cultivation to grow millet and sweet potatoes, he argued, they would remain in a benighted, precarious state. A path forward existed in growing rice in irrigated paddies, which could produce far more calories per unit of land. Since 1913 Japanese policemen had been exhorting indigenes towards this very goal, but over a span of five years their efforts had resulted in only a modest 15.5 total hectares of paddies being planted across eight different settlements. In most indigenous villages, steep slopes and high altitudes made finding suitable land to grow rice difficult, and there were cultural barriers as well. "Savages do not attempt wet-rice agriculture," Yamazaki, "and hold a superstition (迷信) that if they were to build rice paddies a pestilence (悪疫) would break out."<sup>1</sup>

Across the Japanese imperium, officials took superstitions as evidence of backwardness and targeted them for reform. Correcting this particular superstition would be carried out in the context of the forced relocation of indigenous Taiwanese from scattered mountain settlements to rice-farming villages in foothills and mountain valleys, a project that served goals including social control and flood prevention. Sedentarization meant that relocated natives no long lived amongst cold, fast-flowing mountain streams. Instead of pursuing animals and planting alders in lifestyles that were defined by mobility, they lived and farmed in dense, closely circumscribed quarters. To Japanese

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<sup>1</sup> Yamazaki, *Dakusuikei jōryū*, 90.

policemen—and certain indigenes—this constituted progress, a sense that colonial subjects were moving forward. In literal terms, however, their day-to-day movements became relatively stagnant. Similarly stagnant was the water sitting in rice paddies and irrigation ditches, which were supposed to provide the foundation for indigenous sustenance and acculturation. In this stagnant water, mosquitoes thrived and served to transmit malaria. Japanese designs for relocated villages prioritized density, wet-rice cultivation, water conservancy, and ease of police access and surveillance; these same characteristics led to deadly outbreaks of malaria, amoebic dysentery, and other illnesses that highland indigenes had been largely protected from in the mountains. Malaria, it became clear, was the rice paddy pestilence that highland Atayal and Bunun had feared, and through the violent process of relocation their “superstition” was revealed not as ignorance, but as well-grounded fear—as accurate knowledge about the natural world.

This chapter is about the ecology of dispossession. Rob Nixon has written that “Assaults on a nation’s environmental resources frequently entail not just the physical displacement of local communities, but their imaginative displacement as well.”<sup>2</sup> Chapter one demonstrated how the control of water powered the Japanese military conquest of Taiwan’s highlands. Chapter two outlined the subsequent imaginative dispossession of highland peoples through showing how Japanese forestry scientists constructed indigenous livelihoods as threatening both downstream sites and the empire’s land—national soil—itself. In a sense, both of these processes gave concrete form to the great legal dispossession at the dawn of colonial rule by which the vast indigenous territory was made imperial land and all private or community claims on it abrogated. At the same time, they established a structure for the deeper and more violent dispossession that was mass forced relocation. Although antecedents for this policy stretched back to early Japanese and even late Qing rule, it was only beginning in the 1920s that the colonial state began to forcibly relocate settlements

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<sup>2</sup> Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (Cambridge: Harvard University Press, 2013), 150-151.

on a broad scale; after the anti-Japanese Wushe uprising and subsequent reprisals in the early 1930s, relocation accelerated and continued through World War II. Environmental disease killed many indigenes and complicated the work of relocation for Japanese police and physicians, as we will see below, but it did not shake the colonial state's commitment to mass relocation. By the end of the colonial period, roughly half of indigenes residing in the "aboriginal zone" had abandoned their home villages for new settlements. Some relocated gladly and voluntarily, others in the face of various inducements, and many only after facing violent coercion and the suppression of their existing way of life by Japanese police.<sup>3</sup> Even as it fell short of its totalizing goals, relocation remade highland Taiwan.

The process of relocation was fundamentally environmental. I make this case in this chapter through two related arguments. First, Japanese colonial officials intended relocation to replace one set of ecological relationships with another. Swidden agriculture and hunting, by virtue of their mobility, primitivity, violence, and use of fire, ought to be eliminated. Conservationist concern with watersheds in particular, as elaborated in the previous chapter, was after the 1920s a growing presence in articulations of the necessity of relocation. Rice paddies were to structure new settlements, and, following from an ideal of Japanese and Chinese civilization, this would in turn nurture orderly and compliant farmers. In spatial terms, the need to irrigate paddies meant that relocation destinations were to be located on the banks of streams and rivers. Rather than threatening these waterways—and by extension downstream locations—with erosive hillside farming or fire, indigenes would draw water from them into paddies on level ground. My second argument uncovers the fraught ecological consequences of this sort of landscape engineering by foregrounding the deadly reality of environmental disease. Japanese concern with water as a resource

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<sup>3</sup> The distinctive cases of relocations made to make room for the Sun Moon Lake hydroelectric complex will be addressed in the following chapter.



to be ferried downstream or channeled into nearby rice paddies obscured the ways in which water could also spread illness. While indigenous awareness of this precise relationship was dismissed as superstition, ethnobotanical knowledge likely ameliorated certain effects. Linking my two arguments is an ecological chain of events that begins with an ideal of wet-rice cultivation and ends in disease-stricken subaltern bodies. The most important evidence for this history comes from Japanese policemen themselves, who, in addition to being the executors and often designers of relocation policy, wrote broadly about the troubles they were creating. Writings of Japanese physicians brought in to consult on post-relocation hygiene problems are also revealing. Finally, recollections of relocated peoples themselves are crucial for addressing archival gaps and understanding how the violence of relocation was experienced on the bodily level.

*Relocation and the Colonial Production of Disease*

Before describing how relocation came to dominate aboriginal policy, an overview of existing scholarship will help clarify this chapter's contribution to Taiwanese and global colonial history. Like the European empires that faced unfamiliar endemic diseases in their colonies, which propelled the development of tropical medicine, the Japanese advance into Taiwan's subtropical and tropical climes was marked by struggles with microbial threats to Japanese bodies.<sup>4</sup> Paul Katz has shown that malaria was the gravest threat Japanese soldiers faced in 1874 and in the consolidation of colonial rule in 1895.<sup>5</sup> After a 1909 Conference on Malaria and particularly the 1913 promulgation of the Malaria Prevention Law, preventing the spread of malaria began to take pride of place in hygiene

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<sup>4</sup> On the British empire, see Mark Harrison, *Climates and Constitutions: Health, Race, Environment and British Imperialism in India* (Delhi, Oxford University Press, 1999); Suman Seth, *Difference and Disease: Medicine, Race, and the Eighteenth-Century British Empire* (Cambridge, Cambridge University Press, 2018). On American empire, see *Colonial Pathologies: American Tropical Medicine, Race, and Hygiene in the Philippines* (Durham: Duke University Press, 2006).

<sup>5</sup> Paul Katz, "Germs of Disaster: The Impact of Epidemics on Japanese Military Campaigns in Taiwan, 1874 and 1895," *Annales De Démographie Historique*, 1996: 195-220.

campaigns, which involved dispatching sanitary police to conduct blood tests and spleen examinations, distributing mosquito nets, dispensing quinine, and redesigning buildings.<sup>6</sup> The Government-General celebrated its success in modernizing and sanitizing the island by reducing infection rates; many scholars still credit these campaigns with remarkable public-health achievements.<sup>7</sup> By 1926, one Japanese former resident of Taiwan returning to the island for the first time in 11 years reported that early colonial-era tropes of fierce disease—“plague, and cholera, and typhoid fever, and relentless malaria”—had become a “tale of the past” (昔ばなし).<sup>8</sup>

Looking beyond aggregate data and surface impressions, we can see that re-engineering the island for intensive agriculture and industry in fact often created conditions for malaria to worsen in local contexts. Ya-wen Ku has argued for seeing malaria in colonial Taiwan as a “disease of development” and used death records to show that the expansion of the sprawling Jianan Irrigation System near Tainan increased cases of endemic malaria in the region. She has also argued for malaria policy as a vehicle for state penetration into the nexus of non-human entities, built environment, and everyday habits on the village level.<sup>9</sup> Like many environmental histories of Taiwan, Ku limits her

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<sup>6</sup> Splenomegaly, or enlargement of the spleen, can often indicate chronic exposure to malaria. Setoguchi Akihisa, “Control of Insect Vectors in the Japanese Empire: Transformation of the Colonial/Metropolitan Environment, 1920-1945,” *East Asian Science, Technology and Society* 1 (2007): 171.

<sup>7</sup> Lin Yi-ping and Liu Shiyung, “A Forgotten War: Malaria Eradication in Taiwan, 1905-65,” in *Health and Hygiene in Chinese East Asia: Policies and Publics in the Long Twentieth Century*, ed. Angela Leung (Durham: Duke University Press, 2011), 183-203.

<sup>8</sup> Matsuoka Tadao, “Atarashii Taiwan (1)” [New Taiwan (1)], May 18, 1926, *Osaka mainichi shinbun*; Matsuoka, “Atarashii Taiwan (6)” [New Taiwan (6)], May 23, 1926, *Osaka mainichi shinbun*.

<sup>9</sup> Ku Ya-wen, “Shokuminchi-ki Taiwan ni okeru kaihatsu to mararia no ryūkō—tsukurareta ‘aku kankyō’” [Development and malarial epidemics in colonial Taiwan—a constructed “bad environment”], *Shakai keizai shigaku* 70, no. 5 (2005): 67-89; Ku, “Anti-malaria Policy and its Consequences in Colonial Taiwan,” in *Disease, Colonialism, and the State: Malaria in Modern East Asian History*, ed. Ka-che Yip (Hong Kong: Hong Kong University Press, 2009), 31-48. For an in-depth treatment of the post-World War II eradication of malaria in Taiwan (which does not address indigenous Taiwanese), see Hsu Feng Yuan, “Shijie Weisheng Zuzhi yu Taiwan nüejī de fangzhi (1950-1972)” [The Malaria Control between Taiwan and World Health Organization, 1950-1972], PhD Diss., (National Chengchi University, 2012).

focus to Han areas.<sup>10</sup> This absence of indigeneity leaves important research possibilities unexplored. In certain locations, as Chapter IV's section on Sun Moon Lake will describe, the same wetlands and the same mosquitoes troubled Japanese, Han, and indigenous Taiwanese. Moreover, Ku's insights about irrigation as an aggravator of malaria and malaria policy's role in thrusting the state into rural everyday life are useful in the highlands as well. Applying them to the case of indigenous relocation sharpens the sense in which celebrations of public health triumphs in colonial Taiwan mask a deep unevenness in the somatic experience of colonialism.

An association between colonial agricultural development and disease outbreaks obtained not only in Taiwan but in sites across the world. Particularly familiar to environmental historians are the cases of malaria and schistosomiasis in the Nile river valley explored by Timothy Mitchell and Jennifer Derr and the outbreaks of malaria and yellow fever J. R. McNeill describes across what he calls the "Greater Caribbean."<sup>11</sup> Linda Nash's work on California's Central Valley reveals striking epistemological differences between how white settlers and medical professionals viewed the local ailment of "valley fever." In the history of the Japanese empire, Jeong-Ran Kim has shown that irrigation expansion to boost rice production also exacerbated malarial outbreaks in the Korean peninsula. Sakura Christmas has made the case that selenium deficiency in Mongol areas of Manchukuo was caused by a confluence of Japanese soy policy and Chinese settler colonialism, and that this reveals the limits of environmental histories that take place within the confines of a single nation-state.<sup>12</sup> In most of these instances, including the Jianan system explored by Ku, state

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<sup>10</sup> Ku, "Anti-malaria Policy," 38. In Xinzhu, some of the malarial zones Ku maps did in fact include the aboriginal administrative area, but does not address indigenous populations.

<sup>11</sup> Timothy Mitchell, *Rule of Experts: Egypt, Techno-Politics, Modernity* (Berkeley: University of California Press, 2002); Jennifer L. Derr, *The Lived Nile: Environment, Disease, and Material Colonial Economy in Egypt* (Stanford: Stanford University Press, 2019); J. R. McNeill, *Mosquito Empires: Ecology and War in the Greater Caribbean, 1620-1914* (Cambridge: Cambridge University Press, 2010).

<sup>12</sup> Linda Nash, *Inescapable Ecologies: A History of Environment, Disease, and Knowledge* (Berkeley: University of California Press, 2006); Jeong-Ran Kim, "Malaria and Colonialism in Korea, c.1876-c.1945," *Social History of Medicine* 29, No. 2 (2016):

imperatives to expand agricultural production was a driving force behind environmental change.

This was not the case in highland Taiwan, where Japanese colonial police and policymakers had little expectation that the expense of relocation would be offset by a commensurate bountiful harvest.<sup>13</sup>

Rather, an environmental goal of water conservancy was paired with a sociocultural goal of creating villages surrounded by rice paddies in which farmers would peacefully grow, harvest, and consume rice. That this conviction was not productivist *per se* and was maintained in the face of disastrous disease outbreaks gives evidence of its strength.

This sort of rice-centered landscape engineering represented an attempt to impose what I term a “normative ecology” of heavily-irrigated rice cultivation. This would bring highland indigenes in line with lowland Han Taiwanese villages, and it followed from limited precedent under Qing rule of rice-based sedentarization attempts.<sup>14</sup> The deployment of Taiwan-specific vocabulary (e.g. 埤圳 to refer to irrigation ponds and channels) heightened the sense that relocation sought to align the form of indigenous settlements with their Han counterparts, even as it simultaneously endeavored to maintain physical and social distance between the two. In this instance, following Qing precedent was consonant with pursuing the Japanese ideal of the rice-growing village. Japanese attempts to instantiate such an ideal failed in chilly Hokkaido in the 1850s and 60s, Michael Thornton has argued, and were followed by the dogged pursuit of transforming the northern island into a “Neo-European agricultural colony.”<sup>15</sup> Torrid Taiwan was rather less suited towards ecological engineering

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372-373; Sakura Christmas, “Japanese Imperialism and Environmental Disease on a Soy Frontier, 1890-1940,” *Journal of Asian Studies* 78, no. 4 (2019): 809-836.

<sup>13</sup> The closest parallel may be the German colonial forced relocations in Tanzania, coeval with my case, which were grounded in conservationist justifications but, by increasing settlement density, exacerbated sleeping sickness outbreaks. Sunseri, “Chapter 5—Forestry and Forced Resettlement in Colonial Tanzania, 1920-50,” in *Wiedling the Ax*, 97-116.

<sup>14</sup> For Qing precedent, see the below discussion of the 1890 Nan’ao relocation.

<sup>15</sup> Michael Thornton, “Settling Sapporo: City and State in the Global Nineteenth Century,” PhD Diss., (Harvard University, 2018), 294-95; Thornton, “A Capitol Orchard: Botanical Networks and the Creation of a Japanese ‘Neo-

in the European mold, although Japanese colonial officials were eager to emulate successes from European *tropical* colonies. The villages I describe below more closely resembled “Neo-Japans.”<sup>16</sup> Alfred Crosby, the original theorist of Neo-Europes and ecological imperialism, underlined the importance of what he called “portmanteau biota”—the plants, parasites, pigs, and pests that accompanied Europeans on their conquests around the world and set off out-of-control chain reactions that typically devastated native peoples and supported European conquest.<sup>17</sup> In Taiwan’s highland river valleys, the problem was not portmanteau biota from Japan but rather pre-existing parasites whose threat was amplified by imperial interventions. Unchecked disease spread in some of these settlements confirms that in these idealized Neo-Japans, as in Crosby’s Neo-Europes, “humans were seldom masters of the biological changes they triggered.”<sup>18</sup> And while, like Neo-Europeans, Japanese authorities struggled to adapt to these changes, the lion’s share of harm nevertheless fell on the colonized population, and disease control ultimately offered avenues for ever more thoroughgoing police control over indigenous lives and bodies.

This interpretation, in which the center of gravity rests with the normative ecology of wet-rice irrigation, distinguishes this chapter from the existing literature on forced relocation. Relocation has earned mention but not sustained examination in Anglophone scholarship, even with significant recent attention to indigeneity in Taiwan under Japanese colonialism. The literature in Chinese and Japanese is rich, with Chen Xiuchun, Matsuoka Tadasu, Kitamura Kae, and Kondō Aya all giving

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Europe,” *The American Historical Review* 127 (2022): 584. Yamaji Katsuhiko has argued that Ainu assimilation in Hokkaido provided a template for indigenous assimilation in Taiwan: Yamaji, *Taiwan no shokuminchi tochi*, 55-56.

<sup>16</sup> I explore this question of “Neo-Japans” in John Hayashi, “Japan’s Colonial Environments,” in *The Handbook of Environmental History in Japan*, ed. Fujihara Tatsushi (Tokyo: MHM Limited, 2023), 21-25.

<sup>17</sup> Alfred Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900-1900* (Cambridge: Cambridge University Press, 1996) 89-90.

<sup>18</sup> Crosby, *Ecological Imperialism*, 192.

relocation a prominent place in their accounts of colonial policy. Chen and Matsuoka focus attention on anti-millet rice promotion as a form of cultural negation, while Kitamura and Kondō describe the deleterious health effects resulting from relocation.<sup>19</sup> Kondō in particular combined archival and field research to give a textured account of malarial outbreaks, and her unpublished 2003-2004 interviews with Bunun relocation survivors are an invaluable resource. This chapter complements this work through the introduction of new sources and connects it to the other forms of technoscientific dispossessions discussed elsewhere in this dissertation.

### *Roots of Relocation*

In the long view, colonial environmental pressures drove aboriginal Taiwanese to relocate to at least as early as the seventeenth century, when Dutch and Chinese co-colonization of the island devastated the grasslands and deer herds that populated the Western plains and that Taiwan's natives depended upon. These pressures continued under Zheng and Qing rule, and by the Japanese period the idea of a people who retreated into the mountains to defend their autonomy comprised a basic understanding of who highland aboriginal Taiwanese were. On a smaller scale, it was not uncommon for settlements to move around in response to threats from nature or other groups.

Such small-scale relocations did not stop with Japanese rule. But what generally distinguished relocations in the colonial period from their antecedents was their direction—not to push aborigines deeper into the mountainous interior, but to bring them down to valleys, foothills, and plains, closer to cities and state police power. Governor-General Kodama Gentarō (児玉源太郎) made this goal

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<sup>19</sup> Chen Xiuchun, *Rijn shiqi Taiwan shandi shuitianzuo de zhanqikai* [The development of wet-rice cultivation in highland Taiwan during the period of Japanese occupation] (Taipei: Daoxiang chubanshe, 1998); Matsuoka, *Taiwan genjumin shakai*; Kitamura Kae, *Nihon shokuminchi-ka no Taiwan senjūmin kyōikushi* [The educational history of Taiwan's aboriginal peoples under Japanese colonialism] (Sapporo: Hokkaido Daigaku Shuppankai, 2008); Kondō Aya, “Nihon shokuminchiki no Taiwan genjūmin ni tai suru shūdan ijū seisaku to ‘mararia ryūkō jiken’” [The policy of group relocation for Taiwan's indigenous peoples during the Japanese colonial period and the “malarial outbreak incident”], MA thesis, (Waseda University, 2005).

explicit on November 5, 1901, when he gathered state governors, high-ranking officials, businessmen, and Han Taiwanese elites at his residence to deliver a speech on the promotion of new industries (殖産興業). The Governor-General described the verdant forests of Taiwan's central mountains as possessing "inexhaustible wealth" (無尽の富), which through the establishment of transportation infrastructure could be harvested. Because doing so would mean opening up the "savage border," forestry and aboriginal pacification policies needed to proceed alongside one another. Aboriginal policy could serve the exploitation of great highland tracts of timber, Kodama reasoned, by way of determined government guidance to remove the obstruction that natives posed to forestry: "After all, savages are people, and...if they are transformed through the power of education and nurtured through methods of vocational training, then it will be not at all impossible to *bring them out of their deep valleys and settle them on the plains*" (深谷を出て平地に棲ましめんこと, emphasis added).<sup>20</sup>

Kodama's specific interest in getting aborigines out of the way of logging was not shared by all foresters at the time, some of whom viewed indigenes as a source of cheap labor conveniently located in the mountains. His vision of transforming indigenes into lowlanders was nevertheless durable, and it was buttressed by rationales such as greater police control and, later, conservation. At the time of his speech, Kodama's government had just attempted one such relocation project. Kitamura writes of a meeting in October 1901, when representatives from 21 Atayal villages around Xitou (溪頭) and Nan'ao (南澳) gathered to meet the governor of Yilan State. At this meeting, Japanese authorities exhorted the Atayal to cease attacks on Japanese and Han residents and camphor collectors and—as proof of their submission—demanded that they allow their children to

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<sup>20</sup> Aoki Shigeru, *Mori o kangamite* [Looking back on the forests] (Taipei: Minami Nihon shinpōsha, 1931), 57.

be sent away for schooling in Japanese settlements on the plains. One Atayal response to this proposal, which amounted to holding children hostage to ensure parent compliance, was that “the plains in the summer heat are a lair for demons of disease.”<sup>21</sup> This statement, likely translated from an Atayalic language to Japanese by way of at least one Chinese language, was grounded not in vague fears but in specific and recent experience. As Kitamura describes, a Qing pacification campaign in 1890 ended with the relocation of Atayal adults around Nan’ao to foothill settlements, with their children taken to schools in Yilan. This experiment ended in failure after two years, with many dying of disease in the new village before returning to their original villages.<sup>22</sup>

Kitamura’s example from Nan’ao shows not only that the early Japanese state made attempts to force aborigines perceived as dangerous to the plains, but that in doing so they were following a policy attempted under Governor Liu Mingchuan. Liu’s projects in the late 1880s and early 1890s have occasioned much debate over whether or not Taiwan’s modernization preceded Japanese colonization.<sup>23</sup> Beyond famous initiatives to build railroads and telegraphs, Liu also undertook aggressive anti-aboriginal campaigns, yet these have generally been absent from debates about modernization and the legacy the late Qing left the Japanese. During the colonial period, Japanese officials were often reticent to acknowledge a debt to the work of their Chinese predecessors, and it is thus little surprise that I have found no direct mention of Liu’s abortive efforts in Japanese discussions of relocation policy. Nevertheless, the link that Kitamura identifies is suggestive. Although it would be several decades before mass relocation occurred with ideological underpinnings having to do with police control, conservation, and integration into “Japanese” civilization, a first step in this violent, dispossessive work had been taken under the Qing. A paucity

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<sup>21</sup> Kitamura, *Nihon shokuminchi*, 86-88.

<sup>22</sup> Kitamura, *Nihon shokuminchi*, 88.

<sup>23</sup> Lung-chih Chang, “From Island Frontier to Imperial Colony: Qing and Japanese Sovereignty Debates and Territorial Projects in Taiwan, 1874-1906,” PhD Diss., (Harvard University, 2003), 2.



of sources makes it difficult to definitively identify the lowland disease from Qing records as malaria, but whatever its precise character, it suggests that the specter of this malady continued to haunt Atayal memories in Nan'ao a decade later, and to deepen fear of the plains.

Why, despite Kodama's proclamation and these antecedents, did relocation of aboriginal villages remain limited in the first few decades of colonial rule? The primary reason is that waging wars to suppress anti-Japanese resistance, first chiefly against Han Taiwanese and later against indigenes, was for many years the colonial government's overwhelming concern. The 1901 example from Nan'ao shows that these wars, which continued on a large scale through 1914, could lead to relocation as part of their settlement, and indeed forced relocation as punishment for violent recalcitrance would continue throughout the colonial period. Generally speaking, however, military concerns pushed educational and vocational training to the margins of aborigine policy until the Government-General determined that the fundamental work of pacification had been accomplished. Similarly delayed were the related goals of highland development and conservation, which as the last chapter argued grew in prominence over the 1910s. This set of rationales—improving indigenous livelihoods, protecting highland soil and streams, and clearing the way for resource extraction—combined with an ever-present desire for police control, and undergirded relocation policy throughout the remaining decades of Japanese rule. Before exploring the environmental violence perpetrated through wet-rice cultivation in new settlements, an overview of some key quantitative and qualitative issues relating to relocation will be helpful.

Where exactly can we identify a shift towards relocation? Historians Kondō Masami and Yamaji Katsuhiko point to 1925 and 1926, respectively, as the year that a government policy of “group relocation” started tearing people away from their villages, while Government-General

sources from the 1930s identify the start in 1919.<sup>24</sup> All agree that initial relocations were small in scale, and that the 1930 Wushe Incident inaugurated a major growth. Looking at Government-General data in Figure 3.1, we can see that 1922 was the first year in which more than one thousand indigenes relocated, and that after 1925 numbers remained fairly steady—between one thousand and two thousand—before exploding in 1932 and 1933.<sup>25</sup>

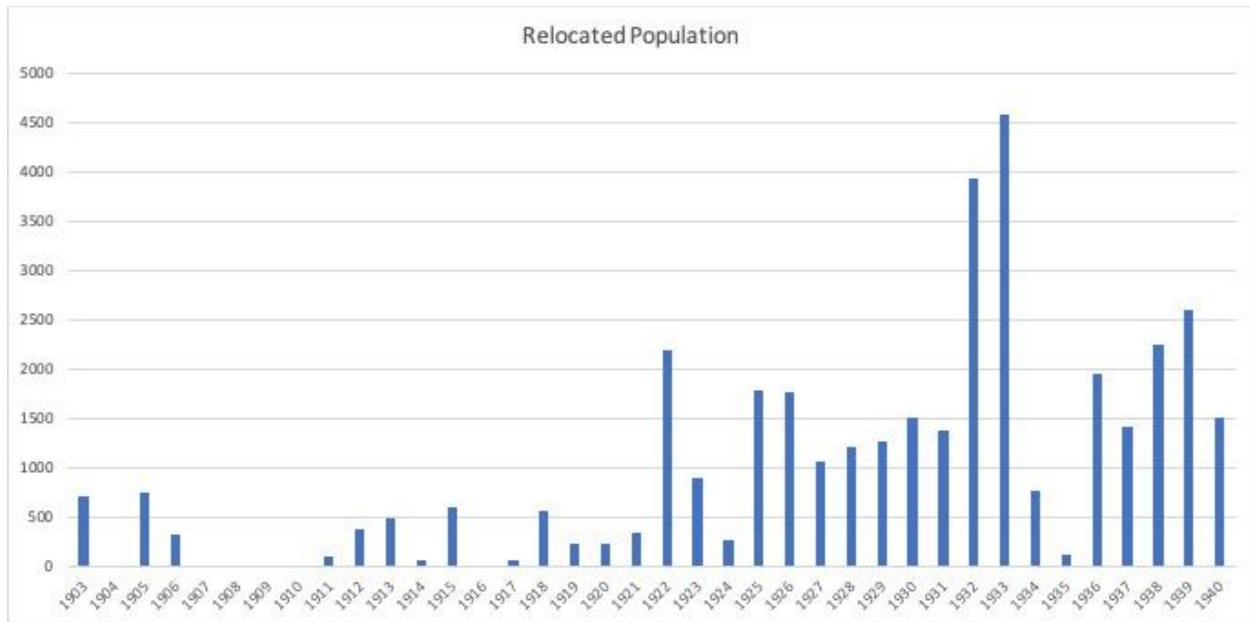


Figure 3.1—Relocated population of indigenous Taiwanese, 1903-1940.<sup>26</sup>

One limitation of this presentation is that relocation events are associated with a single year, when in fact it was entirely normal for the process to stretch out across several years. This helps make sense of seeming anomalies such as the spike in 1922, which reflects 1683 relocations recorded in Taizhong; a closer look makes clear that this was due to resettlement of indigenes from fourteen

<sup>24</sup> Yamaji, *Taiwan no shokuminchi tōchi* 143; Kondō Masami 近藤正己, *Sōryokusen to Taiwan: Nihon shokuminchi hōkai no kenkyū* [Total war and Taiwan: research on the collapse of Japanese colonies] (Tokyo: Tōsui shobō, 1996), 274; *Takasagozoku jusan nenpō shōwa 11-nen* [Takasago tribe annual vocational report, 1936] (Taiwan: Taiwan sōtokufu keimukyoku, 1937), 10.

<sup>25</sup> *Takasagozoku jusan nenpō shōwa 16-nen* [Takasago tribe annual vocational report, 1941] (Taiwan: Taiwan Sōtokufu Keimukyoku, 1942), 26-27.

<sup>26</sup> *Takasagozoku jusan nenpō shōwa 16-nen*, 39.

different villages into four new in a process that commenced in 1922 but did not officially conclude until the end of December, 1925.<sup>27</sup> Similarly, the strikingly low figure for 1935 (121 people) belies the fact that a large number of relocations begun in 1932-33 were still ongoing. What is significant is the overall trend, which indicates that large-scale relocation began a few years earlier than the point in the mid 1920s that other historians have identified, and it reached a zenith after the Wushe incidents of 1930-31. By 1942, the total relocated population reached 45,991, or nearly half of the roughly 95,000 indigenous residents of the aboriginal zone.<sup>28</sup> Hard data past the early 1940s are difficult to come by, but it can be confidently asserted that plans for further extensive displacements were in place, even when the exigencies of total war and, later, imperial collapse prevented their execution.

Relocation was a heterogeneous process, one that unfolded in different ways across the island. I follow most recent historians in referring broadly to relocations as *forced*, which flattens this diversity of experience but is nevertheless appropriate. The Government-General itself reserved the language of compulsion (強制) for indigenes whose perceived threat of armed resistance was the greatest: those who kept secret caches of rifles and gunpowder, or those who were implicated in violent clashes with other tribes or policemen. Relocations following the Wushe incidents fit into this pattern, in which policemen compelled Sediq at gunpoint to abandon their homes.<sup>29</sup> In the case of relocations of peoples in areas inundated by Sun Moon Lake and associated reservoirs, which included indigenous Thao and Han Taiwanese, the Taiwan Power Company offered compensation

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<sup>27</sup> *Takasagozoku jusan nenpō shōwa 16-nen*, 12-13.

<sup>28</sup> *Takasagozoku jusan nenpō shōwa 16-nen*, 39; Matsuoka, *Taiwan genjūmin shakai*, 148.

<sup>29</sup> Iwaki Kamehiko, “Okuchi banjin shūdan ijū mondai no kentō” [Examining the question of the group relocation of remote area savages], *Taiwan keisatsu jibō*, July 1934, 25.

but no choice when it came time to abandon their homes before they were flooded.<sup>30</sup> Less dramatic but equally existential were survival threats faced due to conservationist law enforcement all across the island. Iwaki Kamehiko (岩城龜彦), who was involved in highland relocation and development in a variety of positions from 1918 through 1941, is one of the most important sources about relocation, and his writings make this reality of ecological dispossession preceding relocation quite clear. Wherever concealed guns allow indigenes to hunt freely and a lack of law enforcement enables the cutting and clearing of rich forests at will, Iwaki wrote, there is resistance to relocation. Conversely, in places where strict government patrols prevent the “excessive logging and reclamation” (濫伐濫墾) of land and thereby block future shifting cultivation, people welcome the opportunity to move elsewhere.<sup>31</sup>

What Iwaki identified here was the difference between people who were able to subsist according to customary methods and people whose ability to provision themselves with crops and game had been eroded by government restrictions to the point that they lived on the precipice of starvation. That the former group even existed—that anyone could thrive in the forbidding mountainous environs slated for relocation—was evidence not only of stable wildlife populations and vast “virgin” forests but of poor enforcement of gun, logging, and land-clearing controls. If policemen were effectively discharging their duty, his argument entailed, then aborigines *ought* to be struggling to get by. Put another way, protecting the highlands required making it impossible to survive in them. Government directives to relocate from such environmentally precarious states, even if unaccompanied by the threat of immediate violence, were thus manifestly coercive.

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<sup>30</sup> Kai Yiu Chan (陳計堯), “Shilun Riyuetan diqu yuanzhumin de lishi qianyi (1815-1934)” [A History of Aboriginal Migration in the Sun-Moon Lake Revion, 1815-1934], *Taiwanshi yanjiu* 7, no. 1 (2001): 81-134.

<sup>31</sup> Iwaki, “Okuchi banjin,” 25-26.

Such bleak circumstances did not obtain in every relocation case: sometimes persuasion worked, even when some scope to refuse existed. As with environmental regulation, colonial personnel were often stretched too thin to compel uniform compliance. Yet the commitment to relocation was thoroughgoing, and it worked its way into village life in other ways. A 1934 report on an agricultural training school (農業講習所) in Hualian identified a key objective as training young indigenous men to become “mainstays” in their villages of origin, where they would not only help improve farming techniques but also spread the Japanese language, root out superstition, and displace older and more stubborn community leaders. One young Bunun graduate identified as Bion Rira was praised for convincing obstinate fellow tribesmen to finally assent to police calls for relocation.<sup>32</sup> Coercion thus operated across multiple axes of policing, environmental immiseration, and intra-generational pressure to achieve displacement.

*Reconfiguring native geography*

Geographical considerations were paramount in both determining which villages “required relocation” (要移住) and where new settlements were to be created. While Kodama’s 1901 declaration referred to settling indigenes on “the plains” (平地), later officials instead identified valleys or foothills *near* the plains as ideal locations. With the exception of lowlands in southeastern Taiwan where Amis people lived, the island’s plains were already home to cities and farmland populated by Han Taiwanese and Japanese. Acquiring land and preventing conflict with new neighbors would be difficult in the open lowlands of the vast western coastal plain, the Taipei basin, or the Yilan plain. Even in mountain valleys, preserving land for relocation required coordination, as suggested by a 1920 study of Mb’ala (眉原), along the upper reaches of the Beigang river (北港溪)

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<sup>32</sup> Matsuda Yoshirō, *Taiwan genjūmin no shakaiteki kyōka jigyo* [Social civilizing projects of Taiwan indigenous peoples] (Kyoto: Kōyō Shobō, 2011), 41-46.

in modern-day Nantou, which was chosen as a relocation destination for several Atayal groups.<sup>33</sup>

With a riverside location, aboriginal affairs officers had identified this area as potentially favorable for wet rice cultivation. When state officials investigated the matter, however, they found a raft of competing applications to farm the same land from Han and Japanese individuals. They rejected these applications, thus preserving the area for indigenous relocation, even as surveyors noted that the somewhat narrow and steep riparian zone would actually be better suited to growing dry crops than irrigated rice.<sup>34</sup> Mb'ala also captured the principle of amalgamation, in which several smaller indigenous settlements would be combined into one. This was typically one a scale of three to five becoming one: both a lack of available large land tracts and a fear of concentrating too many suspect subjects in a single place precluded any plan of building indigenous mega-settlements.

With several hundred residents, easy access to transportation routes, and farmland nearby, these were to be harmonious, productive, and easily controlled communities. The settlements depicted in Figures 3.2 and 3.3 capture the fact that while still small by the standards of the plains, the new villages were larger, denser, and flatter than the scattered mountainous settlements in which many highland indigenes resided. Police outposts nearby would be where policemen would live and work. This went far beyond mere surveillance: in the aboriginal administrative zone, policemen were the state. As one European observer wrote,

[their duties] include the several functions of Schoolmasters, Postmasters, Surgeons, Carpenters, Telephone Linesmen, Bridge Builders, Assessors, Commission Agents (without the commission), Fortune Tellers, Glaziers, Astronomers, Strolling Players, Arbitrators, Blacksmiths, and Agriculturalists. They have to administer the Emperor's Government and to wield his authority; to construct waterworks, to instruct in and supervise sanitation; to act

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<sup>33</sup> This Beigang river is a tributary of the Wu river (烏溪, also Dadu river 大肚溪) and is not to be confused with the identically-named Beigang river located farther south in Yunlin and Jiayi.

<sup>34</sup> “Banjin ijūchi oyobi kōsakuchi yotei no baai ninka o yō suru tsūtatsu no ken” [On notifications requiring approval in the cases of land scheduled for savage relocation or cultivation], 1920, 00003052003, Taiwan Historica.

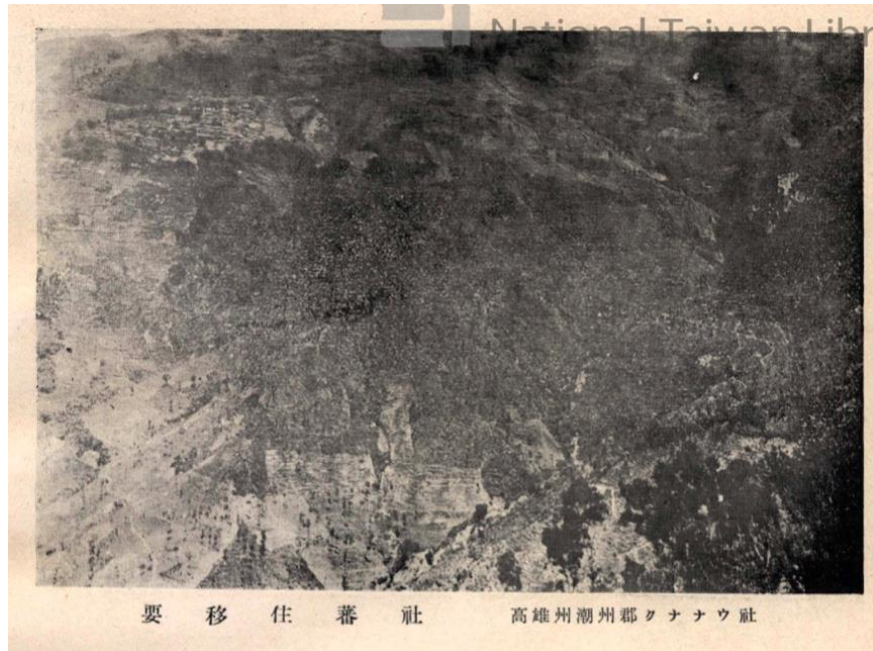


Figure 3.2: “Aboriginal village requiring relocation.” Kuljaljau (古樓), an Paiwan settlement at an elevation of roughly 1100 meters in southern Taiwan. Inhabitants were relocated in several waves after this photo was taken. Though difficult to discern, the settlement is located in the photo’s upper left, atop a vast and largely vegetated mountainside.<sup>35</sup>



Figure 3.3: “Aboriginal village [after] group relocation.” This relocated village is identified as Nan’ao (南澳), one of several new Atayal settlements in northeastern Taiwan. Note the orderly rows of houses located at the base of a hill.<sup>36</sup>

<sup>35</sup> *Banchi kaihatsu chōsa gaiyō narabi ni Takasagozoku shoyōchi chōshiyō* [Savage territory development survey summary and Takasago tripe reserve survey chart] (Taipei: Taiwan sōtokufu keimukyoku ribanka, 1937), inset, National Taiwan Library; Ko-hua Yap 葉高華, “Cong shandi dao shanjiao: Paiwanzu yu Lukaizu de shehui wangluo yu jiti qiancun” [From Mountains to Foothills: Social Networks and Collective Relocations of Paiwan and Rukai Tribes], *Taiwanshi yanjiu* 24, no. 1 (2017): 162.

<sup>36</sup> *Banchi kaihatsu chōsa*, inset, National Taiwan Library.

as foresters, gymnastic instructors and vets; in fact, to do at the shortest of notice anything that is required of them by the primitive peoples among whom they dwell.<sup>37</sup>

Understanding relocation in environmental terms thus requires accounting for the variegated ways in which police made new settlements. While improvisation was inevitable, in police writings it is clear that relocation was guided by a consistent vision.

Central to this vision was the introduction of wet-rice agriculture. As we have seen, the lack of wet-rice agriculture among most indigenes was taken as evidence of their primitive state, with the shifting cultivation they practiced instead a marker of environmental profligacy. Farming rice in irrigated paddies would make indigenes more like both Han Taiwanese and Japanese, and each village would leave a much smaller (if more intensive) environmental footprint than before. The notion that irrigating, growing, and eating rice could serve as what David Bello terms an “agent of ethnic transformation” had a long pedigree not just in Japan but also in Taiwan and other corners of the Qing empire.<sup>38</sup> As mentioned below, some Japanese observers viewed relocation as a process of turning indigenes into Japanese. Simultaneously, some Han Taiwanese saw relocation as assimilation into *Han* society. Visiting a relocated village near Hualian in 1935, famed political activist Lin Xiantang (林獻堂) recorded in his diary that the people there “plow fields and plant sugarcane no differently than Taiwanese people” (耕田種蔗無異於台人).<sup>39</sup> Whatever ethnic meanings applied to wet-rice culture, the physical requirement to secure irrigation sources coincided with the fact that flat

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<sup>37</sup> de Bunsen, “Formosa,” 277.

<sup>38</sup> David A. Bello, “Transformation through inundation: riziculturing Muslim identity in Qing Dynasty Khotan,” in *Landscape Change and Resource Utilization in East Asia: Perspectives from Environmental History*, ed. Tsu-i-jung Liu et al. (Abingdon, Oxon: Routledge, 2018) 81.

<sup>39</sup> Lin Xiantang, ed. Hsu Hsueh-chi, entry for November 3, 1935, in *Guanyuan xiansheng riji*, Taiwan riji zhishiku [Taiwan Diary Knowledge Bank], Academia Sinica: <https://taco.ith.sinica.edu.tw/tdk/>.



land suitable for large settlements and farming often only existed where it had been carved out of the mountains by water. Most resettlement sites were thus located alongside streams.

For a host of environmental reasons, constructing rice paddies in mountain valleys and near or along low hills was not as straightforward as building them on flat ground. A 1930 article aimed at policemen in training complained that many officials involved in resettlement lacked an understanding of soil, drainage, or climate, and as a result they focused simply on carving out a paddy in the right shape near some source of water. The anonymous author enumerated the complications that such an approach invited and outlined obstacles police and indigenes encountered when building paddies and growing rice in the foothills. First was a question of water supply: fires and reckless land clearing in the mountains—by implication, the work of other indigenes—threatened to disrupt water supplies, so care was required to find streams with thorough vegetative cover upstream. Water retention was also an issue because soil in hilly areas drained water much more readily than in the lowlands. Before planting seeds, earth thus needed to be tamped down with large logs. Even with a steady water supply that would not drain away, the water might be too cold—the icy temperatures of streams flowing down from the mountains could kill rice. Finally, an additional threat to young rice plants was came from the acidity of the soil, which was often full of organic matter. In a deeply ironic twist, the suggested remedy for this was to cut nearby grass, spread it across the soil to be planted with rice, and light it aflame. The resulting alkaline ash would boost the soil's pH value and support rice seedling growth better. This was ironic because major justification for relocating indigenous Taiwanese in the first place was the “primitive” and ecologically profligate slash-and-burn agriculture that they practiced. And yet for them to succeed at the supposedly more harmonious and productive wet-rice agriculture, this article suggested, they

would first have to alter their new environments through slashing and burning—this time on Japanese terms.<sup>40</sup>

An example dating from prior to the regularization of relocation policy helps illustrate interlinked strains of coercion, health management, and agricultural reform. Over the course of 1919 and 1920, groups of Gogan Atayal relocated over the mountains from what is now Fuxing (復興), Taoyuan (then part of Xinzhu state) and settled along the Lanyang river upstream from Yilan, then part of Taipei state. Contemporary sources describe this migration as not only voluntary but unsanctioned by the colonial government; considering the military assaults endured by the Gogan in the early 1910s, however, one could view this as a type of coerced relocation, albeit one unplanned by authorities.<sup>41</sup> Colonial police initially reacted with concern at this intra-state and unauthorized relocation, which brought the famously belligerent Gogan closer to Han communities near Yilan. From a broader view of aboriginal policy, however, it was entirely welcome; Taipei state police chief Honma Zenko (本間善庫) later described it as “something [we] hadn’t dared hope for” (願ふてもないこと). Memories of fierce battles against the Gogan were fresh on the Japanese side, and Honma described relocation as a necessary step in tempering the tribe’s strength so that its members could “evolve” (進化). Police from the Xinzhu and Taipei state governments thus agreed to permit the move under the condition that the Gogan accept acculturation and education programs, and on December 1, 1921, indigenes and policemen gathered to mark their understanding with a relocation ceremony. Spread out over several settlements along the Lanyang, the newly-settled Gogan provisioned themselves with grain through millet and dry rice cultivation, and in the offseason they

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<sup>40</sup> Kikō-sei, “Banjin suidensaku shidōjō no chūi jikō” [Points to take note of in the instruction of savages in wet-rice cultivation], *Taiwan keisatsu jibō*, July 1930, 32-33.

<sup>41</sup> Barclay, *Outcasts of Empire*, 233.

harvested and traded timber from the rich forests nearby. In 1925 authorities set aside land for vocational training, and Honma wrote breathlessly that “they have no fear of future attacks from outsiders and have their eternal happiness guaranteed.”<sup>42</sup>

Threatening this Arcadian utopia were continuing outbreaks of malaria, which Honma described as his “sole source of regret” and the single largest barrier to future relocation plans. Along the Lanyang and elsewhere, malarial outbreaks followed relocation. Yet given that agriculturally viable sites required clustering people together in low-lying areas, Honma wrote that it was simply impossible to find land where people would not get malaria. Gogan originally lived free from malaria in territory over 1000 meters above sea level and were thus blessed with a cooler climate similar to Japan’s—this made it a fundamentally more salubrious locale than the torrid lowlands. But given the utter necessity of relocation and the unavoidability of attendant malarial infections, Honma argued, attention should focus on mitigating its effects through use of mosquito nets and quinine.<sup>43</sup>

In afflicting indigenes in their new homes, malaria caused political problems as well. In 1924, individuals among the newly-settled Gogan illicitly acquired rifles and refused to hand them over to the police; the next June, Honma wrote, they used the threat of malaria “as an excuse” to return to their original villages. Although he dismissed malaria here as a cover story for obstinate law-breaking, Honma acknowledged that for relocation to be reversed after a few short years threatened the future of the entire enterprise. In August 1925, authorities from Taipei and Xinzhu states met at the Government-General offices and formulated a solution: police would forcibly send all the recalcitrant Gogan who had returned to their original village *back* to the resettlement sites along the

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<sup>42</sup> Honma Zenko, “Megumaretaru Taihoku-shūka no Gaogan ijūban” [The blessed relocated Gogan savages in Taipei state], *Taiwan keisatsu kyōkai zasshi*, Feb. 1926, 149-150.

<sup>43</sup> Honma, “Megumetaru,” 150-151.

Lanyang river. If the original coercion that pushed the Gogan down from the mountains was indirect and left open a possibility of return, by 1925 the re-relocation was openly forced and intended to be permanent.<sup>44</sup> In an acknowledgement of the continuing battle against malaria, the Government-General committed to renovating houses to better protect them against mosquitoes. Another decision that came out of the August 1925 meeting was that the government would excavate irrigation channels and build rice paddies near the new villages. Wet rice cultivation offered a solution, albeit a very expensive one, for fixing dangerously itinerant indigenes in place. Irrigation channels, built along tributaries of the Lanyang, had a cumulative length of several kilometers and, by Honma's reckoning, cost 4,764 yen, a majority of the 8,535 yen consumed by the entire project. Even more striking is the report that over 14,000 people—Japanese, Han, and indigenous—were involved in the excavation and renovation work.<sup>45</sup>

#### *Relocation and its Discontents*

Historian Matsuoka Tadasu has argued, following James Scott, that the promotion of wet-rice cultivation constituted an effort by the Government-General at wholesale simplification. This included both economic simplification by which indigenes became rice producers within a larger marketplace and also cultural simplification, by which Japanese fondness for rice as food and rice farming as lifestyle displaced an indigenous attachment to millet. Matsuoka writes that police outposts in all areas of the aboriginal territory promoted such policies whether attached to new settlements or not, but he notes a particularly strong association between relocation and wet rice cultivation. It was relocation that was responsible for the huge growth in rice harvests from

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<sup>44</sup> Relocation often proceeded in stages, so the intent of permanent settlement mentioned here should not be mistaken for a general description of forced relocation as a one-off event.

<sup>45</sup> Honma, "Megumetaru," 151-152.

indigenous farmland, a point of pride for the Government-General, and the corresponding decline in millet harvests.<sup>46</sup> For Matsuoka, Emiko Ohnuki-Tierney's work on the foundational place of rice in Japanese culture helps explain why the colonial government remained so committed to this policy, even amidst criticism from its own employees that it was too expensive and that growing a variety of crops in fields that did not require irrigation would make more sense.<sup>47</sup>

Such opposition to relocation, if rare, was certainly possible amongst Japanese policemen, academics, and the Han Taiwanese public. One notable instance was Taihoku Imperial University agronomy professor Okuda Iku (奥田 毅), who held that indigenes should be kept in the mountains. Improving native agriculture by encouraging its intensification and diversification would improve indigenous livelihoods, making them more compliant and preparing them for work in Japanese industry.<sup>48</sup> Anthropologist Mori Ushinosuke held that putting indigenes to work in forestry enterprises would better their lot while protecting their culture from destruction; he disagreed with “superficial” attempts at promoting wet-rice agriculture.<sup>49</sup> Utsurikawa Nenzō (移川子之蔵), Okuda's colleague at Taihoku Imperial University and an anthropologist like Mori, also imagined a place for indigenous labor in highland industry. In response to a *Taiwan nichinichi shinbō* article asking for reader input on how the “savage territory” ought to be developed in 1933, Utsurikawa outlined ways in which indigenous cooperation could enable the construction of a “modern mountain

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<sup>46</sup> Matsuoka, *Taiwan genjūmin shakai*, 118-158. Matsuoka's engagement with Scott's work on high modernism deals chiefly with *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998).

<sup>47</sup> Matsuoka, *Taiwan genjūmin shakai*, 135, 146.

<sup>48</sup> Matsuoka, *Taiwan genjūmin shakai*, 1451-46.

<sup>49</sup> Mori Heisei [Ushinosuke], “Chisui mondai kara mita sanrin to seiban (1)” [Mountain forests and raw savages as viewed from the flood control issue (1)], *Taiwan nichinichi shinbō*, July 24, 1925. Mori's serialized essay was cut off the next day but continued the following month as “Banjin to shinrin no kankei ni tsuite” [On the relationship of savages and forests], *Taiwan shinbō*, August 8-27, 1925. On Mori's criticism of Japanese colonial policy towards indigenes and its resonances with what Renato Rosaldo calls “imperialist nostalgia,” see Robert Tierney, *Tropics of Savagery: The Culture of Japanese Empire in Comparative Frame* (Berkeley: University of California Press, 2010), 87-88.

village” and, he proposed, Taiwan’s first sanatorium. “Rash relocation to the plains” (なまじ平地移住), Utsurikawa wrote, ought not be considered. Iwaki Kamehiko responded with a lengthy and impassioned defense of relocation policy, stressing that it was necessary to eliminate both environmental profligacy and the anti-Japanese savagery among indigenes.<sup>50</sup>

These debates occurred amidst a context of intensifying relocation. The Government-general doubled down on relocation following the 1930 Wushe (Musha) incident and subsequent battles and reprisals. On October 27, 1930, Mona Rudao led several hundreds of Tgdaya Sediq in an uprising against the Japanese presence around Wushe in central Taiwan, notably killing over 100 Japanese who were gathered at a school athletic assembly. In the furious Japanese response, colonial soldiers (including so-called “friendly” indigenes aligned with the state) killed over one thousand men, women, and children from the villages that had participated in the initial attack.<sup>51</sup> From the point of view of political leaders, aboriginal policy up to that point had to be judged a failure for the chaos and bloodshed that transpired. Debates reached the Imperial Diet in Tokyo, the Governor-General resigned, and in 1931, the new Governor-General released new guidelines for aboriginal policy. In stressing relocation and wet-rice cultivation, this important document—titled “fundamental principles of aboriginal affairs” (理蕃大綱)—elevated conservationist concerns to a central position in aboriginal policy. While noting that many indigenes have long chosen to live in high and dry locations for strategic and hygienic reasons, it argued that shifting cultivation nonetheless “invited reckless cutting of forests, washing away topsoil and causing inundation and erosion on downstream fields, generating grave obstacles for both national territorial protection and

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<sup>50</sup> Iwaki Kamehiko, *Taiwan no banchi kaibatsu to banjin* [Taiwan’s savage territory development and savages] (Taipei: Riban no tomo hakkōsha, 1936), 324-327.

<sup>51</sup> Michael Berry, ed., *The Musha Incident: A Reader on the Indigenous Uprising in Colonial Taiwan* (New York: Columbia University Press, 2022).

[native] livelihoods.” Relocation, along with vocational, educational, and above all agricultural reform would help ensure that indigenes would come to have an awareness of themselves as citizens of Japan and even come to think more like Japanese people.<sup>52</sup>

By 1933, relocation was occurring on a mass scale. When a group of Bunun attacked a Japanese police post at Fengban (逢崗) in November 1933, some viewed it as a rebuke of this new aboriginal policy regime. A Chinese-language editorial in the *Taiwan shinminpō*, an arguably liberal newspaper which at the time published in both Japanese and Chinese, expressed such a viewpoint in terms of a tension in aboriginal policy between suppression and nurturing that went back to Qing times. Relocation aimed to nurture indigenes through improving their material conditions, but in relying upon violent methods it took on a suppressive character that doomed the policy to failure. Forcing people of a different culture to abruptly abandon their ancestral homes and undergo a “drastic change of environment” (環境激變) could only engender feelings of “unease, worry, panic, and rebellion.” Rather than rushing to complete mass relocation in twelve short years, the editorial argued, police ought to gradually improve native livelihoods. This would allow them to “turn towards the cultural life of the plains on their own accord, while not threatening their right to survive” (自發的趨向平地文化生活、方不致威脅其生存權).<sup>53</sup> The Han Taiwanese editorialists did not object to the overall goals of aboriginal policy, but significantly they suggested it ought to be oriented towards patient uplift in the direction of lowland Han society. There was no mention of a Japanese ideal of native acculturation. While that transformation was underway, they implied, the colonial state needed to respect an indigenous “right to survive” in place.

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<sup>52</sup> “Riban seisaku taikō ni kansuru ken” [Item concerning the fundamental principles of aboriginal pacification], 1931, 00007393014, *Taiwan Historica*, 334-338, quote on 338.

<sup>53</sup> “Bushe fanbian yu pingdi yizhu ce” [Bunun savage village incident and plains relocation policy], *Taiwan shinminpō*, November 18, 1933.

Other evidence from the Fengban incident makes clear that the Bunun who perpetrated that attack had a visceral sense that their very survival was at stake. In 1950, Japanese policemen Suzuki Hideo recollected:

They beheaded Officer Tsuchimori from the Fengban Police Outpost and killed three children. At that time, we were struggling to stabilize and improve their livelihoods where they lived, so we tried to relocate them to a place in the foothills where they could grow rice in paddies. But this relocation policy wasn't something they could readily understand, and a misunderstanding spread that 'they're trying to bring us down from the mountains to get us sick with malaria or some other disease and kills us all.' The attack on the Fengban Police Outpost had several causes, but this sort of misunderstanding was one of the causes.<sup>54</sup>

Biological warfare was thus one way that some indigenes saw relocation plans—a conspiracy by the Japanese to force them into the lowlands where mosquitos would serve as proxy executioners. While Matsuoka includes the above quote in his book, he stops short of grappling with the pervasiveness of malaria in relocated communities. Rice paddies for him are at once grain-producing machines and cultural artifacts imposed by a colonial government to increase the legibility of a subaltern people. Yet no less important, I contend, is that paddies were also environments. The tendency for malaria-carrying mosquitos to breed in rice paddies and the irrigation canals, ditches, and ponds that supported them was inescapable.

Malaria and other diseases intersected with mass dispossession, eliciting a host of responses from policemen, public health officials, and members of indigenous communities. The sort of straightforward objection to relocation policy mentioned above was unusual: critique was more often slight, directed at logistical issues, and embedded in work that was otherwise fully in support of relocation. Familiarity with malaria led officials with medical training to suggest ways that relocation could be carried out more hygienically, but this did not amount to a challenge to relocation policy or even to the sort of intra-bureaucratic tensions raised by Panama Canal

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<sup>54</sup> Matsuoka, *Taiwan genjūmin shakai*, 145.



entomological workers as described in the work of Paul Sutter.<sup>55</sup> This failure helped ensure that the same familiar and tragic dynamics, including uprisings of relocated, disease-stricken peoples, would characterize forced dispossession through World War II.<sup>56</sup>

### *Topographies of Power*

Some of the best evidence regarding the medical response to malaria resulting from relocation comes from a 1931 article by physician Anazawa Kenji (穴澤顯治), who had personally surveyed five of the forty-eight new settlements. Anazawa's account exemplifies both a lucid understanding of the ways resettlement created deadly geographies and a concern for indigenous health that only went as far as the logic of police subordination would allow it. That this article was printed in the illustrious magazine *Taiwan jibō* in late 1931—when post-Wushe incident attention was high—suggests an audience beyond specialized medical or police professionals, and thus invites a close reading.

Like the Chinese-language editorialists introduced above, Anazawa adopted the classic formulation of aboriginal policy as a balancing act between benevolence and force. He described a range of benevolent vocational programs, the most important of which was wet-rice cultivation. Efforts to instruct aborigines in wet-rice cultivation began as early 1903, he related, but it was only after “group relocation” (集團移住) in the 1920s that these efforts hit their stride.<sup>57</sup> Before relocation, it had been difficult for vocational training and education to reach aborigines who lived

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<sup>55</sup> Paul Sutter, “Nature’s Agents or Agents of Empire? Entomological Workers and Environmental Change during the Construction of the Panama Canal,” *Isis* 98 (2007): 724-754.

<sup>56</sup> The 1941 Neibenlu (內本鹿) incident followed one such relocation and, like Fengban, involved a Bunun attack on a police outpost. Huang Ying-Kuei 黃應貴, “Shiluo de Neibenlu: yige bianjiang shehuizhong kuayue zuqun jixian de quyue zhongxin” [Lost Neibenlu: a regional center straddling group boundaries in frontier society], *Dong Taiwan yanjiu* 6 (2001): 139-172.

<sup>57</sup> “Group relocation” was the usual term used by the Japanese colonial state for mass forced relocation.

in low-density settlements scattered deep in the mountains. Yet by dwelling in such configurations, aborigines were able to avoid contracting infectious diseases—especially malaria. Portraying this pre-relocation state as a benighted condition, Anazawa insisted that aborigines were entirely ignorant of the fact that their residential geography protected them from malaria.<sup>58</sup> As mentioned above, a number of Japanese observers analyzed this as a conscious choice, but Anazawa presented it as a happy accident.

How had living in the mountains protected from disease? Low-density living, Anazawa wrote, was the first line of defense: because a mosquito carrying malaria cannot easily travel between two dwellings separated by any significant distance, spacing out houses would directly slow the spread of disease. Mountains were forbidding environments for Japanese policemen and mosquitoes both. The great distances, steep topography and limited fresh-water supply that frustrated acculturation efforts happened to also make it difficult for mosquitoes to survive. In the foothills and valleys of the aboriginal administrative zone and its borderlands, by contrast, that the mosquito species *Anopheles minimus* thrived.<sup>59</sup> From these springs flowed clear and pure streams, and the introduction of wet-rice agriculture meant harnessing those same streams to flow through canals into rice paddies. A larger area of water—especially standing water—meant commensurately greater opportunities for *Anopheles minimus* to breed. Given these ecological factors, Anazawa wrote that it was only logical that inducing indigenes to settle in areas where malaria-transmitting mosquitos breed had led to outbreaks of malaria that damaged community health. Such horrific hygienic consequences were an unforeseen and regrettable consequence, one that required attention from relevant authorities. Nevertheless, Anazawa held that relocation served goals of improving aboriginal

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<sup>58</sup> Anazawa Kenji, “Banjin shūdan ijū seisaku to mararia mondai” [Savage group relocation policy and malarial problems] *Taiwan jibō*, Oct. 1931, 20.

<sup>59</sup> *Anopheles minimus* was the chief carrier in Taiwan of *Plasmodium falciparum*, the deadliest malarial parasite. *Plasmodium vivax*, endemic in much of Japan and familiar to Japanese authorities, generally poses far less risk.

livelihoods and concentrating police power, and that it was thus a necessity, one that there was “unanimous” support for. Allowing aborigines to continue residing in malaria-free environments was simply not an option, and as such Anazawa proposed several methods to make relocation more hygienic. The first was to choose sites for new villages on high and dry ground. Cliffs were ideal for this: Anazawa pointed to the new Atayal settlement of Bonbon (梵梵社) along the Lanyang river in modern-day Yilan state as an example. In 1924, relocation concentrated a number of scattered riverside hamlets, themselves formed around 1910 and targeted for wet-rice promotion efforts soon after, onto a single dense settlement on bluffs set back from the river. With some distance from riverside paddies that the villagers farmed, Bonbon boasted what Anazawa described as ideal topography for malaria control, although he admitted that a lack of treatment and open water channels meant that residents were still suffering from malaria. Where only flat land was available, Anazawa stated that then ideally at least half a mile would separate a settlement from its associated paddies and freshwater sources. While geographic reality was rarely quite so accommodating, the point was to think in three dimensions about villages in relation to water.<sup>60</sup>

Through amalgamation—forcing people from disparate villages into a single settlement—relocation could also give rise to malaria. When Banun (also spelled Var loon, 碼崙), near Bonbon, was formed with villagers from a lower creek-side village and a highland village, those from the latter quickly caught malaria and died.<sup>61</sup> Nearby Han Taiwanese settlements in the area also posed a threat. Thorough surveys of malaria risk should precede resettlement, Anazawa proposed, with attention to enlarged spleens and the presence of the malaria plasmodium among area residents, type and

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<sup>60</sup> Anazawa, “Banjin shūdan ijū,” 20-23; *Riban shikō dai-sanben*, 328; *Takasagozoku chōsasho dai-goben* [Takasago tribe survey, volume 5] (Taipei: Sōtokufu keimukyoku ribanka, 1939), 27-28.

<sup>61</sup> Anazawa, “Banjin shūdan ijū,” 23-24. Another instance of amalgamation leading to a deadly outbreak is recorded in Nakamura-sei, “Bansha no heigō to bōka sochi” [Aboriginal village mergers and anti-mosquito measures], *Riban no tomo*, June 1936, 3.

number of mosquitoes living in the area, and risk of new malarial outbreaks. In the event that sites otherwise well-suited to vocational training, education, and policing were vulnerable to malaria, however, Anazawa wrote that such measures of disease prediction would have to be “sacrificed.” In that event, greater attention was required to prevent the disease from becoming endemic after relocation and unavoidable malarial outbreaks had occurred. Such measures included regular blood testing, quinine treatment appropriately matched to the course of the disease, and educational measures to increase patient compliance.<sup>62</sup>

The thorniest issue Anazawa confronted had to do with the siting of police outposts (駐在所) within villages. As a rule, positions in the center of villages allowed policemen to accomplish their work of conducting surveillance, issuing orders, and forging interpersonal emotional connections most effectively. It also left them open to infection with malaria, which would “exhaust their minds and bodies” (身体共に疲労) and compromise their ability to complete their work. A police officer reported to Anazawa that it also undermined police authority. Often a policeman would use mosquito nets and medicine to stave off malaria while exhorting villagers to do the same, only for him to catch the disease himself and lose face among his charges, eroding their faith in anti-malarial measures. Under ideal conditions, officers could live and work in police outposts located far enough away from settlements so as to eliminate any risk of transmission. Yet because this would compromise their on-the-job effectiveness it was unrealistic, so Anazawa again advocated three-dimensional thinking to suggest that outposts be placed on high ground several hundred meters from the main groupings of aboriginal dwellings or rice paddies. Such a position would ward off most mosquitoes, keeping outpost staff healthy. Moreover, being at slightly higher elevation at a slight remove from the village could offer an even better vantage for surveillance than being in the

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<sup>62</sup> Anazawa, “Banjin shūdan ijū,” 23-24, 27-28.

thick of it. Anazawa recognized that this proposal could suggest concern for police health and indifference towards aborigines, but he insisted that the police presence existed for the benefits of aborigines, and police could only carry out their important work of improving aboriginal lives if they stayed healthy.<sup>63</sup>

Topographies of power and danger were thus quite clear and quite literal in Anazawa's account. Indigenes dwelling in the mountains may have been safe from malaria, but there they were beyond the carrot and the stick of police control. Bringing them down to lower elevations put them under the thumb of the colonial state, but springs, streams, canals, and paddies in these new places posed threats to their bodies. Police might have judged such threats as acceptable to the extent that only indigenes faced them, but the nature of malarial transmission meant police were often exposed as well. The demands of police control meant that the Japanese had to remain on top. It does not appear that Anazawa's prescription of broad pre-location malarial surveys was implemented. Whether or not it can be ascribed to him, however, his suggestions for engineering topographically segregated settlements did come to align with practice. As an anthropologist touring highland in Taiwan in the 1950s noted, "The new settlements as a rule are situated at the lower parts of the slopes, often descending to a river. The houses stand in parallel rows with a central road leading to the highest point which is occupied by the police station."<sup>64</sup>

#### *Testimonies of Malaria and Dysentery*

While no comprehensive statistics are available, the height of relocation in 1932-33 likely coincided with the fiercest malarial outbreaks. One 1932 article reported that infection rates in indigenous foothill areas in some places exceeded 50%, as measured by the presence of the parasite *Plasmodium*

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<sup>63</sup> Anazawa, "Banjin shūdan ijū," 24-26.

<sup>64</sup> Inez de Beauclair, "Present Day Conditions among the Aborigines of Formosa (Atayal and Bunun)," *Sociologus* 6, no. 2 (1956): 154.

*falciparum* in blood, and nowhere were they significantly lower than 7-8%. Death was widespread, with “no shortage of examples where villages lost more than half of their population.” Another article similarly reported that “there are villages that have been completely wiped out.” The Government-General made no provision in its budget for island-wide prevention programs, so burden fell to individual states. Only a few states which were described as taking satisfactory measures, such as Xinzhu state’s integration of plains-adjacent aboriginal territory into malaria prevention zones.<sup>65</sup>

Among the most severely affected areas were the twin settlements of Isingan (雙龍) and Tamazuan (地利村), located on opposite sides of the Zhuoshui river to the south of Sun Moon Lake. Tamazuan is on slightly lower ground while Isingan sits on a riverside bluff, with the core of the two areas ranging from 400 to 600 meters in elevation. Isingan was first founded by Bunun seeking swidden land in 1924 and Tamazuan was from its initial settlement in 1923 a destination for the forced relocation of Bunun from highland areas along Zhuoshui tributaries. Despite the many deaths from malaria that occurred almost right away, colonial authorities continued to target the area for settlement through the early 1940s, even when Take-vatan Bunun from the area around Mt. Danda fled to the east rather than be forced to settle in the “lair of malaria” (マラリアの巣窟) that Tamazuan was known to be.<sup>66</sup> Japanese police efforts to bring recurrent outbreaks under control had limited effect, and malaria remained endemic in this area throughout the colonial period.

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<sup>65</sup> “Ribanjō yori mitaru banchi mararia bōatsu no tachiba” [The position of malarial prevention the savage territory as seen from aboriginal affairs], *Riban no tomo*, September 1932, 6-7; Hirasawa-sei, “Banchi to jochūgiku” [The savage territory and insecticidal chrysanthemum] *Riban no tomo*, September 1934, 7.

<sup>66</sup> Kondō Aya, “Nihon shokuminchiki,” 68-70, 77-79, quote on 69; Ko-hua Yap 葉高華, “Fen er zhi zhi: 1931-1945nian Bunongzu yu fan Yataizuqun de shehui wangluo yu jituan yizhu” [Divide and Rule: Social Networks and Collective Relocations of Bunun and Pan-Atayal Tribes, 1931-1945], *Taiwanshi yanjiu* 23, no. 4 (2016), 154. Yap stresses that this unsanctioned relocation, which authorities allowed to go forward, was exceptional and ought not to suggest that other groups had the same option open to them. See the same article for the most exhaustive study available on post-1931 Bunun and Atayal relocations.

Oral historical evidence illustrates this devastation and the uneven medical response to malaria vividly. Umin Kusinavan (b. 1931 in Qatungulan) and Langus Sunavan (b. 1934 in Isingan) reported instances in which so many people died of malaria at once that there was no place to bury them. A gravedigger had to expand the grave site, digging all day as more families arrived with their dead.<sup>67</sup> Sunavan and certain Isingan residents described these outbreaks occurring in a context in which there was no medicine available. Others did recall Japanese police beginning, at some point, to distribute quinine the police outpost and local school. Tian Matolean (b 1927 in Lavulan) described daily disbursement and instructions for correct dosages, saying “if Japan hadn’t done that level of education, we Bunun would all have died.”<sup>68</sup> Whatever their evaluation of Japanese medicine, these testimonies agree that malaria was never a problem in their original villages. This concurs with Japanese surveys at the time, which found practically zero infections occurring anywhere on the island with an elevation over 1000 meters. Sunavan’s birthplace of Lavulan, with an elevation of 1340-1500 meters, was well beyond the range that mosquitoes could thrive to spread *Plasmodium falciparum*.<sup>69</sup>

While malaria was uniquely prominent in aboriginal affairs discourse and likely the leading cause of death for relocated highland indigenes, other health hazards were present as well.<sup>70</sup> In addition to measles, prominent among these was amoebic dysentery, a parasitic intestinal infection

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<sup>67</sup> Kondō Aya, “Nihon shokuminchiki,” 124, 166.

<sup>68</sup> Kondō Aya, Nihon shokuminchiki, 82-83, 97-101, 174-175.

<sup>69</sup> Morishita Kaoru, *Mararia no ekigaku to yobō* [Malaria epidemiology and prevention] (Tokyo: Kikuya shobō, 1976), 52-57; “Lafulang-she,” Taiwan Culture Memory Bank 國家文化記憶庫, [https://memory.culture.tw/Home/Detail?Id=325657&IndexCode=Culture\\_Place](https://memory.culture.tw/Home/Detail?Id=325657&IndexCode=Culture_Place)

<sup>70</sup> Government-General data from 1935 record comparable numbers of indigenous deaths from malaria and influenza but do not suggest a close relationship between the latter and either relocation or wet-rice agriculture: *Takasagozoku chōsasbo dai-ichihen: kokō, naitaijin to no sesshoku, eisei* [Takasago tribe survey, volume 1: population, contact with Japanese and Taiwanese, hygiene] (Taipei: Sōtokufu keimukyoku ribanka, 1936), 336.

that was widespread in early 20<sup>th</sup>-century Taiwan but largely absent in highland areas. In Bonbon, mentioned above, one Atayal woman died and several others fell sick when they contracted amoebic dysentery in June 1922. In 1925, msbtunux Atayal at Gihing (義興) along the Dahan river in present-day Taoyuan began falling ill. The noted Atayal physician Losing Watan (1899-1954), one of the only indigenous Taiwanese to receive formal medical training under Japanese rule, came to the village to implement preventative hygienic measures.<sup>71</sup> Losing Watan had helped convince Gogan Atayal groups to accept wet rice cultivation several years earlier, and police authorities looked upon him as uniquely positioned to defeat superstition.<sup>72</sup> In Gihing, Watan was later by a Japanese military doctor, and together they eventually contained the outbreak, though only after 83 people in the area had gotten sick and 13 died from amoebic dysentery. An official account of the Gihing outbreak recorded that “because of the large number of sick and dead, there were those among the savages who—imprisoned by superstition (迷信に囚われ)—spread rumors that they were being punished for breaking the customs of their ancestors by digging communal graves and reclaiming land for rice paddies.”<sup>73</sup> Without offering an alternative theory of the outbreak, this report noted the necessity of proper treatment and prevention that could correct the native misunderstanding. Consigning fears of group burial and wet-rice irrigation to the category of superstition precluded actually investigating them as factors that may have been encouraging the spread of *Entamoeba histolytica*, the parasite responsible for amoebic dysentery.

*Entamoeba histolytica* most often travels through oral-fecal transmission, and circumstantial evidence allows us to speculate on factors in these villages that may have increased vulnerability.

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<sup>71</sup> *Riban shikō dai-gohen*, 390, 926.

<sup>72</sup> Watanabe Eijirō, “Banjin shūkan meishin daha no kanmō” [Forbearance and severity in the defeat of savage customs and superstitions], *Taiwan keisatsu kyōkai zasshi*, December 25, 1923, 32-33.

<sup>73</sup> *Riban shikō dai-gohen*, 926.



Highland Atayal and Bunun customarily urinated and defecated in the open at areas some distance from places where they lived or worked. Building outhouses and persuading indigenes to use them was a major goal of hygiene management for colonial police. By the mid-1930s, the colonial government compiled tables exhaustively recording outhouse use rates for each indigenous group in each state, along with other “cleanliness” metrics such as haircutting and face-washing.<sup>74</sup> In addition to being a marker of civilizational progress, outhouses were also useful for nightsoil collection. Atayal and Bunun, who had not previously gathered feces in one place nor used it as fertilizer, were now instructed by police to spread it on fields and rice paddies (instruction which many resisted).<sup>75</sup> Dense living conditions featuring routine storage of and contact with human waste, both of which had been previously avoided, very likely facilitated the spread of amoebic dysentery. Kondō Aya’s interviews with Bunun relocated to Isingan and Tamazuan suggest the same. None of her interviewees reported having ever experienced amoebic dysentery in their original highland villages, but many described the havoc it caused after relocation. Ali Tanapima (b. 1929 in Hinokon) described her mother’s death around 1937, soon after moving to the village. Bidin Mitiya’gnan (b. 1929 in Qanitoan) recalled, “The main [diseases] to fear were malaria and amoebic dysentery. Once someone got dysentery, it was extremely... there was that very red [stool], like pus, and then soon, there was no saving them. Children, too, if they caught it then before long they couldn’t be saved.”<sup>76</sup>

### *Botanics of Resilience*

Official enthusiasm for bringing indigenes down from the mountains and concentrating them in rice-growing units did not dim, even as village-level efforts to prevent transmission and treat cases

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<sup>74</sup> *Takasagozoku chōsasbo dai-ichiben*, 526-549.

<sup>75</sup> *Riban shikō dai-goben*, 764-765; Kondō Aya, “Nihon shokuminchiki,” 27-28.

<sup>76</sup> Kondō Aya, “Nihon shokuminchiki,” 87-88, 98-101, 114, 159, quote on 136.

met mixed success. One noteworthy response sought to integrate malaria prevention and profit-oriented vocational training efforts in a pilot program to grow pyrethrum daisies (*Tanacetum cinerariifolium*). Native to the Balkans and introduced to Japan in the late nineteenth century, this flowering plant can be processed in several different ways to produce insecticides. In resettled indigenous villages beset by malaria, the prescribed use was to dry leaves and stems of dried pyrethrum daisies, then suspend them over a fire so that their essence would be carried in the fire's smoke.<sup>77</sup> This was to take place from dusk until around ten in the evening to ward off *Anopheles* mosquitos during their most active period. As an additional benefit, this process would also produce dried flowers that could be sold for a tidy profit on the side. Government-general parasitologist Morishita Kaoru (森下薫) judged this “primitive” (原始的) malaria prevention method to be fitting for aboriginal Taiwanese, and over 1932 and 1933 collaborated with Araki Tadao (荒木忠郎) from the Government-General's Central Research Institute to prepare printed instructions to be sent along with seed packets to police outposts all over the island.<sup>78</sup> The resulting flowers, however, only grew successfully in around 20 of the 120 outposts that received them and failed to either generate much revenue from sales or make an appreciable difference in malaria prevention. Vulnerability to excessive rain, it turned out, was the critical factor that doomed most attempts at growing pyrethrum daisies in indigenous villages. The article reporting on this experiment focused most of its attention on a single successful planting undertaken by an educator named Tota Sakurō near present-day Daren, Taidong. Tota's wife used her sewing machine to make clothing for local children, and the

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<sup>77</sup> Smoke from burning pyrethrum daisies was used in lowland anti-malaria campaigns as early as 1913: *Karenkō-chō keisatsu hoki* [Hualian state police regulations] (Tokyo: Teikoku chihō gyōsei gakkai, 1934), 685.

<sup>78</sup> Hirasawa, “Banchi to jochūgiku,” 7; Setoguchi discusses Morishita and his work in “Control of Insect Vectors.”

couple's devotion to each other and to their indigenous charges offered a stirring tale of self-sacrifice.<sup>79</sup>

Morishita Kaoru, a graduate of Tokyo Imperial University, was a student of global tropical medicine keen on adapting strategies from Japan's imperial peers to Taiwan. The simplicity of growing, drying, and burning flowers aligned with his notion of indigenous primitivity, but like most Japanese officials and researchers responding to malaria outbreaks he does not seem to have given much consideration to the strategies that existed for coping with disease among indigenes themselves. As seen with the example of alder swiddening and nitrogen fixation in the previous chapter, however, to characterize Japanese colonial scientists as entirely uninterested in indigenous knowledge would go too far. Amongst those with intense anthropological interest in Taiwan's natives and botanical interest in its plants were several individuals who conducted what we might call ethnobotanical studies. They travelled across the island and collected information on how diverse groups fit plants into their social, religious, and ecological systems. Reading these records with oral historical evidence makes it possible to piece together plant-based insecticides and antimalarial treatments that Atayal and Bunun peoples likely used amidst catastrophic post-relocation outbreaks.

Agronomist Shimada Yaichi (島田彌市) was one such researcher. Travelling across Atayal regions of modern-day Yilan and Taoyuan in 1918, he encountered widespread famine, a result of both cold snaps and a farming population weakened by malaria. Shimada called for famine relief while also suggesting that forcing Atayal to grow rice and millet rather than taro and sweet potatoes would ensure their survival; this sort of account later bolstered the case for relocation as necessary to save indigenes, even as it killed them. Shimada also recorded that Msbtunux Atayal used the steam

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<sup>79</sup> Hirasawa, "Banchi to jochūgiku," 8-9.

and leaves of the herb *Houttuynia cordata* to prepare a decoction that they used to treat malaria.<sup>80</sup> Later studies found that Bunun in Isingan prepared antimalarials by decocting the roots of the woody flowering shrub *Hydrangea chinensis*.<sup>81</sup> Both plants have long recorded uses in China, the former against inflammation and fever and the latter more specifically as an antimalarial, and research continues on them to this day.<sup>82</sup>

In the case of Isingan, the use of antimalarials among recently arrived people with scant prior direct experience of malaria raises the question of how they came to start preparing such decoctions. Shimada recorded that Han Taiwanese had shared pharmacological knowledge with the Atayal, and alignments between indigenous Taiwanese and Traditional Chinese Medicine are striking.<sup>83</sup> Transmission between Bunun groups is also likely to have occurred, but importantly any such transmission would have taken time. Survivors of relocation to Isingan recalled that, although severe illness was rare in their original villages, a variety of herbal concoctions were commonly used for complaints such as stomachaches. Arriving in Isingan and facing unfamiliar diseases such as measles and malaria, however, some reported that initially there was both no medicine provided by authorities and no medicinal plants they could gather.<sup>84</sup> Isuth Tansikian (b. 1931 in Hinokon) stated that familiarity with medicinal plants around Isingan only came following instruction from Han Taiwanese. In the absence of such remedies, one strategy that several Isingan residents

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<sup>80</sup> Shimada Yaichi, *Taiwan Taiyaru banzōku riyō shokubutsu* [Plants used by Taiwan's Atayal tribe] (Taipei: Sōtokufu shokusankyoku, 1921), 1-11, 87.

<sup>81</sup> *Takasagozoku chōsasho dai-rokuben rakuyō sōkonmokubi* [Takasago tribes survey, volume 6: medicinal grasses, roots, and barks] (Taipei: Taiwan sōtokufu keimukyoku ribanka, 1939), 138.

<sup>82</sup> Shahzad Rafiq et al, "Pharmacological Effects of *Houttuynia cordata* Thunb (*H. cordata*): A Comprehensive Review," *Pharmaceuticals* 15 (2022): 1079; Ashraf Taha Khalil et al, "Chemical Constituents from the *Hydrangea Chinensis*," *Archives of Pharmaceutical Research* 26, no. 1 (2003): 15-20.

<sup>83</sup> Shimada, *Taiwan Taiyaru*, 85.

<sup>84</sup> Kondō Aya, "Nihon shokuminchiki," 125, 153, 183-184.

implemented involved trying to sweat out the malarial fever by covering their heads with taro leaves and drinking hot water.<sup>85</sup>

For dysentery, the signature symptom of bloody diarrhea could be addressed by repeated ingestion of a medicine made by grinding guava leaves into a paste with salt and water. The final response to a variety of complaints was to call upon local spiritual healers, known in Bunun as *mamomo*. These healers would come to the house of the infected and recite incantations that would banish illness. Isingan residents interviewed by Kondō in 2004 described such practices as an efficacious but distant memory, as their conversion to Christianity in the early post-World War II period had largely put an end to spiritual healing.<sup>86</sup> These methods of coping did not change the basic dangerous geography that allowed mosquitoes to breed and maintain malaria's deadly prominence in relocated villages such as Isingan and Tamazuan. Official testing and quinine regimes likewise did little to address the causes of malaria, which lay in this geography that relocation had produced.

### *Murderous Momentum*

As Bunun and Han Taiwanese alike were digging up hydrangeas to deal with malaria outbreaks triggered by colonial irrigation projects, they were also discovering that public hygiene demanded of them a great deal of work. Implementing malaria prevention measures in parallel across aboriginal, Han, and Japanese communities was one recommendation that police official Masuya Keisuke (柁屋慶助) made in a 1935 article, one which highlights the ambitions to alter the rhythms of daily life and labor for hygienic ends. Masuya went beyond the typical prescriptions of dispensing quinine, testing blood, and distributing mosquito nets; he also wrote that indigenes could not be permitted to

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<sup>85</sup> Kondō Aya, "Nihon shokuminchiki," 124-26, 142, 180, 184.

<sup>86</sup> Kondō Aya, "Nihon shokuminchiki, 145, 155-156, 171-172.

spend the night in paddy-adjacent huts after a day's work of farming. Instead, they ought to return to their primary residence every evening, and when doing so should gather enough brush to fill one back basket (背負籠), which would then be burned by all households at a set time after sundown every day. The fifteenth of each month should be "hygiene day," with each household required to make one member available for a day's labor of identifying mosquitos and eliminating them through clearing vegetation or filling in pools of standing water.<sup>87</sup>

In 1934, *Taiwan jibō* carried an article by Iwaki Kamehiko that reiterated the necessity of group relocation in response to unspecified "doubts" held by some in the Government-General. In making the case for clearing the mountains, Iwaki began with the destructiveness of shifting agriculture, which beyond requiring precious forests to be cleared invited floods that would both wash away precious topsoil and threaten downstream farms and towns. Familiar arguments about improving policing and easing the way for development of highland resources followed, as did a frank acknowledgement that the location of suitable farmland in the foothills often meant severe outbreaks of malaria. "Because this occurs frequently," Iwaki wrote, "there are some who flee to return to their original villages and some who die suddenly in the new settlements, and therefore there are grudges held against the authorities on the basis of superstition." Once more, the invocation of superstition here served to deny the validity of an eminently understandable reaction to dispossession, disease, and death. Iwaki's main concern with malaria lay in the ways that a fear of it engendered resistance to relocation, and he suggested that improvements in existing settlements and greater education of young natives could help clear a path for the compliant relocation of 26,043 indigenes still dwelling in remote areas.<sup>88</sup>

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<sup>87</sup> Masuya Keisuke, "Banchi mararia bōatsu no kōka," *Riban no tomo*, December 1935, 7-8.

<sup>88</sup> Iwaki, "Okuchi banjin shūdan ijū mondai no kentō" [Examining the question of the group relocation of remote area savages], *Taiwan keisatsu jibō*, June 1934, 20-22; "Okuchi banjin," July 1934, 29. These citations refer to the police trade

Contention and confusion continued over relocation policy: in 1936 aboriginal policy section chief Suzuki Hideo (鈴木秀夫) reported a conversation in which in which an unnamed “gentleman” told him “What a great idea it was to move the high-mountain savages to the foothills— as a result of relocation a lot of people have died of malaria and such, right?” Suzuki responded that sanitary conditions were being improved, and in fact the general trend was now towards gradual population growth. His interlocutor looked surprised, and followed up: “So, you all are working to improve savages’ sanitary condition, with a plan to increase the population of that inferior race? I thought that the relocation policy had been taken to gradually make them extinct (段々滅亡させる) by bringing them down from the good climate of the mountains to the plains.” Suzuki was astounded and disturbed that someone of high social class and education could think this way and by the implication that there must be others out there with the same misunderstanding—even among those working in aboriginal policy. There is perhaps no better indicator of the brutality of forced relocation and the malaria outbreaks it unleashed than the fact that both indigenous victims and members of the colonial elite understood it as a planned attempt at genocide. For Suzuki, this encounter crystallized his determination to complete the work of bringing 100,000 “mountain aborigines” into the ascendent Japanese Empire as compatriots—to bring them culture and “make them ‘Japanese’” (「日本人」に仕上げて行く) who could work towards the “construction of Greater Asia” (大アジア建設) with other nations of the East.<sup>89</sup>

Making indigenes Japanese was never articulated as a goal when mass relocation began. But the same was not true for their farmland: the normative ecology of wet-rice cultivation was

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journal *Taiwan keisatsu jibō*, in which the article was serialized in June and July, 1934. The general-interest *Taiwan jibō* printed the full article under the same title: Iwaki, June 1934, 7-17.

<sup>89</sup> Suzuki Hideo, “Riban no konpongi” [The fundamental meaning of aboriginal pacification], *Riban no tomo*, April 1936, 1-2.

fundamental to both the logic of dispossession and its disastrous consequences. Equally important was an understanding of the island of Taiwan as a natural system linked by rivers, which lent conservationist justifications to the emptying of the mountains. In the next chapter, I will explore how relocation, conservation, and the drive to harness Taiwan's rivers all intersected as Japan descended into war in the 1930s and 40s.



**Chapter IV—Water Under Fire: Sun Moon Lake and Watersheds in Wartime, 1931-1945**

On June 25, 1940, a train carrying General Terauchi Hisaichi (寺内寿一) of the Imperial Japanese Army through central Taiwan slowed to a halt. A landslide had covered the track in debris, and although the obstruction was quickly cleared, it made a lasting impression on the general. Soon afterwards, as he sampled varieties of mango, banana, and sapodilla at a nearby experimental farm, Terauchi explained it this way: “Take a look at my head. I’m bald, so when I take off my hat, sweat comes rushing down all at once. That’s what Taiwan’s hinterlands are. What you have to do is plant a lot of trees in the mountains.”

The demonstration may have been amusing—but coming from one of the top military leaders in the empire, the message was serious. Terauchi explained that like the sweat pouring off the bald dome of his head, the muddy deluges in Taiwan’s river told an obvious story: Taiwan’s interior had become a denuded wasteland. Terauchi expressed concern that this deforestation was endangering the island’s rice crop, which was of vital importance to the empire. He urged that afforestation be stressed over logging and that existing great forests like the one at Baxianshan (八仙山) be left in place. Massive, magnificent trees were wasted on timber, and could much better serve the empire by preventing erosion or serving to enhance the majesty of a national park. Among Terauchi’s audience were an electric power official who pointed out that deforestation was also threatening hydroelectric production by clogging the intake system with mud and an agricultural official who agreed that efforts to boost rice production had to take highland water and forestry conservation into account. Recounting this episode, forester Aoki Shigeru observed that it made perfect sense that the general

should be a “tree-lover” (愛樹者) in the mold of his father, Terauchi Masatake (寺内正毅), who had established “Forest-love Day” (愛林日) as Governor-General of Korea in 1911.<sup>1</sup>

The basic logic of Terauchi’s appeal for afforestation echoes related dynamics across Taiwan’s colonial history. This suggests that a view of inextricable and potentially catastrophic environmental connection between highland and lowland Taiwan was widespread enough by 1940 to reach all the way to the top of the Japanese military establishment. That a general was so concerned with land-use deep in the mountains also demonstrates that discourse and policy relating to highland conservation took on strong military valences by the time of the Second Sino-Japanese War (1937-1945). While Terauchi did not directly address what he understood to be responsible for deforestation in the deepest mountains, other officials made clear that indigenous land-use continued to be a major problem. This was the case both generally across the island and specifically in areas of strategic concern located in the watersheds above critical infrastructure.

The foregoing chapters showed how hydroelectricity linked lowland development to highland conquest, how foresters constructed indigenous lifeways as an environmental threat, and how police subjected those lifeways to violent reform. These three processes all intersected in the Sun Moon lake hydroelectric complex, one of the most expansive—and expensive—engineering projects in colonial Taiwan. This chapter begins with the example of Sun Moon lake to show how the work of colonial conservation became tied to new imperial imperatives as Japan pursued the industrialization of Taiwan and the expansion of its empire. Focusing on the environmental and social questions raised by the pursuit of this massive infrastructure, I explore three relocations—of Thao, Han, and Bunun residents of inundation zones—that occurred as the project neared completion in the early

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<sup>1</sup> Aoki Shigeru 青木繁, “Terauchi shōgun no chisan-ron” [General Terauchi’s afforestation theory] *Taiwan shinbun*, July 2, 1940, reprinted in *Uru kokoro* [The planting heart] (Taizhong: Yoshimura Shōkai, 1941), 29-32. On Arbor Day in Korea, see Fedman, *Seeds of Control*, 179-83.

1930s. Next, I argue the achievements of the hydroelectric plant's initial construction (1919-1934) funneled hydroelectric demand and conservationist scrutiny deeper into the mountains along the upper Zhuoshui river and its tributaries. This partly reflected the fact that in building a reservoir through dams and diversion tunnels, engineers created the consequential category of "reservoir watershed" within the preexisting category of "river watershed." Managing upstream areas through the tools of forestry and police power became an existential question of protecting the generators responsible for a majority of electrical production on the entire island. At the same time, expanding what Aaron S. Moore called the "technological imaginary" of highland hydroelectricity implied continual updates to the system—more dams at higher altitudes. Sun Moon lake's vitality to Taiwan and the broader empire made it a primary target for American bombing during World War II, while restoring and expanding it was a major task for the Chinese Nationalist government after 1945.

Following a focused account of Sun Moon lake, I zoom out to examine the broader issue of "highland development" (山地開發), which included hydroelectric development alongside enterprises such as mining and agricultural reclamation. These all raised environmental questions that brought foresters, entrepreneurs, military actors, and colonial subjects into conflict. Against the backdrop of the Japanese pursuit of total war, regional hegemony, and resource autarky, conservationist anxieties intensified. If the soil that Kada Naoji worried about washing away during the Truku war of 1914 had only just become "national soil" (國土), then what Japan often called its "holy war" meant that all such land was precarious—even if the end of the war and the loss of Taiwan was, for many, unthinkable. Particularly preoccupied with erosion was the science of forest hydrology, which had predecessors in the studies introduced in Chapter II but crystallized in the late 1930s and early 40s. Foresters oversaw afforestation campaigns as they continued to pathologize indigenous swidden and issued new alarms about growing Han agricultural reclamation. The scope for open criticism of military-driven logging, by contrast, was limited. Beyond the bombs dropped

on Sun Moon lake, highland Taiwan was not much a site of active war-making during the Asia-Pacific War. But the war did transform it: connections between the island's watersheds and the empire grew tighter as an increasingly desperate mobilization reached deeper and deeper into the mountains.

*“A New Era in the General Development of Taiwan”<sup>2</sup>—The Sun Moon Lake Hydroelectric Complex*

Taiwan's steep topography gives water little opportunity to settle in ponds or lakes in the mountains. Sun Moon lake is the notable exception. Formed by the subsidence of several basins around Puli, the geographic center of Taiwan, the lake was protected from being filled in by the small size of the streams flowing into it and the relative stability of its surrounding hills.<sup>3</sup> Studies show human activity in the area dating back to 15,000 BCE, with pollen, charcoal deposits, and archaeological evidence suggesting that use of fire for agricultural purposes began around 2,000 BCE.<sup>4</sup> The lake's original geography consisted of two sections—Sun lake and the smaller Moon lake—along with an island called Lalu. The 1800s saw several waves of settlement by indigenous groups from the plains, who came into conflict with native peoples already living around the lake, followed by significant Han settlement.<sup>5</sup> At the beginning of Japanese rule, settlements in the vicinity were home to both Han residents and indigenes now identified as the Thao people, whom the Japanese followed the Qing in deeming “acculturated savages” (化蕃). With imposing mountains, warm waters, and “floating islands” of mud and vegetation, Sun Moon lake was a scenic destination that attracted colonial

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<sup>2</sup> Hayward G. Hill, “The Jitsugetsutan Hydroelectric Project in Taiwan (Formosa),” in U.S. Bureau of Foreign and Domestic Commerce, *Commerce Reports Volume 1* (Washington, DC: United States Government Printing Office, 1932), 28.

<sup>3</sup> Jinbo Kitora 神保小虎, “Taiwan Jitsugetsutan(ko) no chindenbutsu” [Sediment in Taiwan's Sun Moon Lake], *Chigaku zasshi* 26, no. 306 (1919): 154-155.

<sup>4</sup> Hui-Fen Chen et al., “High-resolution records of anthropogenic activity and geohazards from the reservoir of Sun Moon Lake, Central Taiwan,” *Elementa: Science of the Anthropocene* 9, no. 1 (2021): 00150.

<sup>5</sup> Chan, “Shilun Riyuetan.”

fascination. The idea of transforming it into a hydroelectric reservoir originated in 1917 with Ōkoshi Taizō, the designer of the Guishan hydroelectric plant described in chapter I. Quickly gaining traction within the Government-General, plans for the project gained approval from the central Japanese government in 1919 on the condition that it be overseen by a public-private corporation. The Taiwan Electric Power Company, Ltd. (台灣電力株式會社), which survives to this day as the island's electrical utility, was thus born.<sup>6</sup>

While there was a small inflow from various streams into Sun Moon lake and a small outflow, no river ran through it. Diverting its water downhill through a hydroelectric plant would quickly drain the lake unless a corresponding siphon into the lake were built to keep it continuously refilled. Ōkoshi's plan thus called for building a dam to the east of the lake along the Zhuoshui river to create a reservoir; the water there would then be conveyed via underground tunnels into the lake, where two more dams would allow the shallow lake to expand into a great reservoir (see Figure 4.1). At the Shuishe dam water from this newly-created Sun Moon lake reservoir would flow through a penstock downhill to a power plant, past which it would again be channeled through tunnels to a second power plant, and only after that would it eventually rejoin the Zhuoshui river. By harnessing damming and tunneling technologies to link Sun Moon lake into the Zhuoshui, Taiwan's largest river, the plan promised enormous transformation. Early estimates pegged the generating capacity at 120,000 kilowatts, with the location in central Taiwan facilitating transmission to industry across northern, western, and southern areas of the island.<sup>7</sup> 120,000 kilowatts was a massive, even absurd, figure. Guishan operated at a maximum of 600 kilowatts, and the six other hydroelectric and steam

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<sup>6</sup> Shimizu, *Teikoku Nihon no "kaibatsu,"* 132-133.

<sup>7</sup> "Jitsugetsutan suden shinkeikaku" [Sun Moon lake new hydroelectricity plan], *Taiwan nichinichi shinbō*, July 5, 1918. This was later revised to 100,000 kw.

power plants built between 1909 and 1918 only brought the island's total capacity to 10,000 kilowatts.<sup>8</sup>



Figure 4.1: Sun Moon lake hydroelectric complex plans as of 1929; as described below, final plans differed, most significantly in moving the diversion intake from Shimaigahara to Wujie. The lines connecting the lake and tunnel sections to the north are roads, pushcar lines, electrical lines, and cable cars used for transport between construction areas and the town of Puli (埔里). Note how the multiple tunnels effectively hook Sun Moon lake into the Zhuoshui river system, diverting water away that, far downstream, eventually rejoins the river.<sup>9</sup>

The gargantuan undertaking of expanding the island's electric supply by more than an order of magnitude required a commensurately massive investment. Initial plans called for a total project cost of 50 million yen to be met by a combination of corporate bonds, debts, and shares in Taiwan

<sup>8</sup> *Taiwan no doryoku shigen*, 39-41. This does not include the small, temporary guard line stations introduced in Chapter I.

<sup>9</sup> Map, with labels added by author, from “Jitsugetsutan suiryoku denki kōji keikaku gaiyō” [Sun Moon lake hydroelectric construction plan summary] (Taipei: Taiwan denryoku kabushiki gaisha, 1929), inset, Waseda University Library.

Electric Power bought by private shareholders in Taiwan and metropolitan Japan.<sup>10</sup> Shimizu Misato has given a textured account of the business history and political economy of the Sun Moon lake hydroelectric complex. Her work shows that the project became a proving ground for conflicts amongst competing factions within the Government-General, rival political parties in Tokyo, and private Han and Japanese business concerns in Taiwan. Amidst economic turmoil and the political ferment often referred to as “Taishō democracy,” work on Sun Moon proceeded haltingly and uncertainly. Following the commencement of construction in 1919, post-World War I inflation pushed the estimated cost up nearly 150%, and difficulties raising funds led to a construction hiatus in 1922. When the 1923 Great Kantō Earthquake led to a central government shift towards rebuilding and away from colonial investment, this became an indefinite hiatus that lasted for the rest of the 1920s. Only with a 1931 infusion of funds enabled by J.P. Morgan and partners selling \$22,800,000 in foreign bonds on Wall Street was Taiwan Electric Power able to afford to restart the project and push it through its 1934 completion.<sup>11</sup>

Controversy over the project most often related to questions of money: who would bear the costs and reap the benefits. The Taiwan People’s Party (臺灣民衆黨), founded by liberal and educated young Han Taiwanese men and only permitted to exist by the Government-General from 1927 to 1931, took the position that the project would benefit only a small minority of shareholders and power-holders. It declared, “seen from the perspective of the whole of the Taiwanese general

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<sup>10</sup> Shimizu, *Teikoku Nihon no “kaibatsu,”* 132-133.

<sup>11</sup> Shimizu, *Teikoku Nihon no “kaibatsu,”* 134-153. Shimizu’s contributions include connecting the shifting fortunes of rival political powers in Tokyo to the fate of the Sun Moon Lake project. This linking of domestic and colonial politics parallels dynamics described by Emer O’Dwyer in *Significant Soil: Settler Colonialism and Japan’s Urban Empire in Manchuria* (Cambridge, MA: Harvard University Asia Center, 2015). Andrew Gordon significantly suggested “imperial” as a replacement for the term “Taishō democracy” in *Labor and Imperial Democracy in Prewar Japan* (Berkeley: University of California Press, 1991), 5-9.

public, [the project] in truth is unfavorable.”<sup>12</sup> Han publicly supporting the project included businessmen who, along with their Japanese counterparts also based in Taiwan, sought to block Japanese metropolitan firms winning lucrative contracts. These colonial elites argued that, as residents of Taiwan, only they had the understanding and sensitivity to deal with the dangerous Bunun peoples who project contractors would come into contact with. New arrivals from Japan would fail to respect the attachment indigenes had to their native villages and might even, through forced labor or other mistreatment, trigger a “second Wushe incident.”<sup>13</sup>

By raising the specter of the Tgdaya Sediq massacre of Japanese colonists in October 1930 and subsequent violent reprisals, the businessmen sought to establish their local bona fides. And while there may be little surprising about their dedicated efforts to secure some of the lucrative project funding, their argument was unusual in its acknowledgment that Sun Moon lake would transform not just Taiwan’s industry and economy but indigenous lives as well. In the following section, I propose following this prompt to see how reengineering Taiwan’s longest river and largest lake transformed material conditions and conservation regimes for people already living in those sites. This will show how the Sun Moon lake project was inextricably linked to the broader colonial efforts to capture, control, and connect the highlands. As one commentator noted in 1918, “With the calm gradually coming over the savage border and popular sentiment, the Government-General seems to be inclined to a course of adopting policies for promoting natural industries (自然殖産政策) that stretch across the plains and savage border, one part of which includes the proposal for

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<sup>12</sup> “Taiwan minzhongdang tongdian fandui Riyuetan gongshi fuxing” [Taiwan People’s Party telegram: opposes Sun Moon lake project restart], *Taiwan minpō*, March 10, 1929. While criticisms such as this were printed in *Taiwan minpō* and its successor after 1930, *Taiwan shinminpō*, other critical coverage by the newspaper on the Sun Moon lake project was frequently censored.

<sup>13</sup> *Mondai no jitusgetsutan* [The problematic Sun Moon lake] (Taipei: Taiwan kenkyūkai, 1931), 23-25.



hydroelectricity at Sun Moon lake and flood control projects.”<sup>14</sup> Thanks to the successful pacification of indigenous and Han sentiment alike, this article argued, the island was to be knit together in new ways.<sup>15</sup>

*Inundation and Relocation Three Ways*

In the iconography and memory of Sun Moon lake, the Thao people hold a particular place. Beginning in the 1910s and continuing particularly after the hydroelectric complex’s completion, Thao featured centrally in tourism to the region. In an early example of what Kate McDonald calls “local color,” their canoes and musically-infused pounding of millet offered a mode of consuming a distinct colonial culture that was rooted in a particular place but divorced from the dynamism of historical change.<sup>16</sup> The postcard in Figure 4.2 illustrates this, even as it juxtaposes a colorful, quaint native custom with the massive concrete infrastructure of the hydroelectric plant and Wujie dam. Such a presentation often glossed over the fact that the expansion of the lake into a reservoir that had drowned Thao settlements, notably the one formerly located on the island of Lalu. At the same time, Thao becoming avatars for the local native past obscured the Han displacement that had also occurred around the lake *and* the parallel Bunun displacement that occurred through the construction of the Wujie dam.<sup>17</sup> This was a deliberate outcome, one that exhibits a distinct logic

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<sup>14</sup> Rōkeisei 漏溪生 [penname], “Taiwan shokusan seisaku to bankai no shōrai” [Taiwan’s industrial promotion policies and the future of the savage border], *Ōsaka mainichi shinbun*, January 30, 1918.

<sup>15</sup> Also particularly significant were new railways and roads.

<sup>16</sup> McDonald, *Placing Empire*, 103-107. The Thao area also featured on the 1923 travel itinerary McDonald includes on p. 60. Chan, “Shilun Riyuetan” makes clear how dynamic migration in, around, and out of the area was into the 1800s and argues that it is inappropriate to apply the label “Thao” the indigenous peoples who lived in seven different settlements around the lake in the 19<sup>th</sup> and early 20<sup>th</sup> centuries. Without seeking to flatten group diversity or imply a direct connection to 21<sup>st</sup>-century Thao peoples, I do use the term as it is a common referent for the indigenous peoples living in the area around Sun Moon lake.

<sup>17</sup> Shimizu presents the absence of the absence of Thao in her narrative as a shortcoming of her study; in a review Niida Ryūki criticizes her for this and the Han/Japanese binary it implies. What neither author addresses, however, is Wujie Bunun dispossession, a necessary precondition for Thao dispossession and the entire Sun Moon lake hydroelectric

from other relocations explored in this dissertation. Comparing the Thao, Han, and Bunun relocations occasioned by the construction of the Sun Moon lake hydroelectric complex reveals the distinct social and environmental circumstances facing each group.

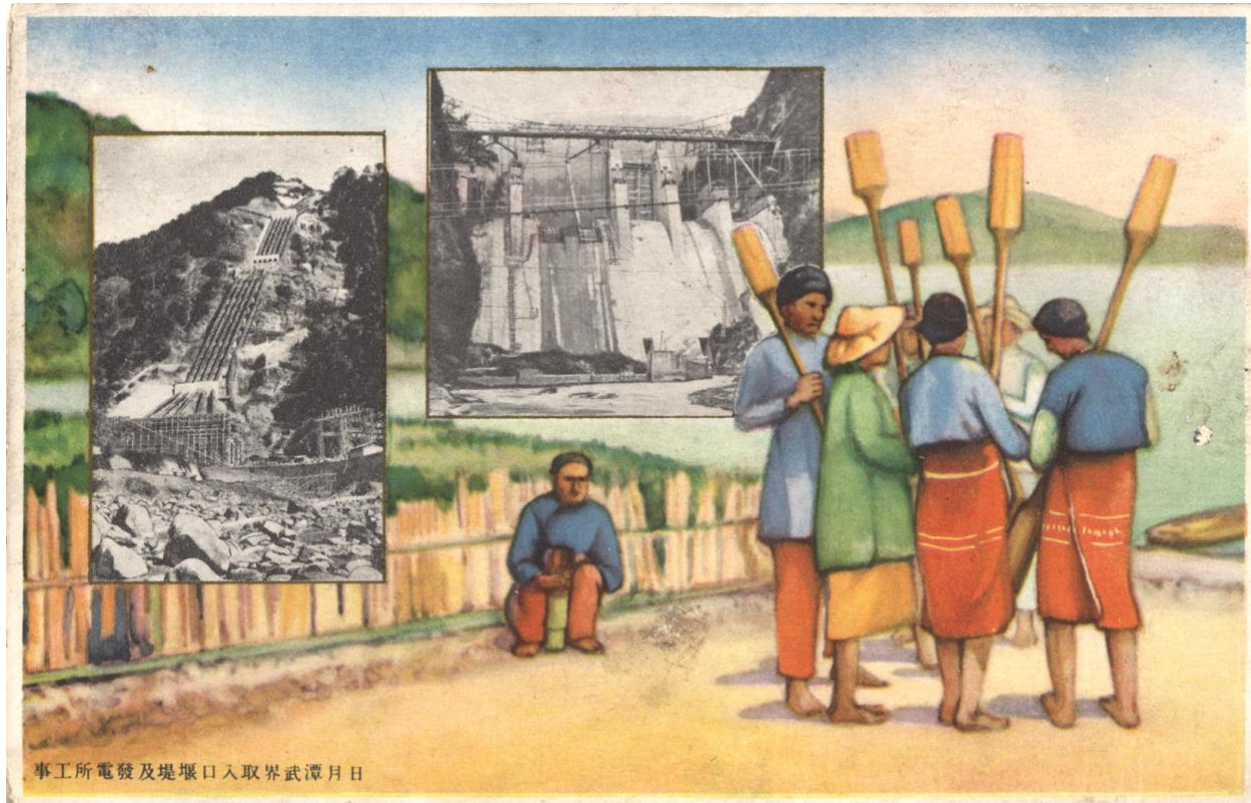


Figure 4.2: “Sun Moon lake Wujie intake dam [center] and power plant [left] under construction.” Versions of the two photographs and this illustration of the Thao millet song circulated widely.<sup>18</sup>

Authorities, facing the task of relocating the 966 Hoklo, 11 Hakka, and 142 indigenes that as of 1921 all resided in the lake’s inundation zone, sought to keep only the Thao close. The reasoning for this had everything to do with local color, as one newspaper article put it: “There is a need to allow the acculturated savages alone to continue to exist as an attraction for the future scenic spot of

project. Shimizu, *Teikoku Nihon no “kaihatsu,”* 283; Niida Ryūki 新田龍希, “Shohyō” [Book review], *Nihon shokuminchi kenkyū* 28 (2016), 83.

<sup>18</sup> *Jitsugetsutan bukai toriūriguchi entei oyobi hatudensho koji* [Sun Moon lake Wujie intake dam and power plant under construction], postcard, circa 1933, reference number T020302\_04\_0532, Academia Sinica.

Sun Moon lake.”<sup>19</sup> Transforming the Thao into a draw for tourists appears as primary consideration here, above and beyond how they might subsist once their farmland was flooded and their fishing grounds transformed. Eventually, aboriginal affairs officials settled upon a plan divide the Thao into two settlements. One was moved over the hills towards the southwest to a site near the Zhuoshui river that possessed enough land to farm while remaining close enough to the lake to align with “the relevant authorities’ sentiment that they wanted to eternally preserve the [Thao’s] unique millet song.”<sup>20</sup> The second group relocated to Buji (卜吉, today called Ita Thao) along the Sun Moon reservoir’s southeastern shore. While a Han settlement had existed around Buji, by the time of the reservoir’s filling in the summer of 1934 most local Han had departed.<sup>21</sup>

In the autumn of 1934, as plans crystalized to use the immense wattage that Sun Moon lake turbines were churning out to build a great aluminum refinery in southern Taiwan, conditions in Buji were dire for the recently-resettled Thao.<sup>22</sup> Newspaper reports described the village as facing imminent destruction. Having lost their rice paddies to the rising waters of the reservoir, the Thao were left with only small patches of land to grow millet to subsist on, and they were beginning to suffer from nutritional deficiencies for want of nourishment. Moreover, while the design of their traditional homes had trapped the smoke produced by food preparation indoors, killing or driving off insects, the chimneys in their new “Taiwanese-style” homes offered no such protection. At least twenty percent of the 124 villagers thus contracted malaria, furthering the health crisis. Although

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<sup>19</sup> 「化蕃のみは将来共日月潭景勝の一名物として存在せしむるの必要あり」 “Jitsugetsutan meibutsu no kabanmura wa kotei e maibotsu suru node Bokukichi ni ijū suru” [The acculturated savage village, a famous Sun Moon lake attraction, will be buried under water at the lake bed, so will be relocated to Buji], *Taiwan nichinichi shinpō*, September 9, 1921. Following my sources, I disaggregate “Han” into Hakka and Hoklo where possible.

<sup>20</sup> “Jitsugetsutan kaban no ijūchi kettei” [Relocation site for Sun Moon lake acculturated savages determined], *Taiwan nichinichi shinpō*, July 11, 1929.

<sup>21</sup> Chan, “Shilun Riyuetan,” 125-26.

<sup>22</sup> “Taiwan arumi kōgyō no keikaku wa shinkōchū” [Plans underway for Taiwan’s aluminum industry], *Taiwan nichinichi shinpō*, October 15, 1934.

local aboriginal affairs officers had been involved in this resettlement process, they claimed that the Thao's status as "acculturated savages" legally equivalent to Han Taiwanese meant that there was nothing they could do to help. Authorities could not provide them with the free medicine, vocational instruction, and relief from tax burdens that were granted to "raw savages" in the aboriginal administrative area.<sup>23</sup>

The Thao petitioned to be relocated away from Buji and rebuffed the Taizhong state government's offer of 5.8 hectares of forest reserves; without irrigation works they would be unable to turn this land into rice paddies.<sup>24</sup> Irrigated rice paddies, which many Thao had long depended upon, did not feature in relocation plans due to concern among officials about diverting water away from the reservoir, where it was needed for hydroelectric generation.<sup>25</sup> In an inversion of the typical pattern, relocation to Buji compelled Thao to give up wet-rice agriculture. Dry-land millet farming, which they had also conventionally practiced and featured in the millet pounding customs they were famed for, was deemed acceptable. Taizhong state officials did not permit the Thao to move away from their designated relocation site and struggled to settle on terms with the Taiwan Electrical Company to lease more land for agricultural purposes.<sup>26</sup> It appears that some of this land was eventually lent to Thao villagers and may have improved their economic and health conditions, but it remained under Taiwan Electrical Company (after 1945, Taiwan Power) ownership into the post-World War II period.<sup>27</sup> The Thao's primary role as tourist attraction within the Sun Moon lake

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<sup>23</sup> "Jitsugetsutan no kaban seikatsunan de jimetsu ni hinsu" [Sun Moon lake acculturated savages face self-destruction due to livelihood difficulties], *Taiwan nichinichi shinpo*, September 26, 1934; "Zuxian tudi mo yu shuidi Riyuetan huafan shenghuonan" [Their ancestor's land submerged at the bottom of the lake, Sun Moon lake acculturated savages face livelihood difficulties] *Taiwan nichinichi shinpo*, October 12, 1934. 1934.10.30

<sup>24</sup> "Suisha o owarete seikatsu ni komaru kaban" [Driven from Shuishe, acculturated savages struggle to make ends meet], *Taiwan nichinichi shinpo*, October 30, 1934.

<sup>25</sup> "Jitsugetsutan meibutsu no kabanmura."

<sup>26</sup> "Suisha o owarete."

<sup>27</sup> Niida, "Shohyō," 83.

hydroelectric scheme was evident within months of the reservoir's completion. On October 9, 1934, even as famine conditions in Buji were ongoing, a troupe of Thao women arrived in Shuishe to perform the millet-pounding song for the visiting Prince Nashimoto (梨本宮), a member of the Japanese imperial family and field marshal in the Imperial Army.<sup>28</sup> The richness of detail that survives about such performances contrasts with the paucity of information available about Thao relocation itself and encapsulates their subordinate position their livelihoods occupied among official priorities.

The task of removing Han residents from the inundation zone was an expensive but more straightforward proposition. As they had with the Thao, Taizhong state authorities and the Taiwan Electric Company worked alongside each other, if sometimes at cross purposes, to identify relocation sites and make necessary arrangements. Following several studies, a destination was located along the lower Zhuoshui's right bank in Ershui (二水), near the point where the hills give way the plains. Many Han accepted the choice of location, even as they lobbied for more favorable compensation terms, while others chose to find new dwellings elsewhere. Taiwan Electric Company began purchasing to-be-inundated land from Han villagers in early 1932 and sent the first round of payments around the time of Chinese New Year, making for a festive holiday in lakeside communities.<sup>29</sup> As inundation approached in the spring of 1934, negotiations with the company broke down, necessitating intervention by Taizhong state officials, who successfully endorsed the

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<sup>28</sup> “Nashimoto-miyasama no tairan ni kyō suru moyōshimono” [Events to be offered for inspection by Prince Nashimoto], *Taiwan nichinichi shinpō*, October 2, 1934; “Kaban no kineuta o tairan” [Inspection of the acculturated savage millet-pounding song], *Taiwan nichinichi shinpō*, October 10, 1934.

<sup>29</sup> “Jitsugetsutan-tan tachinoki no hoshōkin 38,000-en” [38,000 yen in compensation for eviction along Sun Moon lake shore], *Taiwan nichinichi shinpō*, January 13, 1932.

demand that villagers relocated to Ershui have their irrigation rights guaranteed.<sup>30</sup> On other points, such as the loss of livelihood for fishermen, the cost of relocating graves, and extra “encouragement” payments, the threat of holding out seems to have spurred Taiwan Electric to assent to demands.<sup>31</sup> Within weeks of the final agreement, nearly all Han residents had vacated the Sun Moon lake area, their houses slated to be torn down and burned. Some stragglers were encouraged on their way by way of a “eviction compensation” averaging 7 yen per person.<sup>32</sup> This was comparable to what the lowest-paid Han laborers on the Sun Moon lake project might expect to make from two weeks’ wages, so it was not a huge sum. By the same math, however, the mean *total* relocation compensation of 271 yen per household—including those that lost property or income but not their residence—would equal a year and a half of the same laborer’s pay.<sup>33</sup> These averages are means and do not give insight into the distribution of compensation. Nevertheless, it offers a contrast with the environmental violence and near-immediate immiseration faced by the Thao sent to Buji.

Finally, blocked from view by the mountains, was the reservoir along the Zhuoshui river that fed Sun Moon lake. Documentation on relocation here is sparsest of the three, but assembling relevant contextual records allows events to be reconstructed. As Figure 4.1 shows, initial plans sited

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<sup>30</sup> “Suisha burakumin no ijū ga motsureru” [Relocation of Shuishe villagers grows complicated], *Taiwan nichinichi shinpō*, March 9, 1934; “Tjū suru Suisha burakumin no yōkyū wa datō” [Demands of relocating Shuishe villagers are appropriate], *Taiwan nichinichi shinpō*, April 10, 1934.

<sup>31</sup> “Suisha burakumin e hoshōkin 70,000-yo en ni tassu” [Compensation to Shuishe villagers reaches over 70,000 yen], *Taiwan nichinichi shinpō*, April 27, 1934.

<sup>32</sup> “Jitsugetsutan no kohan min hotondo ijū o ryō su” [Nearly all Sun Moon lakeside residents complete relocation], *Taiwan nichinichi shinpō*, May 26, 1934.

<sup>33</sup> “Suisha burakumin e hoshōkin”; “Jitsugetsutan kōji no ukeoinin” [Sun Moon lake construction contractors], *Taiwan nichinichi shinpō*, November 13, 1931. Given a general labor shortage and competition among contractors for laborers, as described in this source, even these low wages were likely higher than those in other industries.

the intake for the diversion tunnel at a place the Japanese called Shimaigahara (姉妹ヶ原).<sup>34</sup> Located near the border between Atayalic Sediq areas to the north and Bunun areas to the south, this was the site an infamous massacre of over 100 Sediq men from Tgdaya by Gantaban Bunun in 1903.<sup>35</sup>

Impounding the Zhuoshui here behind a relatively small 7.8-meter concrete dam would allow for the storage of enough water to consistently supply Sun Moon lake during dry and wet seasons. Past this reservoir, a settling pond would remove sediment to allow clear water to travel through a nearly twenty kilometers of diversion tunnels (including some stretches of open-air channel) into the lake. Preliminary work began in this area during the first phase of construction (1919-1922) and a field office with worker residences was established approximately eight kilometers downstream at Wujie (武界, Bunun: Buqaiz).<sup>36</sup>

For most of 1920s, this field office fell into disrepair while construction was put on hold. Meanwhile, between 1925 and 1929, the riverside plains around Wujie became the chief destination for hundreds of Take-todo (卓社群) Bunun relocating from highland locations by force and by choice. Colonial police invested in reclaiming riparian land for growing rice, excavating irrigation channels and building 58 hectares of paddies.<sup>37</sup> The result, familiar from Chapter III, was catastrophic malarial outbreaks. Police seem to have prevented Bunun in their attempts to flee back to their original villages, even as some 30% of those infected with malaria perished. One source gives the death toll in September 1927 alone as 103. Wujie, like Tamazuan downstream, became

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<sup>34</sup> This area is now known as Qubing 曲冰.

<sup>35</sup> Local Japanese officials may have planned this attack. Paul Barclay, “The Musha Incident and the History of Tgdaya-Japanese Relations,” and Kae Kitamura, “Relistening to Her and His Stories: On Approaching ‘The Musha Incident from an Indigenous Perspective,’” in *The Musha Incident: A Reader on the Indigenous Uprising in Colonial Taiwan*, 45-98.

<sup>36</sup> “Jitsugetsutan junshi no sōtoku” [Governor-general patrols Sun Moon Lake], *Taiwan nichinichi shinpō*, August 5, 1924.

<sup>37</sup> “Bukaigahara o kaikon shi” [Reclaiming the Bukai plain], *Taiwan nichinichi shinpō*, April 17, 1925; “Banjin ijū” [Savage relocation], *Taiwan nichinichi shinpō*, May 22, 1927.

referred to as a “lair of malaria,” though by 1929 police claimed to have brought the outbreaks under control through distributing quinine distribution and filling in standing water.<sup>38</sup>

This relocation and malarial presence came to matter to the Sun Moon lake project when work restarted in 1931. Following recommendations by the American engineering consulting firm Stone and Webster, the revised final Sun Moon lake hydroelectric plan moved the diversion tunnel intake downstream from Shimaigahara to Wujie and raised the dam height considerably from 7.8 to 48.5 meters. Costs incurred by the much larger dam (shown in Figure 4.2) were offset by a shorter diversion tunnel and by relying upon the size of the Wujie reservoir to allow sediment to settle to the bottom instead of building a dedicated settling pond.<sup>39</sup> Malaria remained severe, claiming the lives of at least 15 Bunun in seven weeks in September 1931 and infecting the majority of the thousands of Japanese, Han, and Korean workers who arrived in Wujie to build the dam and dig the tunnel to the lake.<sup>40</sup> By burning vegetation on the surrounding hills for “three days and three nights,” installing double-paned windows in worker accommodations, and establishing a dedicated clinic, the dam’s contractor brought infection rates down among laborers, enabling construction to proceed.<sup>41</sup> Moving past hazards, such as a tunnel collapse that killed one worker and trapped others for days, by March

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<sup>38</sup> “Mabyō no su Bukaigahara” [The Bukai plain, nest of malaria], *Taiwan nichinichi shinpō*, August 24, 1929; *Takasagozoku chōsasbo daigo hen*, 137. The latter source identifies influenza as the cause of the outbreak, but from the preponderance of evidence suggests that malaria was the main threat.

<sup>39</sup> “Jitsugetsutan saikō keikaku ni kansuru naishin yōryō” [Survey summary concerning the plan for Sun Moon lake revival], JACAR Reference A08072175900; “Keizaiteki ni henkō sareta jitsugetsutan suiden no shin-keikaku” [The new Sun Moon lake hydroelectric plan, altered for economic reasons], *Taiwan nichinichi shinpō*, July 17, 1931.

<sup>40</sup> “Bukai hōmen wa mabyō ga shōketsu” [Rampant malaria near Wujie], *Taiwan nichinichi shinpō*, October 23, 1931.

<sup>41</sup> “Dai-8kai Jitsugetsutan” [Part 8: Sun Moon lake], Kajima Corporation, <https://www.kajima.co.jp/gallery/kiseki/kiseki08/index-j.html>



1934, construction concluded on the dam and tunnel, allowing for the slow filling of the Wujie reservoir to begin.<sup>42</sup>

Moving the dam site downstream from Shimaigahara meant a different stretch of riverside land would be flooded. While the original inundation zone threatened as few as five Bunun households, the eventual downstream reservoir seems to have displaced dozens of households and hundreds of individuals. Riparian land upstream from the Wujie dam included areas where resettled Take-todo Bunun resided and a significant amount of rice paddies recently built by authorities. Less than a decade after arriving at Wujie, hundreds were having to relocate again, this time slightly upriver to areas around the reservoir's northern end at Shimaigahara. Distinct from down-from-the-mountains "group relocation," however, Wujie Bunun were eligible for compensation. This follows from the fact that part of this compensation was directly allocated for the rice paddies; the relocation was a matter of necessity containing no justification in terms of public safety or conservation necessity. Reimbursement for lost houses and possessions was set at between 30 and 100 yen per household, markedly lower than lakeside Han residents.<sup>43</sup>

#### *Upstream Momentum and the Sun Moon Lake Watershed*

The "consumption question" (消化問題)—what to do with all of the wattage the Sun Moon lake power plant would produce—was a major concern in debates over the project during its planning, delay, and execution. Many were not convinced that Taiwan needed 100,000 additional kilowatts in

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<sup>42</sup> "Wujie di-1 suidao bengkuai" [Wujie tunnel #1 collapses], *Taiwan nichinichi shinbō*, October 14, 1932; Ping-Yen Lin 林炳炎, *Taiwan jingyan de kaiduan: Taiwan dianli zhushu huishe fazhan shi* [The beginning of the Taiwan experience: The history of the development of the Taiwan Electric Power Company] (Taipei: Taiwan dianli zhushi huishe ziliao zhongxin, 1997), 97-99.

<sup>43</sup> "Jitsugetsutan kōji chakushu to bossui suru kohan" [Work begins on Sun Moon lake, lake shore to be inundated], *Taiwan nichinichi shinbō*, July 1, 1931; "Denryoku kōji no tame Kantaban no daijū" [Great relocation of Kantaban because of electric construction], *Taiwan nichinichi shinbō*, April 29, 1932; "Kantāban no ijūhi" [Relocation costs for Kantaban], *Taiwan nichinichi shinbō*, July 10, 1932. Given the conflicting numbers given by these sources, I interpret the July 1 report to be based on information not yet updated to reflect the adoption of the new plan.

generating capacity, though plans for a great aluminum refinery in Gaoxiong, southern Taiwan, offered a way to match demand to supply. Once the first part of the project was complete in 1934, however, electric consumption rose so rapidly that anxieties rapidly shifted to whether or not there would be sufficient capacity for the refinery.<sup>44</sup> This positive feedback loop between industrial development and electric power development accelerated into the late 1930s and early 1940s, with the task of industrializing Taiwan closely aligned with the imperatives of commercial and military expansion.

Feeding the water from the first Sun Moon lake power plant through another hydroelectric station located further downhill had long been a part of Taiwan Electric plans. This second site, “Power Plant #2” on Figure 4.2, was built between 1935 and 1937 and added up to 43,5000 kilowatts to the island’s power supply.<sup>45</sup> Beyond this secondary appendage to the existing Sun Moon lake complex, however, the greatest hopes for finding new sources of hydroelectric generation looked into the mountains. As part of Taiwan Electric’s push to restart construction at Sun Moon Lake it sought to update its plans on the basis of current information, and the company’s president thus reported to the Governor-General in 1930 that that he was dispatching a survey to “travel upstream far into remote areas to survey changes within the [Sun Moon lake hydroelectric complex] catchment area and thoroughly investigate headwater conditions.”<sup>46</sup> Leading this expedition into the Zhuoshui’s uppermost reaches was Kubushiro Kenji (久布白謙治)—a veteran of the 1919 upper Zhuoshui survey—and accompanying him were several police, dozens of engineers and technicians,

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<sup>44</sup> Minato Teruhiro 湊照宏, “Ryō taisen kanki ni okeru Taiwan denryoku no jitsugetutan jigyō” [The planning and development of the Jitsugetutan project by the Taiwan Electric Power Company during the interwar period], *Keiei shigaku* 36, no. 3 (2001), 52, 70.

<sup>45</sup> Lin, *Taiwan jingyan*, 125-126.

<sup>46</sup> Matsuki Kan’ichirō denki hensaikai, ed., *Matsuki Kan’ichirō* [Matsuki Kanichiro (biography)] (Tokyo: Gotō Kōji, 1941), 185-186.

and hundreds of porters. Their brief involved both measuring forest hydrological conditions that would directly affect the Shimaigahara (later Wujie) intake and identifying sites for future highland hydropower.<sup>47</sup> The latter effort produced plans for another tall dam, this one approximately 15 kilometers northeast of Wujie at a place called Wushe (霧社, see Figure 4.3).

Wushe (Japanese: Musha), a Japanese settlement amongst various Tgdaya Sediq settlements, lay at the center of the infamous 1930 massacre of Japanese and subsequent reprisals.<sup>48</sup> Impounding the Zhuoshui river approximately 4.5 kilometers southeast of here would create a large reservoir stretching that would complement existing infrastructure in several ways.<sup>49</sup> Firstly, the ability to store and release water lent greater control over the water flowing into the Wujie reservoir and, from there, into the lake itself. This would make up for low natural flow during the dry season and thereby allow Power Plants #1 and #2 to average higher outputs, thus “producing the same result as if one were to expand the Sun Moon lake reservoir.” Storing water to release downstream during the dry season would also benefit irrigation, while the dam would “serve a flood control purpose” (治水の目的に達し) by preventing torrents from rushing downstream. Last but not least, a power plant at the foot of the Wushe dam would directly generate 20,000 kilowatts of electricity in addition to the tens of thousands of kilowatts in added efficiency it would enable downstream.<sup>50</sup>

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<sup>47</sup> “Shimaigahara okuchi Dakusui, Bandai ryōkeiryū no daichōsatai hensei saru” [Large team assembled to survey Zhuoshui and Wanda rivers in hinterlands of Shimaigahara], *Taiwan nichinichi shinbō*, March 4, 1930; *Matsuki Kan’ichirō*, 242.

<sup>48</sup> Because of its multiple referents, the toponym of Wushe/Musha has caused confusion since the Japanese colonial period. Focusing on “Musha town,” where the initial October 27, 1930 massacre occurred, Paul Barclay likens it to a fortified occupying settlement like the Baghdad Green Zone. Barclay, “The Musha Incident,” 47-52.

<sup>49</sup> Upstream of its confluence with the Wanda river (萬大溪), the Zhuoshui’s main stem is often today referred to as the Wushe river (霧社溪).

<sup>50</sup> *Matsuki Kan’ichirō*, 210; Chūsan sangyō chōsakai, ed., *Jinteki jūgyō taikēi*, 2 [Compendium of human endeavors, 2] (Tokyo: Chūsan sangyō chōsakai, 1939), 186; Lin, *Taiwan jingyan*, 160.

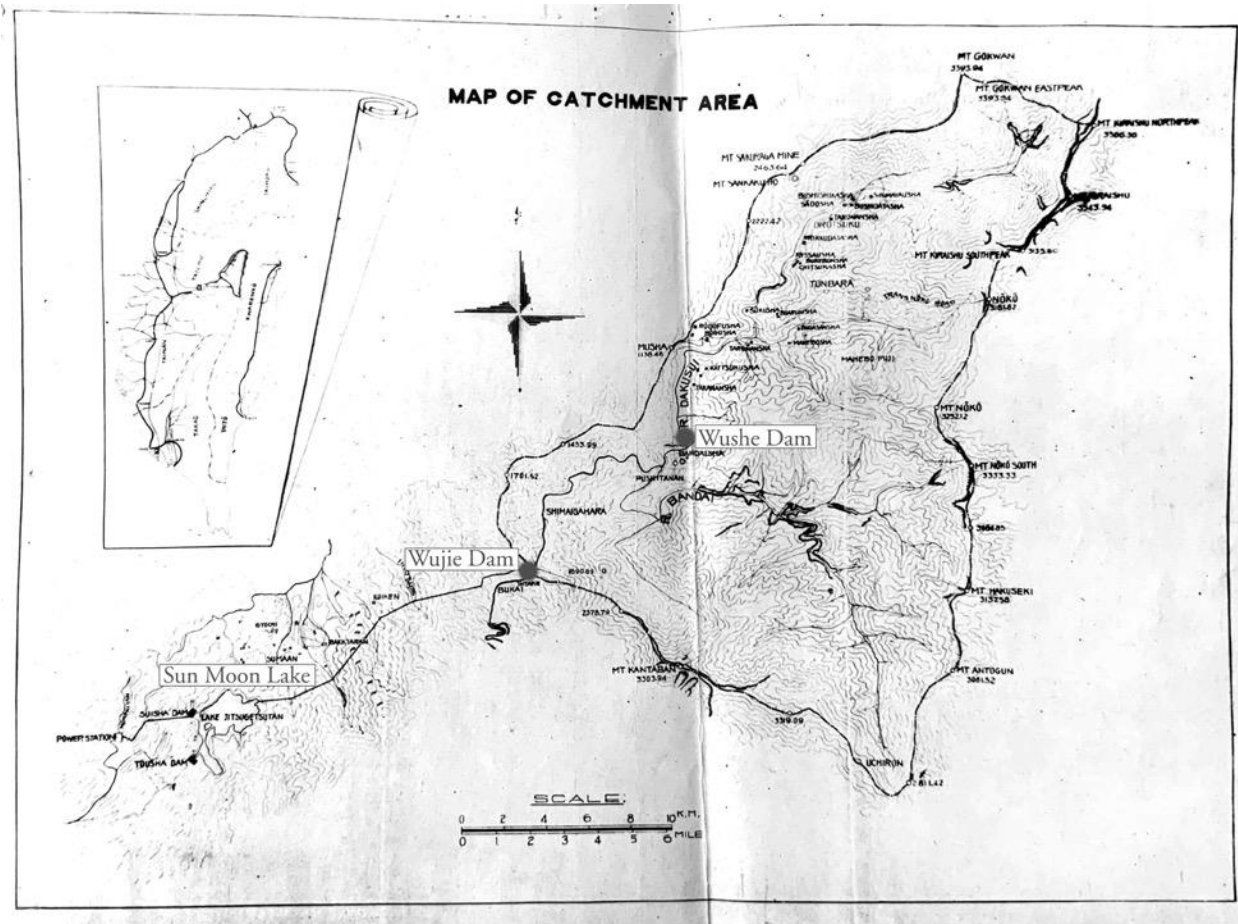


Figure 4.3: “Map of Catchment Area.” Produced by Taiwan Electric and attached to a company bond, this map shows the catchment area (watershed) of Sun Moon lake. The indigenous settlements subjected to relocation to make way for the Wushe reservoir were those closest to the dam; the many further to the north would eventually become part of the Wushe reservoir watershed when it was completed after World War II.<sup>51</sup>

Taiwan Electric’s plans for the Wushe dam were finalized by 1936, even as construction on Power Plant #2 was ongoing and funding uncertain. Erecting this towering, 95-meter concrete dam would require “the largest-scale dam project in the country,” and was a forbidding task to undertake in a remote area, particularly once war with China began. Although construction began in 1939 with assembling materials and erecting support buildings, very little work on the dam itself took place,

<sup>51</sup> “Map of Catchment Area,” n.d., attached to F.L. Belin to Percy C. Madeira, June 1, 1944, RG 165, Box 1727, Folder 3020-5990 “Islands–Formosa,” NARA. Boxed labels added by author.

and Taiwan Electric abandoned work on the project in 1944.<sup>52</sup> What the company did succeed in establishing here was the Wanda hydroelectric plant (萬大水力發電所), which shared facilities with the Wushe project but drew its water from the nearby Zhuoshui tributary of the Wanda river instead. By using a weir and tunnels in a run-of-the-river design rather than requiring a massive dam to be erected, the Wanda plant was able to contribute 15,000 kilowatts in generating capacity at a much lower cost.<sup>53</sup>

Across the expansion of the Sun Moon hydroelectric complex, the Japanese anxieties over highland environmental practice that had been articulated in the 1919 upper Zhuoshui survey grew deeper. Building infrastructure higher and higher in the watershed meant the perceived threats of indigenous swidden, fire, and erosion became much more immediate, intensifying the pressures of colonial conservation. As a Taiwan Electric publication put it,

...the verdant lushness of the forest is the sole resource that recharges the [river's] water volume. However, savages residing in this area number some 4500. Not only do they slash and burn these verdant woods to farm, many of them regularly use fire to hunt animals, turning dense forest into scorched earth. As a result, we fervently hope that the government will quickly relocate [these] aboriginal peoples, designate areas within the catchment zone as forest reserves, and additionally police the use of fire, and by doing so ensure total flood and erosion control (治山治水の全き).<sup>54</sup>

The “catchment area” referred to here was the Sun Moon lake catchment area, or watershed, which with the construction of the diversion tunnel included not just the small basin directly surrounding the lake but also the entire vast area of the Zhuoshui watershed upstream of Wujie. Figure 4.3 shows this watershed, and the fact that Taiwan Electric went to the trouble of producing this map in

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<sup>52</sup> “Hontō suiryoku dengen chōsa kaishi” [Beginning of survey on this island’s hydroelectric sources], *Taiwan denki kyōkai kaibō*, December 1936, 72; Lin, *Taiwan jingyan*, 160; quote from “Musha entei chikuzō keikaku” [Wushe dam construction plan], *Taiwan denki kyōkai kaibō*, May 1938, 81.

<sup>53</sup> Lin, *Taiwan jingyan*, 129-130.

<sup>54</sup> *Matsuki Kan'ichirō*, 187.

English is evidence of the power of this idea, which was not just a geographical area but a technical object to be defined, measured, and controlled.

All of the conservationist strategies Taiwan Electric called for seem to have been implemented to various degrees in the effort to protect the watershed. Intriguingly, in the immediate aftermath of the Wushe incident of 1930, editions of the major metropolitan newspaper *Asahi shinbun* ran an article titled “Restart of Sun Moon lake construction cause of disturbance? Forest logging banned for headwater conservation.” This reported the theory that Government-General policing of woodland use upstream of the Shimaigahara intake had grown so strict as to destroy the livelihoods of swidden farmers in the area, who, hearing a rumor that they would soon be driven from the area completely, were primed to be driven to violence by an instigator.<sup>55</sup> Taiwan Electric hastened to deny this rumor, and the lack of other supporting evidence (or even mention) of this theory amidst the exhaustive literature on the Wushe incident makes it likely that it had little basis.<sup>56</sup> Demands of corvée labor and related abuses in the service of other projects, such as road construction, appear to have been the precipitating factor. Still, the sense underlying these reports that conservationist crackdowns could push colonized peoples to extreme violence is significant, even as on-the-ground information is lacking.

In late 1931, a vast area comprising more than 279 square kilometers in the upper Zhuoshui watershed was designated as forest reserves.<sup>57</sup> This bolstered the legal basis of exclusionary headwater conservancy and, given its location, scale, and timing, was almost certainly related to the

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<sup>55</sup> “Jitsugetsutan saikō ga bōdō no gen’in ka suigen kanyō no tame ni shinrin bassai o kinshi sare” [Restart of Sun Moon lake construction cause of disturbance? Forest logging banned for headwater conservation], *Osaka asahi shinbun*, October 29, 1930; “Jitsugetsutan kōji de shinrin bassai no kinshi kara ka” [Prohibition of forest logging due to Sun Moon lake construction responsible?], *Asahi shinbun*, October 29, 1930.

<sup>56</sup> “Jitsugetsutan kōji chakushu wa myōnen ichigatsu-goro to narau” [Construction on Sun Moon lake likely to commence next January], *Taiwan nichinichi shinpō*, November 12, 1930.

<sup>57</sup> *Fubō* (Government-General gazette) #1402, December 9, 1931.

construction on Sun Moon lake. More directly, plans for the Wushe reservoir also led to evictions of over 800 Tgdaya Sediq and Wanda Atayal peoples living near the planned reservoir and their resettlement to riverside settlements near what is now Qingliu (清流) on the Beigang river.<sup>58</sup>

Resource and financial pressures under mobilization for total war meant that Taiwan Electric made scant progress on building the Wushe dam itself, but authorities largely removed the local indigenous presence all the same.

### *Sun Moon Lake as Tap and Target*

Even amidst an expansion of hydroelectric capacity and a major thermal plant in the northern port city of Jilong, Sun Moon lake's power plants continued to generate the lion's share of the island's total electric capacity.<sup>59</sup> New industries including aluminum refining and copper concentrate production sprung up to use this electricity, while the manufacture of industrial alcohol from local sugar supplies expanded. Such materials, all vital for the empire, could in theory have the motive force of their production traced back to the precipitation that fell in the Wujie reservoir's watershed; direct demand for industrial water supplies increased as well. As the onset of the Second Sino-Japanese War in 1937 and the Pacific War in 1941 heightened demand for light metals and growing fuel shortages created resource pressures that pushed on Taiwan's hydraulic infrastructure.

Continuing to industrialize the island would only be possible as long as rivers kept flowing and sediment was kept out of the way. Electricity official Tsuda Tetsuo expressed this in elemental terms, stating, "Taiwan Electric deals in electricity through the medium of water. This is how we've

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<sup>58</sup> Barclay, "The Musha Incident," 84-85; "Mushaban ga dai-ijū" [Wushe tribe great relocation], *Taiwan nichinichi shinbō*, April 26, 1938; "Musha no Takasagozoku" [Wushe Takasago tribes], *Taiwan nichinichi shinbō*, November 21, 1939.

<sup>59</sup> Minato Teruhiro, *Kindai Taiwan no denryoku sangyō—shokuminchi kōgyōka to shibon shijō* [Modern Taiwan's electricity industry: colonial industrialization and capital markets] (Tokyo: Ochanomizu Shobō, 2011), 179.

made a promise for the industrialized Taiwan of tomorrow. So for the company, water is life, more important than anything else. In this view, securing water is a fundamental issue for the company.”<sup>60</sup>

As forestry and electric power industry officials noted the nebulous threat to Sun Moon lake represented by poor environmental practice in the upper watershed, a very specific threat appeared in the form of American bombing. In 1942, American officials began interviewing various engineers and scientists living in the United States who had made visits to Sun Moon lake in the 1930s. Stanford University geologist Bailey Willis seems to have furnished particularly valuable information, providing Navy Taiwan expert George H. Kerr with maps, photographic negatives, and typewritten reports. Willis sent so far as to suggest the best aerial approaches to Sun Moon lake and identify vulnerable points, which included the Wujie dam, Shuishe dam, diversion tunnels, and the first power plant.<sup>61</sup> Having researched Taiwan’s electric industry and affirmed Sun Moon lake’s power plant, one report for the Board of Economic Warfare concluded, “Demolition of the Jitsugetsutan [Sun Moon lake] Power Plants, it is believed, would more seriously cripple Taiwan’s economic life than any other single accomplishment by air attack.”<sup>62</sup>

In the fall of 1944, Sun Moon lake’s Power Plant #1 became a target during the Battle of Formosa, a major engagement involving American Navy bombing runs against targets on Taiwan and attempts to repel them by Japanese Army and Navy aviators. American newspaper coverage of the attack on Sun Moon lake was triumphant, with a naval lieutenant saying of the power station: “We blew it off the map.”<sup>63</sup> In reality, the damage to the plant was severe but not critical; after

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<sup>60</sup> Aoki, *Uru Kokoro*, 45.

<sup>61</sup> Bailey Willis, “Formosa (Taiwan) Facts of hydroelectric development,” n.d, Box 3, Folder 17, Bailey Willis Papers, Huntington Library, San Marino, CA; George H. Kerr to Bailey Willis, July 17, 1942, RG 165, Box 797, Folder “Misc-Formosa,” NARA.

<sup>62</sup> M.H. Walker, “Military and Industrial Objectives in Taiwan (Formosa),” September 17, 1942, p. 61, RG 165, Box 797, Folder “Misc-Formosa,” NARA.

<sup>63</sup> “One Day of U.S. Carrier Attacks is Enough for Formosa Air Force,” *St. Louis Post-Dispatch*, October 18, 1944.



shutting down operations for a week for repairs, Power Plant #1 was able to reopen at 80% capacity, having lost one of five penstocks that carried water down from the lake into the generator house. The next air raid on March 13, 1945, however, saw 128 1000-pound bombs dropped on the

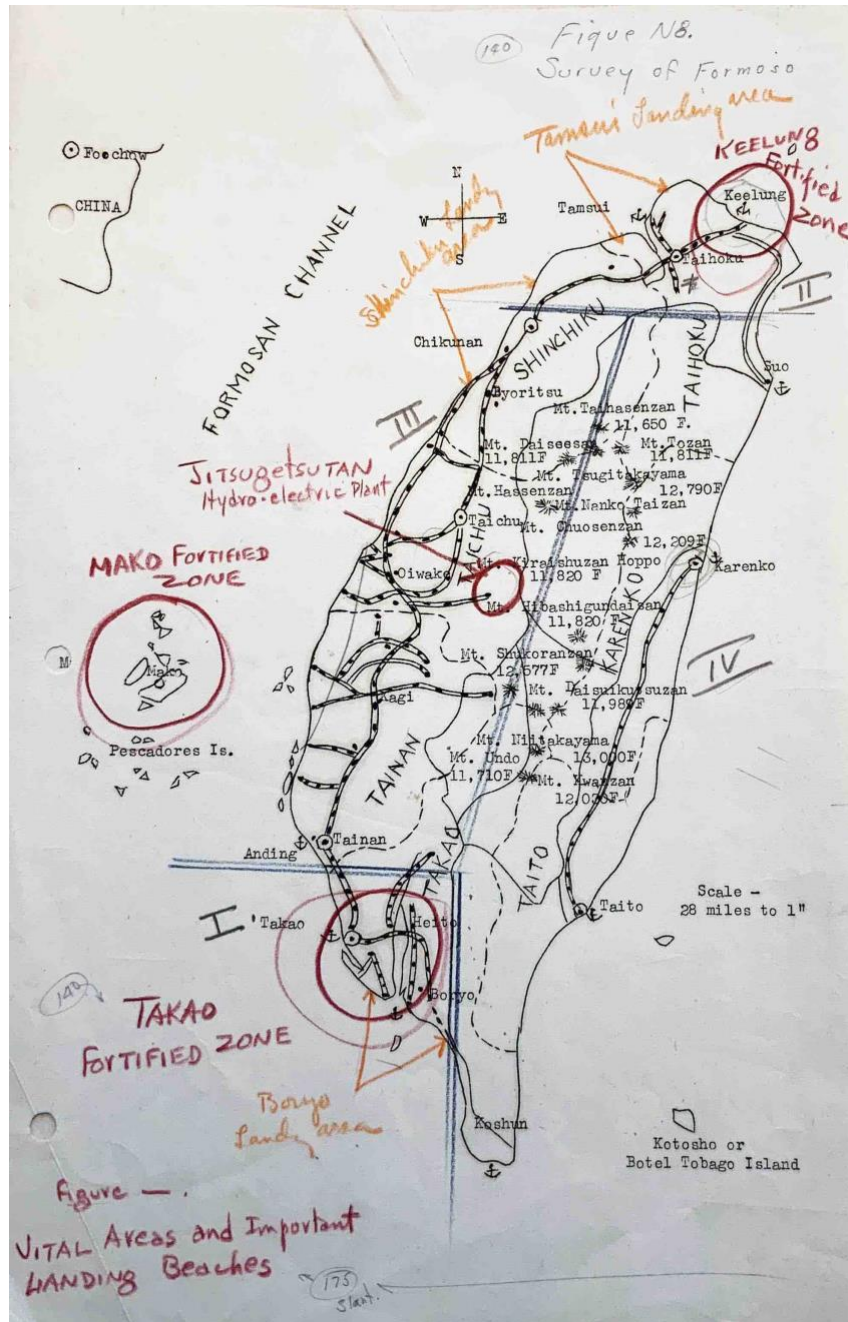


Figure 4.4: “Vital Areas and Important Landing Beaches.” Note the attention given to Sun Moon lake and the military-industrial zones in Keelung (Jilong) and Gaoxiong (Takao), for which it was the chief source of electricity.<sup>64</sup>

<sup>64</sup> “Vital Areas and Important Landing Beaches,” n.d., RG 165, Box 795, Folder 1220, NARA.

site, many of which hit the transformer yard next to the generator, completely destroying the transformers there and disabling the plant for the remainder of the war (both the penstock tubes and the transformer yard are visible in the inset image within Figure 4.1). Ten days later, another run dealt superfluous damage to Power Plant #1 and also targeted Plant #2, likewise devastating its transformer yard.<sup>65</sup> This actually did little to further the American objective of disrupting Taiwan's industry, as the primary strategic targets powered by Sun Moon lake—chemical and light metal factories in Gaoxiong and Jilong—had already been directly bombed and destroyed.<sup>66</sup>

The United States Strategic Bombing Survey, while exacting in its description of damage done to the Sun Moon lake equipment and infrastructure, did not record any human casualties resulting from the hundreds of bombs dropped there. Oral historical evidence makes clear, however, that at the least indirect violence was done to bodies of those in the area. The Bunun relocation meccas of Tamazuan and Isingan lie only eleven kilometers or so southeast of Power Plant #1, and American bombing runs forced resettled peoples there to seek refuge in bomb shelters. Isuth Tansikian (b. 1931 in Hinukun) recalled covering her bodies in leaves for camouflage as she went out to dig up the tubers that the village was subsisting on. Working in the rice paddies that had been a key feature of the settlement's establishment—and a cause endemic malarial conditions—became more difficult with the risk of exposure to American aerial surveillance. The rice Isingan did continue to produce was sent out of the village to soldiers.<sup>67</sup> The overall contribution to military food supplies was likely slight. But the straitened environmental circumstances in which relocated

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<sup>65</sup> "Report of Formosa Bomb Damage Survey Party to United States Strategic Bombing Survey," Report No. 32-a(1), USSBS Index Section 6, n.d., pp. 92-93, National Diet Library, Tokyo.

<sup>66</sup> "Report of Formosa Bomb Damage," 7.

<sup>67</sup> Kondō Aya, "Nihon shokuminchiki," 134, 143-144,

Bunun in Isingan spent the war, and hid from American planes, was a legacy of the evictions that had emptied much of the lower Zhuoshui watershed.

### *Developing the Highlands*

In the case of the Sun Moon lake hydroelectric complex, the scientific and conservationist concerns of foresters were largely aligned with the interests of Taiwan Electric Power Company. Both viewed Taiwan's montane forests as great reserves of water that required protection for the integrity of the island's natural hydraulic—and human industrial—systems. Because they understood swidden agriculture and hunting to be threats to forest health and downstream reservoir function, they also tended to support police action to concentrate dispersed highland villages in foothill settlements. It is important to stress, however, that in other ways the push to put the highlands to work for Japan's war machine created frictions. The remainder of this chapter zooms out from Sun Moon lake to look more generally at how colonial conservation interacted with the drive towards “highland development,” formalized forest hydrology studies, and sought to contribute to the war effort.

The term “highland development” (山地開發) began appearing with some frequency in colonial discourse in Taiwan around 1935. “Savage territory development” (蕃地開發) was its less common predecessor, and the semantic shift towards identifying Taiwan's interior by its topography rather than its indigenous inhabitants reflected their ongoing material and imaginative dispossession. Impulses towards “savage territory development” were longstanding—see Kodama Gentarō's 1901 quote in Chapter III and post-Wushe debates about the advisability of relocation. After the mid-1930s, however, many commentators viewed highland development as something new. Taihoku Imperial University agronomist Tanaka Chōzaburō (田中長三郎), who claimed credit for popularizing highland development policy in Taiwan, described it as concerned chiefly with expanding agriculture into higher elevation, where coordination with forestry would protect topsoil

while producing crops not suited to the lowlands.<sup>68</sup> Many in other fields understood the term more capaciously. When the colonial government launched a four-year highland development plan in 1936 with 400,000 yen in funding, it included a broad mandate to expand montane industries ranging from mining to livestock husbandry. Some took this news as requiring the acceleration of indigenous relocation, with one journalist opining, “the pace of Takasago group relocation should be sped up and the process concluded within four years...to eliminate obstacles to highland development.”<sup>69</sup> Environmental justifications buttressed this view that using the highlands required emptying them. Aboriginal affairs officials stated quite plainly in writing that “liberating the highlands occupied... by the Takasago tribes” (高砂族の...占有地を解放して) would be necessary both to develop them and to protect Taiwan’s “root source of flood control” (治水の根源) from the despoilment threatened by hunting and shifting cultivation.<sup>70</sup> In such a conservationist framing, developing the highlands became not merely economically advantageous but also an environmental imperative.<sup>71</sup>

Calls to protect the land could also buttress arguments of those who sought to use and improve—rather than remove—indigenous populations. Hoshi Hajime envisioned in Taiwan’s highlands massive cinchona plantations that would allow his company, Hoshi Pharmaceuticals, to provision the Japanese empire with all of the quinine it required and free it from the need to rely on imports. Modeling plantations on American Indian reservations, Hoshi planned for indigenous workers to live and work harmoniously in ideal paternalistic conditions. As Timothy Yang has

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<sup>68</sup> Tanaka Chōzaburō, *Taiwan sanchi kaibatsu no shin-shimei* [The new mission of highland development in Taiwan] (Taipei: Taihoku Teikoku Daigaku, 1940), 1-2.

<sup>69</sup> “Zenbanchi o heiwakō ni” [The whole savage territory into a peaceful frontier] *Taiwan nichinichi shinpō*, March 24, 1937. “Takasago” is an ancient Japanese name for Taiwan, and in the 1930s “Takasago tribe(s)” (*Takasago-zōken*) began to displace the derogatory “savage” (*banjin*) as the preferred term for Taiwan’s indigenous peoples in Japanese colonial discourse.

<sup>70</sup> *Kiō no bansha shūdan jū jōkyōchō* [Survey on conditions of savage villages already relocated] (Handwritten manuscript, no publisher: October 1937), 4, National Taiwan Library.

<sup>71</sup> “Sanchi kaihatsu wa shokusai chūshin no nōgyō de ikitai” [Highland development ought to be centered around plant and tree agriculture], *Taiwan nichinichi shinpō*, August 18, 1936.

documented, in practice these cinchona plantations failed to produce according to expectations and retain, or to improve the lives of, indigenous Taiwanese.<sup>72</sup> Such schemes were not necessarily in conflict with group relocation when the latter targeted remote, inaccessible areas that were unappealing for agriculture or industry. At the same time, tensions between colonial planners about the proper place of indigenes within highland development persisted.

Despite the conservationist commitments professed by Tanaka, the reality of highland development resulted in widespread deforestation, as will be elaborated below. Environmental consequences went beyond the chain of events, often elaborated by foresters, involving a loss of trees, topsoil erosion, and flooding—like relocation, it reached into the bodies of colonial subjects. In April of 1944, Han Taiwanese physician Shi Jiangnan (施江南, Taiwanese: Si Kang-lam), who had trained at Kyoto Imperial University, wrote that there had been an undeniable increase in malaria during World War II. Part of this had to do with declining supplies of imported quinine—the same situation that Hoshi attempted to ameliorate. Noting that the spread of the disease was most marked in mountainous areas, Shi reasoned that highland development and increased mining activity were also responsible; they disturbed ecologies and created pockets of stagnant water. Most concerning to Shi was the danger malaria posed to the young, strong men who ought to go to the front and fight for the empire.<sup>73</sup> Scholars including Ya-wen Ku have also argued that highland development after the mid-1930s propelled higher and higher rates of malaria during wartime.<sup>74</sup>

*Protecting the Highlands and Forester Anxieties*

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<sup>72</sup> Timothy Yang, *A Medicated Empire: The Pharmaceutical Industry and Modern Japan* (Ithaca: Cornell University Press, 2021), 194-207.

<sup>73</sup> Shi Jiangnan, “Kenmin kōza: mararia to kekaku” [Prefectural resident course: malaria and tuberculosis], *Shin-kensetsu*, April 1944, 51. After the war, Shi went missing and was presumed killed during the February 28 incident of 1947. Chia-Jung Chang 張家榮, “Lüejì Lugang Shi Jiangnan jiniānbei yuānyou” [In brief: the reason for the Shi Jiangnan memorial in Lugang], *Taiwan Historica*: <https://www.th.gov.tw/epaper/site/page/130/1873>

<sup>74</sup> Ku, “Shokuminchi-ki Taiwan ni okeru kaihatsu,” 69.

Breezy claims that developing the mountains was compatible with conserving their resources were not met with credulity in all quarters. In 1938, a forester criticized the trend towards agricultural highland development, likening it to the ecological plunder conventionally practiced by swidden agriculturalists in Taiwan. Land was being cleared with little effort at afforestation, and the author thus wrote “I do not hesitate to state that I believe that highland development in such a manner is not development but rather destruction of the highlands” (開発で無くして山地の破壊なり).

This article did not promote preservation, letting the highlands (or their people) be, but rather a cautious, measured approach towards agricultural expansion. Some slopes were too steep to farm at all, and care had to be taken to emphasize afforestation as a central part of agriculture, rather than just an accompanying feature to it. Without referencing aboriginal practices directly, the author in fact proposed a sort of shifting cultivation—highland soils could not sustain sustained cultivation indefinitely, so following a productive period of some years they ought be given over to afforestation and the expansion of “beautiful forests.”<sup>75</sup>

In fact, even as deforestation was expanding, coordinated efforts for mass tree planting gained new energy. The logic of integrated watershed management, this dissertation has argued, increasingly pervaded common sense about flooding in Taiwan and the empire at large after the 1910s. The first dedicated long-term project of “forest hydrology” (森林治水) in Taiwan, however, did not begin until 1936 in the Tamsui basin, with much larger efforts commencing in 1939 with a 17-year plan for the Zhuoshui and Zengwen drainage basins. Further expansions came in 1941 and 42. Over the same period, the budget the Government-General allotted these efforts grew from less

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<sup>75</sup> Sadao-sei さだを生, “Nanbu Taiwan ni okeru sanchi kaihatsu no ichirei ni tsuite” [On one example of highland development in southern Taiwan], *Taiwan no sanrin*, October 1938, 53-55. The author’s name is semi-pseudonymous but likely refers to Yamashita Sadao 山下貞夫.

than 700,000 to over one million yen.<sup>76</sup> This represented a significant amount for the Government-General, which in 1939 had total expenditures of roughly 116 million yen.<sup>77</sup> Joint private-public afforestation efforts aimed at protecting water sources were similarly well-funded. Beginning in 1937, the Jianan Irrigation Cooperative launched a ten-year, 2.7 million yen project to afforest areas uphill and upstream of the Wushantou Reservoir and thereby protect it from filling up with sediment; government funding was to cover half of this cost. Foresters nevertheless complained that funds available to them paled in comparison with the tens of millions of yen spent annually for afforestation and water conservancy in the home islands and Korea.<sup>78</sup>

Even as more resources became available for foresters and engineers to protect water sources, there was a tangible sense that these efforts were insufficient. When Takemoto Tadao (武本忠男) became chief of the Zengwen Forest Hydrology Office in July 1940, he warned that catastrophe awaited downstream areas. Sediment washing into the river threatened to clog up the massive Wushantou Reservoir, threatening the Jianan Irrigation System it depended on, and, by extension the ability of the entire state of Tainan to maintain a productive economy and protect its citizens from disease and disaster. In Takemoto's description, "the mountainous areas of the Zengwen watershed are extremely devastated. There are many places without a single tree or blade of grass, where the sharply exposed ridges make for a bizarre, moon-like sight. Experts who have seen this speak about it as some of the worst areas by global standards, or as ruinous geological

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<sup>76</sup> Kurata Takehiko 倉田武比古, "Taiwan ni okeru shinrin chisui jigyo no hattatsu" [The development of forest hydrology projects in Taiwan], *Taiwan no sanrin*, July 1942, 1; "Zentō shinrin chisui no tame Tokufu 17-nen keikaku naru" [Government-General forms 17-year plan for forest hydrology for entire island], *Taiwan nichinichi shinbō*, October 6, 1938.

<sup>77</sup> Ho, *Economic Development of Taiwan*, 34.

<sup>78</sup> Kurata, "Taiwan ni okeru shinrin chisui," 2.

conditions with few parallels in the world (世界にも類例の少ない).”<sup>79</sup> Takemoto’s final characterization can be reasonably interpreted as hyperbolic: after all, severe geologic degradation caused by human activities has been common across the world for much of human history. There was also an interest for those employed in explicitly conservationist roles like Takemoto’s to justify the importance of their work upon a basis of acute crisis and overarching importance.

### *Afforestation amidst Deforestation*

The specter of deforestation loomed over much of the discussion about developing new water sources in the highlands. Because this chapter mostly focuses on qualitative descriptions of deforestation, and because, as I will show below, such expressions disproportionately targeted indigenous land-use, it is important to reconstruct the circumstances under which forest loss was happening. Deforestation in Taiwan indeed accelerated with the war, partially to support agricultural expansion into the highlands but chiefly to meet rising demand. Record timber harvests from 1939 to 1943 reflect this fact. Although state control over the economy and daily life alike was tightening, the need to provide the military with ever-greater supplies of wood—and dwindling supplies of capital to support this effort—actually led the colonial government to privatize logging operations in 1942. This facilitated the expansion of logging in private areas and also coincided with a major expansion in hardwood harvests. Forestry in Taiwan had focused on conifers since the early years of Japanese rule, but the restriction of hardwood imports into the empire led loggers to look to Taiwan’s forests, and by 1940 hardwood harvests exceeded that of conifers. Although official

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<sup>79</sup> “Sobunkei o seiryū ni suru” [Turning the Zengwen into a clear river], *Taiwan nichinichi shinbō*, July 14, 1940.



propaganda continued to advertise forestry as a regenerative venture, evidence shows that during the wartime afforestation and reforestation increasingly lagged behind logging.<sup>80</sup>

Forestry Experiment Station Chief (林業試験所長) Seki Fumihiko (關文彦) echoed the above forester in sounding the alarm about ongoing destruction. In 1941, Seki warned that rash clear-cutting was threatening to “turn the island’s mountains all into bald mountains within three years.” He excoriated loggers who justified their profligate activities through lip service to “conforming to national policy” (國策順應) or “selfless devotion to the state” (滅私奉公)—true devotion to the state would require that no trees to be cut down without several new ones planted in their place. Seki singled out valuable hardwoods like zelkova, Japanese bay tree, and Japanese oak (*Lithocarpus*) as being under particular threat in new ways.<sup>81</sup>

In the wartime Japanese empire, foresters lamented deforestation while accepting the broader circumstances driving it—that is, military demand for lumber. Aoki Shigeru, one of the most prolific commentators on forestry in Taiwan during this period, began a call for greening national territory (國土緑化) with the straightforward observation that “lumber is more important than ever.”<sup>82</sup> It was precisely because of the empire’s need for timber, in this view, that forestry in Taiwan needed to be managed smoothly. A faith in scientific forestry’s ability to provide high, consistent yields in the long term explains what we might see as a contradiction between wartime forestry’s regenerative and exploitative instincts. Assuming that the Japanese empire would endure,

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<sup>80</sup> Kuo-tung Ch’en, “Nonreclamation Deforestation in Taiwan, c. 1600-1976,” in *Sediments of Time: Environment and Society in Chinese History*, ed. Mark Elvin et al. (Cambridge: Cambridge University Press, 1998), 717-721; Hagino Toshio, *Chōsen, Manshū, Taiwan ringyō battatsu-shi ron* [Theories of forestry development in Korea, Manchuria, Taiwan] (Tokyo: Ōzorasha, 2005 [1965]), 484.

<sup>81</sup> Seki Fumihiko, “Shinrin no ranbatsu bōsai o imashimu,” *Taiwan no sanrin*, July 1941, 2-3. We can additionally surmise that insofar as it represented the clear-cutting of new ecological zones, the expansion of logging into hardwood forests would have disturbed plant and animal life in new ways.

<sup>82</sup> Aoki Shigeru, “Kokudo ryokka,” *Taiwan shinbun*, March 28, 1939, reprinted in *Uuru kokoro* (Taizhong: Yoshimura Shōkai, 1941), 48-50, quote on 48.

many wrote in the period about highland protection as part of a hundred-year plan (百年の大計), during which time generations of fast-growing trees could be planted and harvested. This fit into both discourse and initiatives that were shared and coordinated across the empire. In 1940, the Central League for Natural Spiritual Mobilization marked the 2600<sup>th</sup> anniversary of the mythical founding of Japan with a Patriotic Tree-Planting Movement (植樹報國運動) that was to commemorate Japan's sylvan heritage by blanketing the empire with green.<sup>83</sup> A 1942 pamphlet produced by the Imperial Erosion and Flood Control Association (帝国治山治水協會) summarized the view of afforestation as act of loyal service to the war effort that contributed to an almost endless list of virtues, including easing the passage of boats, improving scenery at religious and historic sites, protecting soil integrity, preventing floods, replenishing water sources, promoting healthy thoughts, moderating the climate, and cleaning the air.<sup>84</sup> Because Japan was a nation beset by natural disasters, the pamphlet argued, the necessity to protect the landscape was particularly acute. Appealing to affective bonds with soldiers on the front, it continued,

Sooner or later, our brave comrades at the front, who put their lives on the line, will win the war and return to their hometowns wreathed in glory. What if the mountains and rivers are ravaged, their homes washed away, their fields buried, or their own flesh and blood have become victims and are no longer in this world? How will our brave soldiers feel then, and how will we on the home front be able to face them, to welcome them home?... Our esteemed forebears have taught us, to govern the waters, first govern the mountains.<sup>85</sup>

The authors of this pamphlet outlined broad understandings of forests and afforestation alike. The anti-erosion function of trees derived not just from holding soil in place but from the way

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<sup>83</sup> Shimokawa Kōshi, ed., *Kankyō-shi nenpyō* 1926-2000 [Environmental history timeline, 1926-2000] (Tokyo: Kawade shobō shinsha, 2004), 28; “Shokuju hōkoku undō jissshi ni kan suru ken” [Item concerning the implementation of the patriotic tree-planting movement], National Archives of Japan, call number *san* 02501100, 3; Fedman notes this intra-imperial coordination in *Seeds of Control*, 184.

<sup>84</sup> *Daitōa kensetsu to shinrin chisui* [Greater East Asia construction and forest hydrology] (Tokyo: Teikoku chisan chisui kai, 1942), 1-2.

<sup>85</sup> *Daitōa kensetsu to shinrin chisui*, 7.

that leaves and branches slowed the journey of rainwater into the understory, where fallen leaves, shrubs, and moss all acted like sponges to absorb and water and ease its distribution down into the earth, where it replenished aquifers. Forests were “the root of culture and the mother of industry,” and as such protecting and expanding them was incumbent upon all on the home front. While there was often a slippage in between protecting national soil and national territory, the author of this pamphlet explicitly called for afforestation mobilization as part of war. As implied above, that Japan would prevail in the war was taken as an article of faith, so the real battle involved ensuring the empire’s continuing vitality after the war was won. Here, the pamphlet concluded with a proverb, “All nations (民族) that nurture mountain forests will prosper, those that do not will perish.”<sup>86</sup>

*“Gravel’s mischief”: placing highland indigenes*

Anxieties about deforestation and increasingly militant calls for afforestation were common, particularly among foresters, all across the empire. Taiwan’s deforestation in the service of mobilization also fit in with broader patterns. What remained distinctive, however, were the ways in which commentators situated the despoilment of watersheds within racialized pathologies. Forester Kurata Takehiko (倉田武比古), head of the Forest Hydrology responsible for the Tamsui, wrote that there were two types of wasteland in Taiwan. One was largely private property bordering lowlands that had been rashly cleared—implicitly, by Han Taiwanese. The other consisted of highland areas where indigenes had set fires to hunt animals or clear brush. Kurata noted that, conveniently, the latter was almost entirely government land, which eased the way for the state to implement erosion control measures.<sup>87</sup> The dichotomy in property outlined here by Kurata was not coincidental, and instead reflected the fact that the Japanese government had respected many Han

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<sup>86</sup> *Daitōa kensetsu to shinrin chisui*, 8, 17.

<sup>87</sup> Kurata, “Taiwan ni okeru shinrin chisui,” 3.

land titles at the beginning of colonial rule while declaring indigenous areas *terra nullius*. As Yamaji Katsuhiko has argued, Japanese officials and anthropologists framed indigenous Taiwanese as unfamiliar with concepts of property and thus undeserving of any legal rights to their land.<sup>88</sup>

The simultaneous expansion of highland development and afforestation flood control under conditions of increasing material scarcity all served to direct greater attention to the observed environmental threat posed by indigenes. In 1939, public works engineer Aoyanagi Haruichi published a two-part article entitled “The Savage Territory and Erosion Control” in the leading aboriginal affairs trade journal *Riban no tomo*. Aoyanagi began his appeal by stating, “Because nearly all major rivers on this island originate in the savage territory, erosion control in Taiwan cannot be separated from the savage territory.... Such efforts cannot succeed without a great deal of assistance from individuals involved in aboriginal affairs and the Takasago people themselves.”<sup>89</sup> Aoyanagi went on to enumerate the destruction wrought by rivers. He stressed “gravel’s mischief” (砂礫の悪戯) the capacity of sediment carried in floodwater to wreak far more havoc—including destroying farmland—than water on its own could muster. He also described the damage posed by raising a riverbed, whether through flooding or ill-conceived engineering projects. Letting rivers run amok was no different from leaving things up to nature; this was the approach taken in Taiwan before Japanese imperial rule, and it was an extremely damaging one. The chief tools available to fight the flood, Aoyanagi argued, were planting trees, re-shaping hillsides, draining areas that retain water, and river channelization. Using these together appropriately could, with the prevention of erosion, help eroded landscapes “naturally” re-forest. Aoyanagi did not gainsay the importance of active afforestation work, but unlike his forester colleagues he held that watersheds were simply too vast

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<sup>88</sup> Yamaji, *Taiwan no shokuminchi tōchi*, 4, 43-44.

<sup>89</sup> Aoyanagi Haruichi 青柳晴一, “Banchi to sabō (sono ichi)” [The savage territory and erosion control (part 1)], *Riban no tomo*, May 1939, 3.

for huge planting programs to be practical. The constant threat of typhoons and earthquakes in Taiwan likewise posed a persistent threat, even to “areas covered in beautiful forests that appear stable,” to say nothing of more ecologically degraded zones.<sup>90</sup>

Where Aoyanagi brought this back to his readership was in making the point that all of these erosion control projects could only succeed if the mountains were controlled. This entailed “restricting harmful uses of mountainous areas.” As long as the Takasago people were hunting and practicing shifting cultivation, they would be producing sediment, and attempting erosion control in such zones was akin to “trying to put out a fire with both water and oil.” Aoyanagi recognized that these were not esoteric customs for indigenes but rather fundamental lifelines, and thus reasoned that they could not be reformed right away. Nevertheless, he thanked his colleagues in aboriginal affairs for their hard work in eliminating hunting and resettling indigenes in places with rice paddies. This, Aoyanagi concluded, improved prospects for water conservancy, erosion control, and the “awakening” (覚醒) of the Takasago people themselves.<sup>91</sup> Aoyanagi was a public works engineer—not a forester—and it is notable that, some two decades after Yamagata had cast doubt on the relevance of scattered highland swidden for flooding, he fully embraced the “upstream thinking” paradigm of watershed management that forestry science had promoted.

By 1939, per government data, a great deal of the violent work of forced relocation had already been completed. Nevertheless, erosion control surveys (which Aoyanagi had also stressed the importance of) would soon support his concerns about upland land-use. On March 1, 1940, Aoki Shigeru led a survey party of several engineers, a policemen, porters, and several dozen indigenous guides that set out from Taizhong to thoroughly survey southern Zhuoshui tributaries

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<sup>90</sup> Aoyanagi, “Banchi to sabō (sono ichi),” 3; Aoyanagi Haruichi, “Banchi to sabō (sono ni)” [The savage territory and erosion control (part 2)], *Riban no tomo*, June 1939, 3.

<sup>91</sup> Aoyanagi, “Banchi to sabō (sono ni),” 3

such as Chenyoulan, Danda, and Kashe rivers. Upon returning, Aoki reported a marked difference between opposing slopes in the valleys that rose above these rivers. This had to do with how their steepness produced great differences in the amount of sunlight they received. Slopes facing north were forested, moist, and not well-suited to human habitation—along the Kashe and Danda some were covered in “glorious primeval forests.”<sup>92</sup> Slopes facing south received considerably more sun, and were thus drier. Moreover, this is where indigenes chose to live, farm, and hunt, and the drier micro-climate meant that fires spread very quickly. Cork oak, pine, and alder grew sparsely on these south-facing slopes. Aoki found the area to be far too large for there to be any hope of carrying out patient artificial planting. What could work, instead, was a sort of “natural afforestation” in which existing pines and alders were allowed to grow, and thus create conditions for oaks, Japanese baytrees, and *Castanopsis* could flourish. This would serve to promote water conservancy goals but would only be possible if “indigenous fire-setting is absolutely banned.”<sup>93</sup>

The most thorough study of this issue came in 1942 by Iwaki Kamehiko. Iwaki framed the long history of Taiwan’s native peoples through their relationship to forests and rivers. He repeated common tropes about the environmental profligacy of the Han settlers of Taiwan, who had laid the land to waste beginning in the 17<sup>th</sup> century and were still doing so today. Iwaki quoted Japanese novelist Sugiyama Heisuke’s observations of Han agriculturalists in the highlands, “The price of bananas has gone up recently, so all over southern Taiwan, from ridge to valley they strip the soil red and are planting bananas. Even if they understand perfectly well that doing this sort of thing will not only invite floods, but in the long run cause terrible damage to the soil, they don’t care a bit.... I had come to Taiwan with thoughts of the poetic feelings invoked by the banana stem, and the exoticism

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<sup>92</sup> The Danda watershed was in the process of being nearly entirely emptied of indigenous presence through relocations to Tamazuan, Isingan, and the eastward flight of Take-vatan Bunun to Hualian. See Chapter III; Yap, “Fen er zhi zhi,” 30.

<sup>93</sup> “Banjin wa chisui o sogai” [Savages hinder flood control], *Taiwan nichinichi shinbō*, March 17, 1940

aroused by the banana seed, but it would be safe to say that mountainsides under the occupation of banana fields are hideous.”<sup>94</sup> Sugiyama thus saw deforestation primarily as an issue of aesthetic degradation, one which squandered poetic potential and validated prejudicial views about Han Taiwanese shortsightedness. Such views were common in this period, and the despoilment of “beautiful forests” due to agricultural development could serve to motivate aesthetes to seek out landscapes in aboriginal land.<sup>95</sup>

In this sense of comparison with Han Taiwanese, Iwaki did not present indigenous Taiwanese as entirely profligate. Before Japanese rule, they dwelled in the mountains without disturbing “the great forests, which knew neither axe nor hatchet for one thousand years, and protected the watershed of every river” on the island. Nevertheless, Iwaki’s main orientation was not historical or aesthetic but functional. The “savage territory” was still largely in the hands of the Takasago people, and he wrote that the rich forestry and mineral products located there could be useful for their “operationalization” (操縦化育) towards imperial ends. This coincided with ongoing processes of relocation and sedentarization. Iwaki reported Bureau of Aboriginal Affairs calculations that the roughly 485,000 hectares of land indigenes occupied was twice what they “needed”—243,000 hectares would suffice not only to stabilize but even, the claim went, to improve their lives.<sup>96</sup>

Iwaki related a familiar condemnation of swidden agriculture as practiced in Taiwan’s highlands. He described the way that hillsides were cleared by cutting and burning then sapped of fertility and stripped of topsoil in a few quick years as “truly shocking.” While he acknowledged the

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<sup>94</sup> Iwaki Kamehiko, “Takasagozoku no tochi sen’yū riyō jōkyō to zōrin gaiyō” [Takasago tribes land occupation and use circumstances and silviculture summary], *Taiwan no sanrin*, May 1942, 18.

<sup>95</sup> Miura Ihachirō, “Taiwan no rinsō to fūkei” [Forest types and landscapes of Taiwan], *Fūkei*, January 1941, 5.

<sup>96</sup> Iwaki, “Takasagozoku no tochi,” 18-19.

Atayal practice of nitrogen-fixing afforestation, he saw highland agriculture as deficient in its lack of intensive, sustained production on a single piece of land. Intensification (集約化) was the goal, and Iwaki wrote with great pride about the progress that had been made in the 30-plus years since Governor-General Sakuma Samata had begun his first five-year plan for aboriginal pacification.<sup>97</sup> The key metric by which Iwaki judged the progress of intensification, relocation, and the civilizing process of indigenous Taiwanese more generally was the expansion of wet rice irrigation. The area of rice paddies within aboriginal districts went from a scant 31 hectares in 1916 to nearly 2500 by 1939. Iwaki expounded,

In this way, turning to rice paddy irrigation is the most ardent desire among Takasago people in the savage territory, and accordingly shifts in Takasago land use are also characterized by rice paddyism (水田中心主義). Their areas of residence have shifted from the former dispersed state to a concentrated pattern centered around paddy areas.... their method of swidden farming that relied on constant shifting cultivation and movement in search of fields has seen a great revolution—this fact is truly astonishing. As we witness a steep decline in shifting cultivation areas, the increase in paddies is also on other fronts having great effects in prevention deforestation and reckless reclamation securing sylvan resources, replenishing water sources, and intensive use of national territory.<sup>98</sup>

Insofar as this represented the realization of a longstanding government goal, a connection to the broader economic context of the Pacific War might not be apparent. Iwaki did make this connection, however, in justifying relocation and wet-rice agriculture as a strategy to save labor. Labor shortages related to war production across various industries were increasingly desperate in lowland regions, and the efficient production of calories through rice growing would allow indigenous Taiwanese to go and fill these jobs. In the mountains as well, they could play new roles in service of state ends. For example, in the remote village of Labwane (now Dawu, Wutai), police employed several dozen Rukai locals in an afforestation program, who because of good pay were

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<sup>97</sup> Iwaki, “Takasagozoku no tochi,” 20-21.

<sup>98</sup> Iwaki, “Takasago no tochi,” 22



welcoming of the work. This, Iwaki noted, helped indigenes learn to think like foresters. Former swiddens were quickly becoming woods of paulownia, tung tree, Chinese fir, and bamboo, which functioned to replenish water sources and supply timber for the future. This pointed to the development of “silvicultural thought.” Iwaki’s prescription for the highlands and native forestry was not exclusively about forest production and regeneration. Another feature of the war economy was a rising demand for charcoal. In his description of employing indigenous Taiwanese in charcoal production, it was clear that for Iwaki that “thinking like a forester” did not mean per se that native peoples should not cut trees. The logging and charcoal production they performed, instead, were to happen strictly on terms determined by the imperial government.<sup>99</sup>

*From Swiddeners to Imperial Soldier-farmers*

Accompanying the material demands of wartime in the highlands were intensified expectations for spiritual mobilization. The early stages of relocation sought to impose a Japanese normative ecology on resettled villages, but there was not a strong emphasis on making indigenes more like Japanese people. By the latter half of the 1930s, however, commentators increasingly described relocated villages as patriotic Japanese communities. One vivid description from May 1937, just months before Japan and China plunged into all-out war, read thus: “All of the tribes of the island now gladly submit to our impartially benevolent (一視同仁) rule of the island, with imperialization (皇化) widespread, and no matter how deep a village lies within the mountainous savage territory, all are at peace. There is not a single place where one does not hear *Kimi Ga Yo* [the national anthem] as the national flag is raised.”<sup>100</sup>

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<sup>99</sup> Iwaki, “Takasago no tochi,” 24-25

<sup>100</sup> Uemura Eikichi, “Takasagozoku to kōchi no kankei” [The relationship between the Takasago tribes and cultivated land], *Taiwan no suiri*, May 1937, 83.

The author, aboriginal affairs officer Uemura Eikichi (上村榮吉), was surely overstating the case. In the very same article, he noted with consternation that there were still places deep in the highlands where indigenes lived ecologically profligate lives that threatened environmental destruction and possible unrest. He wrote with pride of what he and his colleagues had achieved in relocation so far, “We banned their dissolute and wasteful use of the land, and out of necessity for the rational use of national land, selected and reserved just as much land as they needed, and settled them on that land.” Uemura was full of hope that this process would be extended to the remote mountainous areas that were still far from the reach of the state. Resettlement for him, as for his colleagues, was predicated on wet rice cultivation. Uemura claimed that resistance among resettled peoples had quickly given way to eager tutelage under passionate instructors, and he paid particular attention to the irrigation channels that were being planned to support rice paddies in indigenous villages. 24 different channels made the list in locations spanning across the island, with lengths exceeding four kilometers and costs running into tens of thousands of yen each. As of Uemura’s writing, work had only commenced on one of these channels. The meticulous planning nevertheless speaks to a vision of hydraulic integration for highland areas. Uemura wrote, “In a future where group relocation and the construction of irrigation facilities has stabilized their lives, their labor can serve other industries as part of highland development.”<sup>101</sup>

Beyond home-front labor, many indigenes came to participate in the war effort through fighting and dying for Japan on the front lines. This history is well-known among scholars (if under-reported in Japan), not least because the final holdout of the Japanese Imperial Army, an Amis named Nakamura Teruo (Attun Palalin) lived in the Indonesian jungle for nearly three decades after the end of the war, finally surrendering only in 1974. That indigenous Taiwanese, some of whom

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<sup>101</sup> Uemura, “Takasagozoku,” 88-92.

had resisted Japanese colonial rule so tenaciously into the 1930s, enthusiastically joined the war effort—and proudly clung onto imperial loyalism after the war’s end—has generated a good deal of popular and academic debate.<sup>102</sup> It appears that training of young indigenous men for the front lines was often paired with instruction in agriculture—both ways to better serve the empire. Although primary sources relating to Japanese wartime military matters can be difficult to find, attestations of this connection survive in American records. Intercepted and translated radio broadcasts describe training centers for young men in places ranging from Nan’ao in the northeast to Sandimen (now Pingdong) in the south. Here, training was oriented towards military skills, instruction “as worthy Imperial subjects,” and agricultural skills as well. Military service was not a permanent occupation, but rather a gateway to an identity as “soldier-farmers.” Similar broadcasts in 1944 also trumpeted the establishment of an “Agricultural Specialists’ Training Center” particularly oriented for helping indigenes acquire farming knowhow.<sup>103</sup>

These radio reports were in line with arguments that focused on pairing relocation and sedentarization with spiritual development. Writing in 1938, Baba Hiromu paid tribute to the toil aboriginal affairs officers had put in over the course of four decades; the resulting transformations protected downstream villages from floods and had transformed indigenes from “raw savages” into “savages” into “Takasago tribes.” Baba wrote, and “The path towards transforming the Takasago people into imperial subjects (高砂族皇民化の道) lays in promoting agriculture-based industry by use of the Japanese spirit, the imperial spirit (皇道精神).” Indigenes themselves, Baba wrote, were happy to be advancing along this path, such as one village chief in Xinzhu who professed gratitude

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<sup>102</sup> Ken’ichi Gotō, “Japan’s Southward Advance and Colonial Taiwan,” *European Journal of East Asian Studies* 3, no. 1 (2004): 38; Leo Ching, *Becoming “Japanese,”* 168-173.

<sup>103</sup> Office of Strategic Services, *The Programs of Japan in Formosa with Biographies and Organizations, Assemblage #48* (Honolulu: Research and Analysis Branch, OSS, 1944), 14, 16, 22.

at being given the opportunity to become an imperial subject.<sup>104</sup> The civilizational progress promised by resettlement and the transformation of swiddeners into wet-rice farmers, Baba implied, was part of the glory of joining the company of imperial subjects.

*Colonial Conservation after Empire*

In the fall of 1945, employees of Taiwan Electric salvaged a transformer from the unfinished Wushe power plant construction site, which they were then able to transport over the mountains to install amidst the wreckage of Sun Moon lake Power Plant #1. By December, when Strategic Bombing Survey personnel surveyed the site, this plant was using water from Sun Moon lake, flowing through damaged penstocks, to produce 18,000 kilowatts of electric power from a single transformer.<sup>105</sup> The full restoration of the hydroelectric complex would take much longer. But as Taiwan emerged from World War II and, after 1949, became the base of the Republic of China, hydroelectricity and Sun Moon lake powered its recovery. The Taiwan Electric Power Company was reborn in 1946 as the Taiwan Power Company (台灣電力公司), inheriting from its predecessor vast infrastructure and developmentalist momentum. Taiwan Power also inherited personnel, including experts in watershed management. As was the case elsewhere in postwar Republican China, some of these technical specialists were Japanese.<sup>106</sup> Hidaka Kōjirō (日高孝次郎) was one such individual, a forestry specialist with a long postwar career who stayed in Taiwan until 1953.<sup>107</sup> In a 1949 report, Hidaka and colleagues described Sun Moon lake as the “lifeline of industry” for Taiwan and wrote

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<sup>104</sup> Baba Hiromu 馬場弘, “Takasagozoku shinten no kōki” [A good opportunity for progress of the Takasago tribes], *Taiwan nōrin shinbun*, December 10, 1938.

<sup>105</sup> “Report of Formosa Bomb Damage,” 92.

<sup>106</sup> Daqing Yang, “Resurrecting the Empire: Japanese Technicians in Postwar China, 1945–49,” in *The Japanese Empire in East Asia and Its Postwar Legacy*, ed. Harald Fuess (Munich: Iudicium, 1998), 185–205; Seow, *Carbon Technocracy*, 246–247.

<sup>107</sup> Wang Guorui, “Taiwan linye renwu zhi xupian (8)” [Taiwan forestry biographies, sequel (8)], *Taiwan linye*, March 1993, 59.

with concern about the lax conservation enforcement that had prevailed since World War II, imperiling this lifeline's headwater regions. Preventing fire and ensuring afforestation would require learning instructing indigenes about the dangers of shifting agriculture, and the foresters suggested that Japanese-era policemen provided an educational model. The report did not call for a wholesale return to the Japanese system. In a departure from Japanese precedent, Hidaka and his colleagues described alder planting on fallow land as a beneficial custom that ought to be made more universal, and they made no mention of relocation.<sup>108</sup>

Relocation would come again, though under different terms. With American foreign aid and financial support, Taiwan's Republican government began in the early 1950s to expand hydroelectric capacity by repairing and completing work halted during World War II at the Tianlun Power Plant (天輪發電廠) on the Dajia river and the Wulai Power Plant (烏來發電廠), located along the Nanshi river upstream of Guishan, where Taiwan's hydropower had begun a half-century earlier.<sup>109</sup> After these came Wushe, where work on the dam began in 1953 and concluded in 1957. The wartime resettlement of Atayalic peoples from the inundation zone obviated the need for Taiwan Power to take on responsibility for clearing residents out of the way of the reservoir. Many indigenes did continue to reside, however, in the Wushe reservoir watershed that came into being with the dam's completion (see areas north of the dam in Figure 4.3). This overlapped with the area of Hidaka's survey, where in the 1950s shifting cultivation was still widespread. Indeed, without Japanese police to maintain irrigation channels, provide fertilizer, and crack down on illegal reclamation, many locals gave up wet-rice agriculture for swidden after 1945.<sup>110</sup> Republican

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<sup>108</sup> "Riyuetan shuiyuandi fangzhi shaoshan ji baolin banfa an" [Proposal on methods to prevent forest fires and protect forests in Sun Moon lake headwater areas], July 6, 1949, Record number 0040766107266002, Taiwan Historica.

<sup>109</sup> The Japanese had referred to Tianlun as Tianleng/Tenrei (天冷).

<sup>110</sup> "Riyuetan shuiyuandi," 8.

government agencies, Taiwan Power, and the Sino-American Joint Commission on Rural Reconstruction (JCRR) all viewed erosion above the Wushe reservoir as a threat to the functioning of Wushe reservoir and, by extension, the entire Sun Moon lake complex. Postwar watershed management programs—in both indigenous and Han areas—included firefighting measures and training and incentives provided to farmers for practicing terraced agriculture. Upstream of the Wushe reservoir, Taiwan Power took a more comprehensive approach to Toda and Truku Sediq swiddeners, offering them vocational training in handicraft production and even employment with the company.<sup>111</sup> Some sixty young Sediq men accepted training as linemen and moved, along with family members, to work for Taiwan Power in lowland towns. The farms they left behind were planted with trees in an effort to prevent rocks and topsoil washing into the reservoir.<sup>112</sup>

This vocational relocation differed from Japanese colonial efforts in scale and coercion. It aimed less at wholesale highland clearance than a thinning out of indigenous presence. Rather than concentrating indigenous settlements in the foothills to maintain a separation between lowland and highland, it sought to integrate natives into the social and economic life of the plains. It significantly carried on the upstream momentum described in this chapter, however, whereby the construction of hydroelectric infrastructure and study of forest hydrology came to increasingly implicate highland indigenous environmental practice in the functioning of that infrastructure. Robert E. Dils, a Colorado State University professor and a founder of watershed science, suggested to ROC leaders that Wushe provided portable lessons. In 1963, he wrote, “The problem of shifting agriculture on aboriginal reservations can be reduced in part by the methods applied by the Taiwan Power Company in the Wusheh watershed. Every effort should be made to retrain the people and where

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<sup>111</sup> Ira K. Landon, *Soil Conservation in Taiwan* (Taipei: Joint Commission on Rural Reconstruction, 1963), 202.

<sup>112</sup> Robert E. Dils, *Watershed Conditions Problems and Research Needs in Taiwan* (Taipei: Joint Commission on Rural Reconstruction, 1964), 12.

practical move them out of the mountains.”<sup>113</sup> While coercion and violence were lessened, this suggests that for Taiwan’s indigenous peoples, colonial conservation did not end with the collapse of the Japanese empire. The next chapter will address this directly through the example of Taiwan’s first multi-purpose dam.

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<sup>113</sup> Dils, *Watershed Conditions*, 15.

## Chapter V—Japanese Colonial Plans, American Aid, and Local Displacement in the Construction of the Shimen Dam in Republican Taiwan, 1948-1964

This chapter focuses on the planning, construction, and impact of the Shimen (石門) Dam, completed in 1964 and located along the Dahan river (大漢溪) upstream of Taipei.<sup>1</sup> Shimen is a rich site for understanding the remaking of colonial conservation in the decades following the collapse of the Japanese Empire and the arrival of the Republic of China in Taiwan. Drawing from Japanese colonial precedents, experience on the Chinese mainland, and global developments, Republican leaders sought to harness rivers to safeguard Taiwan's future. This took on greater urgency across the 1950s, as any prospect of swiftly retaking the mainland from the People's Republic receded from view. If the future of the Republic was to be on Taiwan, it would require economic expansion to keep up with population growth. The promise of a reservoir that could provide drinking water, irrigation, and hydroelectric generation—while additionally protecting from floods—situated the project, to boosters, as “one of the most vital economic projects ever undertaken on Taiwan.”<sup>2</sup> Matching the soaring ambition of the Shimen dam were its massive costs. The Chinese Nationalist Party (GMD), which ruled the Republic of China under a one-party system, found eager backers for the project in United States government allies. American technical assistance and funding were essential to building the Shimen dam, which in strengthening Taiwan supported Cold War goals while implementing a dam-anchored vision of development.

Shimen was Taiwan's first major multi-purpose dam. It represented a departure from the

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<sup>1</sup> The dam is most often referred in terms of the Shimen reservoir (石門水庫) in Chinese. Note that English-language sources usually use the Wade-Giles spelling “Shihmen,” and that the Dahan River was known through the mid-1960s as the Dakekan river (大嵙崁溪).

<sup>2</sup> International Cooperation Administration, “Press Release: ICA to Help Free China Start Largest Economic Project,” May 1, 1956, 1, in folder 2-520 (a) “Shihmen Dam Project,” RG59, NARA, College Park, MD.



Japanese colonial projects such as the hydroelectric Sun Moon Lake dam and the irrigation Wushantou dam that came before it.<sup>3</sup> Combining these two functions, and adding to them municipal water provision and flood control, was of a piece with the large dam development the United States supported across the globe in the Cold War.<sup>4</sup> But the versatility of multi-purpose dams in general, and Shimen in particular, belies the difficulty of using a single technology to accomplish multiple goals. People living downriver of Shimen witnessed this with a terrible clarity in September 1963, when the nearly-complete dam provided limited protection from widespread and deadly flooding brought on by Typhoon Gloria.

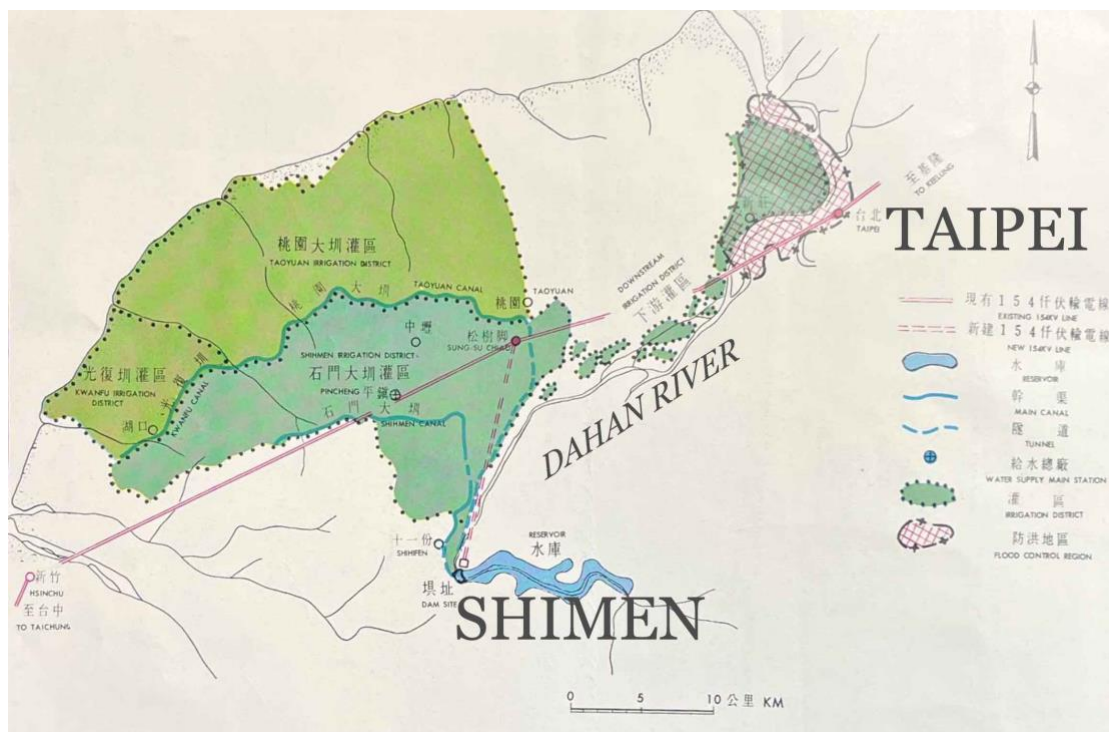


Figure 5.1: "Project Benefited Area, Shihmen Reservoir Project." This map shows how Shimen was designed to complement the colonial-era Taoyuan Irrigation System. Taipei and adjacent New Taipei City are the focus of the downstream "Flood Control Region." Note that no upstream areas are included within the "project benefited area."<sup>5</sup>

<sup>3</sup> As noted by Ma Chu-Ching, the Agongdian reservoir (阿公店水庫) completed in the early 1950s provided both irrigation and flood protection, but operated on a much smaller scale: Ma, "Rizhi shiqi Taiwan hechuan zhengce," 299-300.

<sup>4</sup> Sneddon, *Concrete Revolution*.

<sup>5</sup> Shihmen Development Commission, *Shihmen Reservoir Project* (Taoyuan, Taiwan: Shihmen Development Commission, 1964), inset, Waseda University Library.

Much like the floods of 1911 and 1912 described in chapter II, grappling with this destruction thrust flood control to the forefront of political and media discourse in Taiwan. This ushered in a revival of an emphasis on watershed protection, which stressed control over mountains as a prerequisite for flood control in a vocabulary of “govern the mountains to prevent floods” (治山防洪) that was but a slight adaptation of the Japanese slogan of colonial conservation: “govern the mountains to govern the waters” (治山治水). The presence of large dams, however, brought about a crucial transformation in the locus of watershed protection. A trend that had been nascent since the late colonial period reached maturity: the silt blocking up reservoirs and compromising all of a dam’s multiple functions became a threat as grave as flooding directly resulting from precipitation and erosion. The Shihmen reservoir became a technical object, one to be protected through conserving its watershed.

That watershed, along the upper reaches of the Dahan and its tributaries, is a mountainous and remote area inhabited then and now mostly by indigenous Atayal peoples.<sup>6</sup> Hydrology measurements and lifestyle prescriptions would come to define their environmental practices as threats to the precious reservoir of economic potential that Shimen represented. This process was slow and uneven, however. Damming the Dahan dispossessed people in another, far more direct way: it drowned their land. 2,729 Han and Atayal residents who lived near the river just upstream of the dam relocated to make way for the reservoir, in addition to 141 people living just downstream whose land was needed for the dam’s afterbay.<sup>7</sup> Across the late 1950s and early 60s, these people

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<sup>6</sup> “Shimen Reservoir Watershed” is a direct translation of the Chinese term (石門水庫上游集水區). The Atayal communities in this area belong to the groups Msbtunux (which includes inundated settlements), Mkgogan, Mrqwang, and Mknazi. Da-Wei Kuan 官大偉, “Yuanzhumin shengtai zhishi yu liuyu zhili yi Taiyazu Mrqwang qun zhi renhe guanxi wei li” [Indigenous Ecological Knowledge and Watershed Governance: A Case Study of the Human-river Relations in Mrqwang, Taiwan], *Dili xuebao* [Journal of Geographical Science] 70 (2013), 76.

<sup>7</sup> Shihmen Development Committee, ed., *Shimen shuiku jianshe zhi* [The Construction of the Shimen Reservoir] (Taoyuan, Taiwan: Shihmen Development Commission, 1966), 607-608.

moved into government-constructed model villages in marginal coastal and riverside land. In a bitter irony famous in Taiwanese environmental history, the Atayal relocation village was located along the Dahan just downstream of the dam. When the September 1963 typhoon threatened to overflow the reservoir and dam engineers released up to 9500 cubic meters per second of water into the river, this village was one of the first places to be destroyed.<sup>8</sup>

This is one dramatic demonstration of how, as this dissertation has argued, efforts to harness Taiwan's rivers and control their watersheds knit highland and lowland together in violent ways. Yet neither the Shimen dam nor the dispossessions it brought flowed seamlessly from Japanese plans. In recent years, historians of science, technology, and the environment have been at the cutting edge of tracing the afterlives of Japan's empire across the Pacific. While rejecting the end of World War II as a fundamental break in the way implied by much national history, this scholarship is most useful when it moves beyond binaries of continuity and discontinuity to give accounts of more finely-textured transformations.<sup>9</sup> This chapter will show the ways in which plans for the Shimen dam and the logic of watershed conservation it bolstered drew from Japanese colonial plans and other sources. To that end, the below begins with an overview of colonial designs to use water from the Dahan at Shimen before describing the process by which these were adapted and realized in Republican China.

### *Shimen as Frontier and Fount*

When the Japanese empire collapsed, one of the many schemes for transforming Taiwan left on the colonial drawing board was a great dam along the Dahan river. The location for this was Shimen,

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<sup>8</sup> “Kokufu no jumyō o chijimeta taifū 14-gō” [Typhoon No. 14, which shortened the lifespan of the Nationalist Government], *Taiwan Chinglian*/[The Young Formosan] No. 35 (October, 1963), 27.

<sup>9</sup> On transwar studies of technology and environment in the Japanese empire, see Seow, *Carbon Technocracy*; Christmas, “Japanese Imperialism and Environmental Disease”; Hiromi Mizuno et al, ed., *Engineering Asia: Technology, Colonial Development and the Cold War Order* (London: Bloomsbury Academic, Bloomsbury Publishing, 2018).

literally “stone gate,” where the river, flowing westward down a mountain valley, passes through a final pair of steep hills as it emerges onto the lowlands, where it abruptly shifts course, flowing towards the northeast, eventually meeting the Xindian river in Taipei’s south to form the Tamsui river.

At the beginning of the Japanese period, this gate marked a passage between the Han lowlands and the indigenous mountains. As seen in Figure 5.2, the “savage border” (蕃界) ran right through it, and many lowlanders had little idea of what existed above. Since Shimen was a border zone with easy access from Taipei, however, it did not long remain a periphery. A guard post here was one base for the slow but inexorable Japanese invasion of the highlands described in Chapter I. In serving this role it also became a target for Atayal attacks, with deaths recorded among both Japanese and Han guards and policemen across several incidents in 1904.<sup>10</sup> Buttressing of the guard line (隘勇線) followed this, along with an advance into the mountains, so that Shimen—much like Guishan—soon fell firmly within Japanese control.<sup>11</sup> Within a few short years, Japanese police forces and Han settlers alike moved up the Dahan beyond Shimen. An account by Han notable Lü Yingyang (呂鷹揚) describes early travails that met the founders of Amuping (阿姆坪) as they fought malaria and landslides in their efforts to build rice paddies and bring the area under cultivation.<sup>12</sup> This was the origin of Han hamlets in the area, which alongside Atayal ones would be inundated by the completion of the Shimen dam.

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<sup>10</sup> “Shimen aiyongxian zhi qianjin” [Forward advance of the Shimen guard line], *Taiwan nichinichi shinpō*, December 19, 1903; “Sekimon banjin no kyōgai” [Barbarian Savagery at shimen], *Taiwan nichinichi shinpō*, April 22, 1904. “Daichiku-kō bangai” [Savage attack at Dazhukeng], *Taiwan nichinichi shinpō*, August 27, 1904.

<sup>11</sup> “Dakekan aixian wancheng” [Dakekan Guard Line Completed], *Taiwan nichinichi shinpō*, November 9, 1906.

<sup>12</sup> Lü, “Amuping kaiken ji” [A Record of Reclaiming Amuping], *Taiwan kyōikukai zasshi* 99 (1910): 16-17.

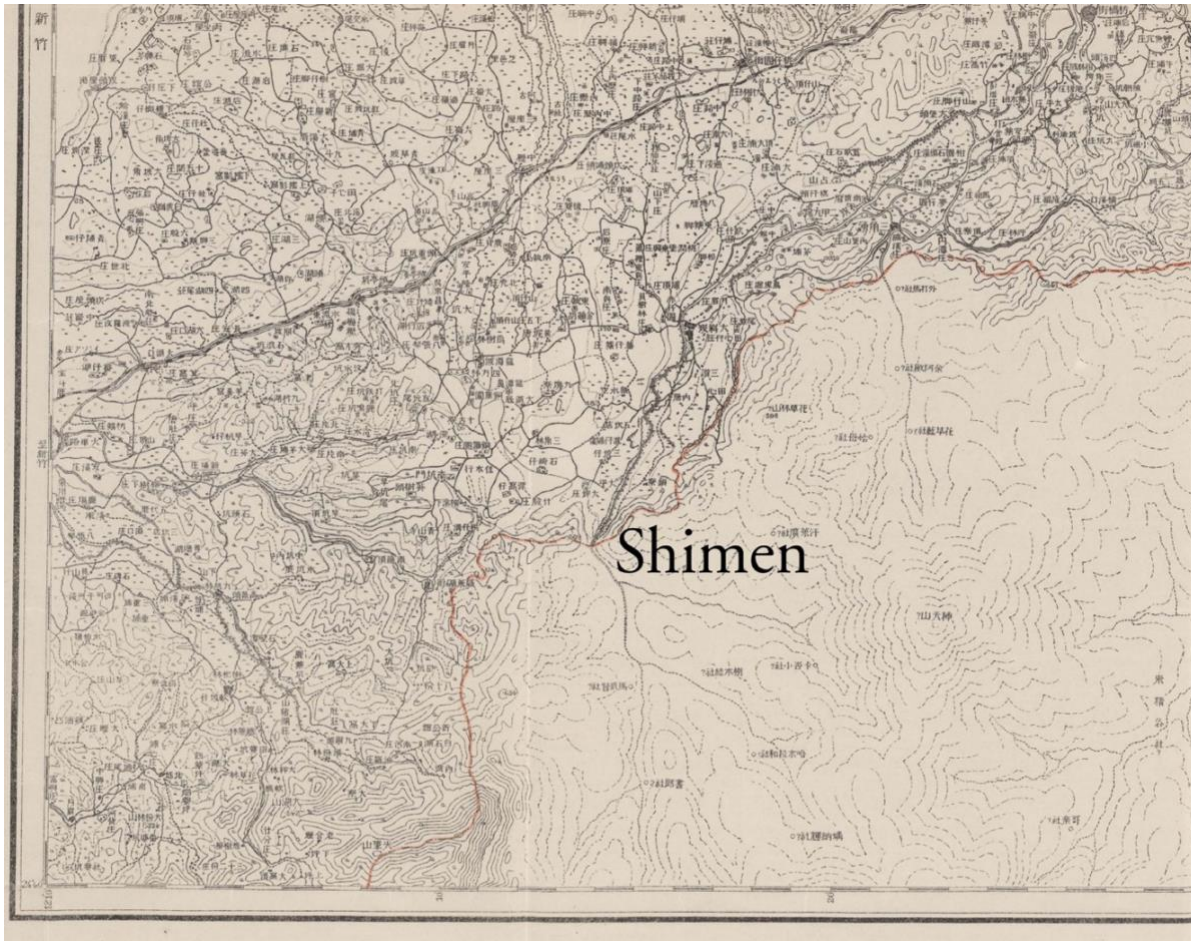


Figure 5.2: In this 1897 map, Shimen marks both a passageway between lowland and highland and a border between two distinct zones of political control and geographic knowledge.<sup>13</sup>

Consolidating control over this strategic point on the Dahan river opened up the possibility of drawing water from the Dahan for irrigation, whether through the construction of a dam or a system of aqueducts. Inspiration here came from multiple sites around the world. Tokumi Tsuneo (徳見常雄), who joined the Government-General several years after graduating from the Faculty of Engineering at Tokyo University, first proposed a massive irrigation system upon returning to Taiwan in 1902 from a tour of Java, the Philippines, Australia, and India. Irrigation dams in Maharashtra, western India, made a particular impression on Tokumi, who reported how

<sup>13</sup> “Taiwan kasei 20,000 bun 1 zu” [Taiwan 1:200,000 Scale, Sheet 1], (Tokyo: Rikuchi sokuryōbu, 1897), cropped. From Stanford University Digital Repository, <https://purl.stanford.edu/wc958mv2300>.

astonishing “manmade lakes created by blocking up valleys” stored water from the rainy season for the dry season. Tokumi proposed that the methods used to create the Bhatgar and Fife (now Khadakwasla) reservoirs ought to be implemented in Taiwan.<sup>14</sup> It is not clear, contra accounts given by other historians, that Tokumi ever specifically identified Shimen as the site for this massive irrigation dam.<sup>15</sup> In any event, Tokumi’s proposal was not met with the massive funds it would require to carry out. Tokumi was able, nonetheless, to maintain an interest in observing practices around the world that might prove useful back in Taiwan.

In 1909, he visited Crystal Springs dam in California and interviewed its designer, Hermann Schussler, with a view towards dam designs that could withstand earthquakes. As Tokumi told a reporter from the *San Francisco Chronicle*, “By storing water in reservoirs in the mountains and bringing it to the level lands in the dry seasons it will be possible to raise two crops each year instead of one.”<sup>16</sup> What Tokumi did not mention in this American interview was that storing water in the mountains would require subjugating the indigenous peoples living there. This point was unambiguous the next year, when Tokumi’s department within the Government-General, the Department of Public Works (土木部), dispatched technicians for a survey of the Dahan river. Noting that “recent aboriginal pacification movements [were] coming to an end,” the *Taiwan nichinichi shinbō* reported, “Because [the Dahan] was conventionally outside of the Guard Line it was not possible to conduct a survey. However, broadly speaking, the hope was to build a great dam near Shimen to create a reservoir and send this through channels for irrigation.” This is the first

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<sup>14</sup> “Kangai kōji” [Irrigation works], *Taiwan nichinichi shinbō*, June 27, 1902; *Rinji Taiwan tochi chōsakyoku dai-ni kai jigyō hokokoku* [Temporary Taiwan Land Survey Bureau Second Project Report] (Taipei: Rinji Taiwan chōsakyoku, 1904), 202.

<sup>15</sup> Chun-Ming Huang and Yu-Chen Jian, “Taiwan ni okeru Sekimon damu no keikaku katei n ikan suru kenkyū” [A Study on the Planning Process of Shih-men Reservoir Project in Taiwan], *Dobokusbi kenkyū* 32 (2012), 299; Jiang et al, ed., *Lao dangan li de shimen shuiku* [The Shimen reservoir in old archives] (Taoyuan: Beiqu Shui Ziyuan Ju, 2019), 7.

<sup>16</sup> “Japan Plans Vast Irrigation Scheme: Representative Arrives Here to Study Methods Used in California,” *San Francisco Chronicle*, August 31, 1909.



clear evidence of the plan for a dam at Shimen. Although reports from this survey do not survive, the transformative potential attributed to the dam project was significant: the article concluded by stating that the Dahan's “destiny is to serve as a great fuse for the development of the savage border (蕃界開發の一大導火線) along Taipei, Taoyuan, and Xinzhu.”<sup>17</sup>

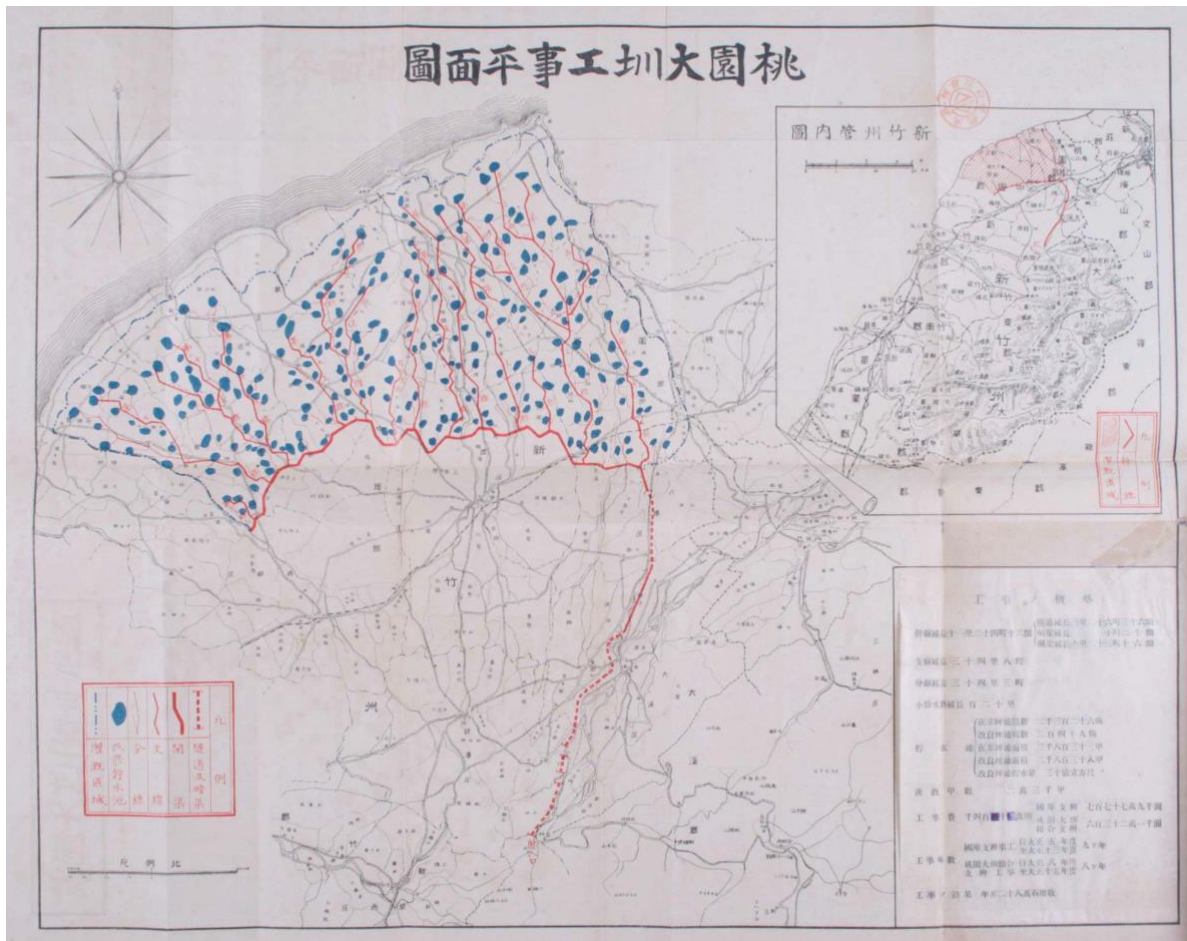


Figure 5.3: The Taoyuan Irrigation System. Shimen is located near the bottom of the map, at the beginning of the red line, as it was the source of the aqueduct that fed the system.<sup>18</sup>

While the colonial government did not undertake a massive dam-building project, Shimen was nonetheless vital as the source of water for the Taoyuan Irrigation System (桃園大圳). As early as 1907, plans were developed for an irrigation channel that would travel north and use water from the

<sup>17</sup> Daikokan suigen chōsa” [Daikokan Headwater Survey], *Taiwan nichinichi shinbō*, September 28, 1910.

<sup>18</sup> *Tōen taishū* [Taoyuan Irrigation System] (Xinzhu: Xinzhu State, 1924), inset, Taiwan National Library.

Dahan to expand agricultural productivity in rice-growing areas along the coast of Taoyuan. No major rivers flow through this area, and its slight elevation precluded irrigating it directly from downstream reaches of the Dahan. This project also promised to align with Government-General goals of replacing the patchwork, private system of irrigation ponds and ditches with a streamlined, state-controlled one. Optimistic initial reports predicted completion by 1910. Work on the project did not in fact begin until 1916 and stretched until 1924. As seen in Figure 5.3, the finished product maintained the original plan, with roughly twenty kilometers of aqueduct carrying water from Shimen through brick tunnels and open channels to the distribution point, where it was dispersed among tributary aqueducts. Irrigation ponds could be filled when water was in low demand to ensure that double cropping of rice would be possible both in the area served by the Taoyuan Irrigation System and in other areas dependent on the Dahan River.<sup>19</sup>

While the Taoyuan Irrigation System that ended up being built under Japanese rule stopped short of the grand dreams for a Shimen dam, it likewise grew out of global inspiration and the security guaranteed by the advance of the Japanese guard line. Taoyuan was a crucial precedent for the even larger Jianan Irrigation System (嘉南大圳) in southwestern Taiwan, seen today as one of the signature public works achievements in Japanese Taiwan. The Jianan Irrigation System (completed 1930) and Sun Moon Lake Hydroelectric Plant (completed 1934) both implemented visions of what Shimizu Misato has called “colonial development” centered on large dams.<sup>20</sup> At several points, Japanese engineers revived proposals for a Shimen dam. Hatta Yoichi (八田與一), whose contributions to irrigation works at Taoyuan and particularly Jianan granted him lasting fame,

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<sup>19</sup> “Tōen no kan’ei hishū” [Government Irrigation Ditches and Channels in Taoyuan], *Taiwan nichinichi shinbō*, July 23, 1907; *Taiwan sōtokufu naimukyoku shukan doboku jigō gaiyō* [Summary of Public Works Projects by the Home Bureau of the Taiwan Government-General] (Tokyo: Naimu-kyoku, 1927), 65-73; Kobayashi Shigeru et al, “Development of Irrigation and Land-Use Changes in the Taoyuan Tableland, Taiwan: Application of GIS Analysis,” *E-journal GEO* 9, no. 2 (2014), 177-178.

<sup>20</sup> Shimizu, *Teikoku Nihon no “kaihatsu.”*



proposed a massive concrete dam as part of a comprehensive plan for northern Taiwan's waterways in 1929. Reflecting worldwide trends towards multi-purpose dam planning, Hatta envisioned irrigation, hydroelectricity, and flood control as unified functions of this dam. The projected cost of 60 million yen put its cost on par with the Sun Moon Lake and Jianan projects, however, and the idea seems not to have attracted serious consideration.<sup>21</sup>

#### *Adapting Colonial Plans for Republican Goals*

While a Japanese colonial vision for a great multi-purpose dam at Shimen survived the ravages of World War II and the collapse of the empire, precise plans for how the dam was to be built did not. Several sources point to the lack of detailed designs, including project leader Xu Nai (徐鼎), who wrote that Japan had left “only a few fragmentary and incomplete records.”<sup>22</sup> At the same time, hydrological records for the area did stretch back into the colonial period, providing data on precipitation back to the late 1890s and river discharge at the Shimen site from the late 1920s. These data were promising, and bolstered the case, as the commissioner of the Sino-American Joint Commission on Rural Reconstruction put it, that the dam project was a “very worthy one.”<sup>23</sup>

Interest in the project among Japanese colonial authorities was never high, and there no references to it from the late 1930s into the early 1940s, when the imperial economy increasingly focused on industrial mobilization for war. By contrast, the Chinese Nationalist government began surveying for the dam within a few years of taking control of Taiwan. To an extent, this reflects the simple fact that by the 1930s, Taiwan was a small part of Japan's growing empire, while after 1949 it represented nearly the entire territory under GMD control. Taipei and environs had paramount

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<sup>21</sup> Ma, “Rizhi shiqi Taiwan hechuan zhengce,” 297-299.

<sup>22</sup> Xu Nai, *Shimen shuiku* [The Shimen reservoir] (Taoyuan: Shihmen Development Commission, 1965), 7.

<sup>23</sup> R.H. Davis, “Shihmen Dam Project,” October 29, 1954, in folder “Taiwan–Shihmen Dam,” RG 469, NARA.

political and economic importance. Even when a resumption of active conflict with the People's Republic was most urgently anticipated, the needs of Taiwan's population—native and recently arrived—could not be ignored. Scarce water in the dry seasons exacerbated social conflicts, while the summer scourge of flooding continued. By the 1950s, dam-building also became an instrument to mobilize American aid.

In the summer of 1948, Republic of China military leader Chen Cheng (陳誠) put Shimen on the map when, according to official accounts, he happened to go sightseeing in the vicinity and beheld the site's "magnificent scale." Chen served as provincial chairman (equivalent to governor) the following year and later as ROC premier and vice-president that, and in all capacities was dedicated to seeing the project through. His advocacy focused on the dam's potential for boosting agricultural production, which would feed a rapidly growing population while freeing up labor and resources for industry. Plentiful water and greater harvests would likewise ease the implementation of land reform. This began with rent reductions in 1949 and proceeded in the 1950s with government purchase of landlord-held land and sale of it back to tenants.<sup>24</sup>

As under Japanese rule, cost was the overarching obstacle to moving forward with plans to build a dam at Shimen. By 1951, a provincial assembly member was demanding answers as to why the longstanding designs had yet to be translated into action. In response to suggestions that talk of dam building risked becoming "useless and idle prattle," the head of the Provincial Department of Reconstruction explained that the \$36 million USD estimated to be required was simply a figure that the Republic of China government could not cover by itself. Negotiations were thus underway to secure support from the Food and Agriculture Organization, a United Nations Agency.<sup>25</sup>

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<sup>24</sup> Xu, *Shimen shuiku*, 27-28.

<sup>25</sup> *Taiwan sheng canyihui di-1 ji di-11 ci dabui teji* [Special Records of the 11<sup>th</sup> Meeting of the First Taiwan Provincial Representative Council], 89-90, Record Number 001-01-11OA-00-6-4-0-00100, Digital Repository of Taiwan Provincial Assembly.

While UN backing did not materialize, preliminary Republican government studies began the following year.<sup>26</sup> Soon, rather than explaining delays, authorities had to begin working to justify the cost. Ministry of Economic Affairs (經濟部) documentation makes clear that criticism—much of it within the government—pointed towards a greater cost per irrigated acre than that had been attained by recent projects in the United States or pre-World War II projects in mainland China—projects that many of the planners had direct experience with.<sup>27</sup> The response to such criticism was that such “continental” metrics couldn’t be used to assess projects in Taiwan, and that multidimensional economic benefits would assure that construction costs were recouped within a few decades. Beyond that, the dam would make money for many years to come. While recognizing that siltation could compromise reservoir usefulness in Taiwan, internal reports contended that the Dahan contained low levels of sediment, and that thus, “according to the most conservative estimates, following its completion the Shimen reservoir’s lifespan could reach from 500 to 750 years.”<sup>28</sup>

Similarly grandiose assurances as to the dam’s ability to prevent floods appeared in the wake of Typhoon Nina, which led to widespread flooding in northern Taiwan in August of 1953. Water Conservancy Bureau chief Zhang Xishou (章錫綬) visited inundated sections of Zhonghe, Taipei, and explained that in the future, torrential outflows from mountain streams along the Dahan would be contained by the dam. Even with floodwater flowing into the Tamsui from the Xindian—its other main tributary—Taipei and its suburbs would “permanently” be saved from the threat by

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<sup>26</sup> *General Report of the Joint Commission on Rural Reconstruction* (Taipei: Joint Commission on Rural Reconstruction, 1955), 145.

<sup>27</sup> For background on such projects, see David Pietz, *Engineering the State: The Huai River and Reconstruction in Nationalist China, 1927-1937* (New York: Routledge, 2002).

<sup>28</sup> “Shimen shuiku yu Taiwan jingji jianshe” [Shimen Reservoir and Taiwan’s Economic Reconstruction], 3-6, in *Shimen shuiku xingjian jihua* (Shimen Reservoir Construction Plan), Record Number 040-010407-0001, Academia Historica, 184-187.

flooding, “regardless of the amount of rain.”<sup>29</sup>

*“TVA of the Far East”: Mobilizing American Aid*

In technical and diplomatic contexts, officials made the case for the Shimen dam in more sober terms. The most important organization in securing funding for the dam was the Sino-American Joint Commission on Rural Reconstruction (JCRR). Describing the JCRR’s role is revealing both in how the cash-strapped Republican regime called upon American support to finance the massively expensive dam and in how partnership with the US helped fit Shimen into an imaginary of American (rather than Japanese) dam-led development.

In 1954 JCRR joined several organs of the Republican government and the semi-public Taiwan Power Company in formally establishing the Shimen Planning Commission (石門水庫建設委員會) under the aegis of the Ministry of Economic of Affairs. JCRR provided a grant of nearly three million New Taiwan Dollars to carry out topographic, geological, economic, hydrological, and meteorological surveys of an areas including the irrigated district, the project area, and the Dahan watershed.<sup>30</sup> While this work was underway, the JCRR Commissioner wrote to the Foreign Operations Administration (FOA) in anticipation that the ROC would make a request for support.<sup>31</sup> When this request formally came through, to the order of \$12,434,000, officials at the FOA’s successor organization, the International Cooperation Administration (ICA), noted that the JCRR “urges initiation of this project as the next step in agricultural development in Formosa.”<sup>32</sup> There

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<sup>29</sup> “Shi Beishi yong bu shou shuihuan” [Making Taipei eternally safe from water disasters], *Zhongyang ribao*, August 18, 1953.

<sup>30</sup> “A Summary of Shihmen Reservoir Project,” September 8, 1954, in folder “Taiwan–Shihmen Dam,” RG 469, NARA.

<sup>31</sup> R.H. Davis to Frank Turner et al, “Shihmen Dam Project (Formosa),” October 29, 1954, in folder “Taiwan–Shihmen Dam,” RG 469, NARA.

<sup>32</sup> E. W. Holmgreen to William F. Russell, “The Proposed Shihmen Multipurpose Dam Project–Formosa,” in folder “Taiwan–Shihmen Dam,” RG 469, NARA.

was skepticism, however, within the ICA. This had to do with both the technical difficulty of building a massive dam and the propriety of sending such sums overseas. American bureaucrats were concerned about tough questions from Congress and were dubious of the ROC claim that the dam would be built even if American support was not provided. As one wrote, “As a matter of fact, the Chinese could not build this dam ‘without U.S. Aid.’ Inasmuch as we are making up the deficit in the Chinese budget... the U.S. Taxpayers will be footing the bill.”<sup>33</sup>

Despite such misgivings, action from relevant U.S. authorities coalesced in favor of the project. A technical review conducted by the Bureau of Reclamation and supported by officials who traveled to Denver from Taiwan found the project “well-planned, economically justifiable, and financially feasible.”<sup>34</sup> On a 1955 visit to Taiwan, Undersecretary of State Herbert Hoover Jr. was impressed by a presentation on the project’s benefits by provincial chairman and thereafter expressed his support.<sup>35</sup> Forestalling looming food shortages in a close ally (shortages which would only necessitate more US aid) was a key American motivation. More broadly, the ICA saw the project as “enhancing the prestige of the Chinese government both at home and abroad and, by reason of its contribution to the productive capacity of Taiwan, the project would add to the military strength of the island.”<sup>36</sup> While concerns over costs lingered, outlays for Shimen represented a relatively small proportion of overall American expenditures in Taiwan in the mid-late 1950s: the

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<sup>33</sup> Ibid.; quote from: W. F. Dickson to E. W. Holmgreen, “Shimen Dam–Formosa,” August 11, 1955, in folder “Taiwan–Shihmen Dam,” RG 469, NARA.

<sup>34</sup> Everett Eslick to A. K. Hamilton, “Shihmen Multipurpose Hydro Project,” September 12, 1955, in folder “Taiwan–Shihmen Dam,” RG 469, NARA; quote from “Press Release: ICA to Help Free China,” 2.

<sup>35</sup> Robert G. Barnes to The Under Secretary [Herbert Hoover, Jr.], “United States Contribution to Construction of Shihmen Dam, Taiwan,” May 2, 1956, in folder 2-520 (a) “Shihmen Dam Project,” RG59, NARA.

<sup>36</sup> ICA Taipei, “Shihmen Multi-Purpose Project,” September 30, 1955, in folder “Taiwan–Shihmen Dam,” RG 469, NARA.

U.S. aid program topped \$70 million a year in this period.<sup>37</sup> Congressional criticism did emerge, most pointedly from Senator Allen Ellender, who inveighed against a suspect ICA bidding process and the project's ballooning budget. While routine for Ellender, who for years sought to cut foreign aid "to the bone," such scrutiny of Shimen in particular was not typical in American government and media.<sup>38</sup>

Several commentators put Shimen into a familiar frame for Americans by likening it to Tennessee Valley Authority (TVA) projects. As David Ekbladh has written, the imaginary of the TVA was a powerful symbol of American aid globally.<sup>39</sup> Journalist Thomas L. Stokes described the TVA as a "particular American idea [that] has been, and is being, copied all over the world," and described the Shimen dam as "only one of several TVAs or partial TVAs to which we are contributing financially."<sup>40</sup> A consulting American soil conservationist who had dispensed technical advice on watershed protection reported that the project was "already being labeled the TVA of the Far East."<sup>41</sup> Tennessee's example indeed loomed large in Taiwan. ROC hydrologist Song Xishang (宋希尚), who had a long pre-WWII career in mainland China, devoted long sections of his 1956 *New Theory of Flood Control* (治水新論) to examples drawn from the TVA.<sup>42</sup> Shimen planners

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<sup>37</sup> "Press Release: ICA to Help Free China," 3.

<sup>38</sup> "Ellender to Fight More Foreign Aid," *New York Times*, April 21, 1956; 美參院撥款委會辯論石門水庫貸款["US Senate Appropriations Committee Debates Shimen Reservoir Loan"] *Lianhebao*, April 12, 1959; 86<sup>th</sup> Congress, 1<sup>st</sup> Session, *Congressional Record*, July 2, 1959: S 12590-12598.

<sup>39</sup> *The Great American Mission: Modernization and the Construction of an American World Order* (Princeton: Princeton University Press, 2011). On links between the TVA and the ROC in mainland China, see Pietz, *Engineering the State*, Ying Jia Tan, *Recharging China in War and Revolution, 1882-1955* (Ithaca: Cornell University Press, 2021), especially Chapter V. Tan also describes Sun Yun-suan, ROC Premier from 1978 to 1984, and his role as a TVA-trained engineer in forming the Taiwan Power Company after World War II, see 140-143.

<sup>40</sup> "TVA Now Benefits World," *Detroit Free Press*, July 10, 1955.

<sup>41</sup> I. [Ira] K. Landon, "Conservation on "Terraced Bay,"" *Soil Conservation* 22, no. 7 (1957), 166.

<sup>42</sup> Song Xishang, *Zhishui xinlun* [New Theory of Flood Control] (Taipei: Zhonghua Wenhua Chuban Shiye Wenhuanhui, 1956). See for example the section on multi-purpose plans, 70-91.

consulted TVA policy for details such as compensation for landowners who would be relocated out of the inundated area.<sup>43</sup> Hydrologists in Taiwan understood TVA both as a key to American strength and the type of multipurpose development it represented as transformative for Taiwan.<sup>44</sup> By this line of thinking, the inadequacies of Japanese hydraulic development, namely the Sun Moon Lake and the Jianan Irrigation projects, lay in a blinkered pursuit of a single goal.<sup>45</sup>

Describing a dam as “multipurpose” can misleadingly suggest a parity amongst various functions, which in practice—as I explore below—is rarely achieved or desired. That being said, the basic multipurpose design of Shimen *was* a departure from precedent on Taiwan. The exaggeration by both American and GMD commentators lay in attributing this to the overwhelming power of TVA influence. Japanese colonial plans for Shimen from the 1920s and 30s, coeval with the early TVA, identified the multiple functions hydroelectric generation, irrigation, and flood control. Eliding this fact minimized continuity with colonial times while underlining American influence.

### *The Quandary of Multiple Purposes*

To much of the Taiwanese public, Shimen’s power lay in its unified productive and protective capacities. Those who studied the dam’s multiple purposes in detail, however, often found them to be imperfectly aligned or even in conflict. One expression of this lay in describing certain functions as primary and others as lower priority. The initial 1955 plan for the dam explained it thus: “When it comes to these multiple purposes, making optimal use of the dam for each of the use creates

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<sup>43</sup> Shihmen Development Committee, *Shimen shuiku jianshe zhi*, 608.

<sup>44</sup> The idea and example of the TVA was powerful in Japan as well. On the prewar Japanese empire, see Moore, *Constructing East Asia*, 162; on postwar Japan see Dinmore: “Concrete Results?” and “High-Growth Hydrosphere”. Other parallel cases include Vincent Lagendijk, “Streams of knowledge: river development knowledge and the TVA on the river Mekong,” *History and Technology* 35, no. 3 (2019): 316-337; Seohyun Park, “Reassembling colonial infrastructure in Cold War Korea: the Han River Basin Joint Survey Project (1966-71),” *History and Technology* 37, no. 3 (2021): 329-354.

<sup>45</sup> Xu Yansun (許硯蓀) and Zhang Shaohui (張劭會), “Taiwan hechuan yu shuiku jianshe” [Taiwan’s rivers and reservoir construction], in Taiwan yinhang jingji yanjiushi, ed., *Taiwanian zhi hechuan* [Taiwan’s Rivers] (Taipei: Taiwan Yinhang, 1966), 166.

conflicts among each in terms of the need to store or release water in the reservoir... As for the ranking of priorities... it has been decided that flood control will be first, followed by public water supply, next by irrigation, and after that by hydroelectric generation.”<sup>46</sup> Writing in the same year, American officials charged with evaluating the project proposal described it rather different terms. They characterized its benefits (not synonymous with its goals) as having primarily to do with irrigation and a concomitant increase in food production, and they relegated other outcomes to the category of “incidental benefit.”<sup>47</sup>

Working out these priorities mattered both for how the dam would be financed and how it would be run. Allocating the project costs for power generation in particular determined the extent to which the electric utility, Taiwan Power Company, would fund construction.<sup>48</sup> As a practical matter, as implied above, demand for different functions implied different schedules of retaining or releasing water. As initial plans prioritized flood control, this meant maximizing available space in the reservoir during the summer, when the potential of flooding was the greatest. Figure IV, shown below and compiled during the dam’s initial planning on the basis of precipitation records and projections, suggests some of these problems. Electricity demand was greatest in the winter, when precipitation was the lowest. The reservoir level would get lower over this period, and by May reach its low point, due to both declining precipitation and drawdown for the first planting of rice that began in late March. This low level accommodated the onset of the rainy season, which would bring levels back up. More threatening in terms of flooding, however, were typhoons in late summer in. This was the same time frame in which water needed to be held in the reservoir to irrigate the year’s

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<sup>46</sup> Shihmen Planning Commission, *Shimen shuiku gongcheng dingan jibua baogao* [Definite Plan Report on Shihmen Reservoir Project] (Zhongli, Taoyuan: Shihmen Planning Commission, 1955), 59.

<sup>47</sup> Everett Eslick, “Shihmen Multipurpose Hydro Project; Abbot K. Hamilton to William F. Russell, “Proposed Shihmen Multi-Purpose Dam Project,” July 20, 1955, in folder “Taiwan–Shihmen Dam,” RG 469, NARA.

<sup>48</sup> *Shimen Reservoir Construction Plan*, Record Number 040-010407-0001, 104.



second rice planting; drawing the reservoir down to accommodate the latter risk would compromise the previous function.

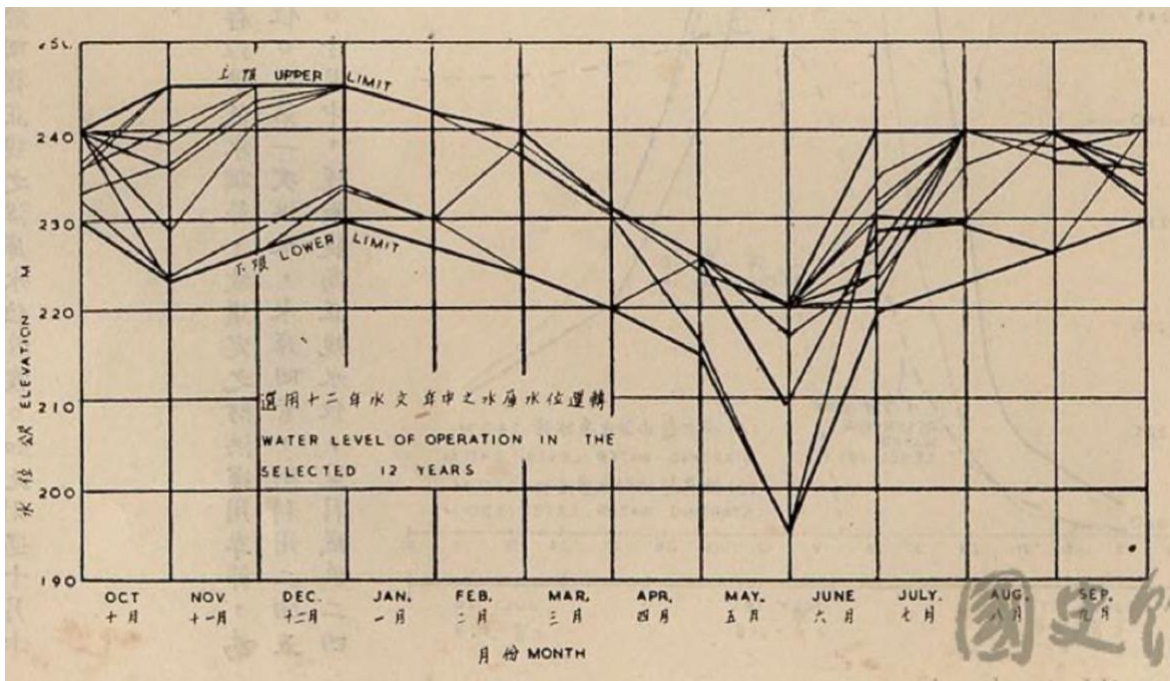


Figure 5.4—Projected range of the Shimen reservoir's under various precipitation and operation scenarios.<sup>49</sup>

Internal planning documents described multiple functions as priorities that needed to be properly ordered, but rarely dug into the potential conflicts between them. American engineering consultants retained by the ROC's Water Resources Planning Commission (水資源統一規劃委員會) used starker language to describe the quandary of attempting to store water in a reservoir that ought also remain empty to protect against floods:

The use of storage reservoirs to conserve flood flows for future use and at the same time provide flood control would be a practical impossibility or, at best, an operational nightmare. Flood flows in Taiwan can occur in any sequence and at any time during the typhoon season. Therefore, in order to have flood protection, the reservoir should be kept empty throughout the season. It would take almost divine judgement to decide to hold a full reservoir from one flood on the chance that no more floods would occur that season.<sup>50</sup>

<sup>49</sup> *Shimen shuiku gongcheng dingan*, 59, Academia Historica.

<sup>50</sup> Water Resources Survey Team, Engineering Office of Clyde C. Kennedy, *A Report on Water Resources Planning in Taiwan* (San Francisco: Engineering Office of Clyde C. Kennedy, 1958), page 6–8. This is a single page, note the unusual pagination.

Because this precluded “the combination of flood control and conservation functions in the same volume,” the American engineers suggested that flood control might better be accomplished through alternative measures such as downstream levee work.<sup>51</sup>

Matching this less sanguine view about the ability of multipurpose dams to prevent floods in Taiwan were warnings about flood risks. In the report’s view, much of the extant precipitation and water level records gave little insight into flood flows historically. Stations that recorded only river stage (height) failed to control for shifting channel and streambed characteristics. Measurement of sediment load in streams and rivers, while also having a long history stretching back into the 1910s, was also often haphazard, sometimes relying on “improvised samplers such as wine bottles.”<sup>52</sup> This complicated efforts to forecast both the siltation of rivers and the risk of future floods. Solutions included both watershed conservation measures, such as check dams, and zoning that would prevent development in flood-prone areas. The report asked, “Why allow a village to become established within the area or allow an established village to become a city if flooding is inevitable?”<sup>53</sup>

There are no records directly attesting to responses to this report. Most residents of Taiwan understood that geography and meteorology made floods a fact of life. Flood control was not flood prevention, and amelioration would require comprehensive measures to attenuate river flows and minimize risk for vulnerable areas. It is also the case, however, that state descriptions endowed Shimen with awesome flood control capabilities. Moreover, relocation policy ended up doing rather more than “allowing a village to become established”—it moved Atayal residents directly from Msbtunux to a gravelly riverbed where flooding was inevitable and, it just so happened, imminent.

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<sup>51</sup> Water Resources Survey Team, *Report on Water Resources Planning*, 10–5.

<sup>52</sup> Water Resources Survey Team, *Report on Water Resources Planning*, 7–15, 7–27, 10–5.

<sup>53</sup> Water Resources Survey Team, *Report on Water Resources Planning*, 6–11.

*Planning Reservoir Relocation*

As the Shimen Planning Commission members and consulting engineers worked to assemble troves of data and map out the massive logistical undertaking of building the dam, the issue of clearing land upstream of the dam that would be inundated by the reservoir was a marginal concern. This partially reflected the relatively minor cost required. When the Commission finalized its *Definite Plan Report*,<sup>54</sup> in 1955, it estimated that purchasing land in the inundated zone would cost \$4.3 million NTD and that relocating villages from that land would require another \$4.5 million NTD, for a total of \$8.8 million NTD or (by contemporary exchange rates) \$562,300 USD.<sup>54</sup> With a total budget reaching nearly \$55 million USD, this was little more than one percent of overall expenditure.<sup>55</sup> The calculation of the costs for land acquisition was based on a 1954-1955 survey of the inundated area, which found that 2,214 people lived there and farmed 141.14 hectares of rice paddies; the initial survey additionally assessed the value of their residences and property.<sup>56</sup>

Relocation, although a small part of the dam project when measured by expenditure or by the attention paid to it by commentators at the time, represented a significant transformation brought by damming the Dahan. As this dissertation has argued, efforts to harness rivers brought the plains, foothills, and mountains of Taiwan together through material, discursive, and social processes that often dispossessed highland residents. Shimen exemplifies this in two ways. The first is the focus of the following section: the relocation of Hoklo, Hakka, and Atayal residents who lived in the area inundated by creation of the Shimen reservoir. The second, which I will return to at the end of the chapter, has to do with the consequences of upstream areas becoming part of the “Shimen reservoir watershed,” through which local environmental practices came to have direct consequences for

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<sup>54</sup> *Shimen shuiku gongcheng dingan*, 167.

<sup>55</sup> *Shimen shuiku gongcheng dingan*, 167, 171.

<sup>56</sup> *Shimen shuiku gongcheng dingan*, 2, 8.

reservoir management.

In contrast to the often-violent punitive relocations under Japanese rule described in earlier chapters, the Shimen Planning Commission professed a commitment to “respecting the interests of landholders.” Prices for purchases from landholders were negotiated over, and in over 95% of cases the two sides were able to reach an agreement. The Commission additionally provided compensation for property on the land, including buildings, crops, graves, and investments that had raised the value of the land. Only roughly half the land the Commission acquired was for the reservoir itself: it also needed land for the dam, power plant, afterbay, a nearby quarry to mine rock fill, and the various irrigation, public water supply, and electric networks emanating from Shimen.<sup>57</sup>

The area that was to become the reservoir extended from the dam site around 16.5 kilometers upstream, encompassing everything under 250 meters in elevation, which was to be the reservoir’s maximum height. The area’s steep topography meant that this did not cover a large area in all sites along the river. But several stretches of low land near the riparian zone encompassed communities that were set to be drowned, where some 2729 people lived in 402 households. Of these, 288 were Han (both Hoklo and Hakka), while 128 were indigenous—longtime Msbutunux Atayal residents. These upstream communities included 710 tenant farmers and 714 people classified as “half-independent farmers” (半自耕農). While such people did not own land for which they could be compensated, any loss of property was also eligible for compensation. In addition to farmers who owned their own land (“independent farmers” 自耕農), “half-independent farmers” also qualified for relocation to the “new migrant villages” (移民新村): new settlements whose construction the Commission was overseeing. Consonant with “land-to-the-tiller” goals of land reform, a key feature of these villages was the notion that they would provide a path to independent

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<sup>57</sup> *Shimen shuiku jianshe zhi*, 605-606.

farming. Following resettlement, the Commission planned to lease 1,455 hectares of state-owned land to each household and bear some or all of the costs of reclaiming this (marginal) land for agriculture. After three years, the resettled households would gain title of the land they cultivated, thereby becoming full-fledged independent farmers. The 79 landlords and 139 farm laborers resident in the inundation zone did not fit into this scheme and thus did not qualify for resettlement assistance.<sup>58</sup>

Shaping Commission policy was the notion that inundated settlements ought to be reconstituted as communities in new places. But where could such places be found? Even with relocation settlements divided into five discrete villages, finding land for this purpose was a major task. Commission personnel traveled all over northern and central Taiwan but found few major tracts of suitable publicly-owned land. Environmental concerns precluded several sites. Mountainous areas had slopes that were too steep for responsible cultivation, while woodlands—in addition to being accessible—lacked water sources required by wet-rice cultivation. Reclaimed coastal land was one of the only options not under pressure by any competing use.<sup>59</sup>

*Siting Zhonghuang: the Ideal and the Experience of Atayal Relocation*

In this way, the four Han settlements of Caota (草濼), Shulin (樹林), Datan (大潭), and Xucuoqiang (許厝港) were sited along a twenty-kilometer stretch of Taiwan's northwestern coast.<sup>60</sup> Revealingly, initial Commission efforts sought to move indigenous relocated peoples not here, but rather to keep them away from the plains.<sup>61</sup> The Commission considered keeping indigenes in the

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<sup>58</sup> *Shimen shuiku jianshe zhi*, 608-609, 613.

<sup>59</sup> *Shimen shuiku jianshe zhi*, 609.

<sup>60</sup> For the latter two, settlers were moved to several locations in a small area rather than a single tight community.

<sup>61</sup> "Shimen shuiku jishui quyue jihua zao lin" [Afforestation Planned in Shimen Reservoir Watershed], *Lianhebao*, September 27, 1957.

vicinity—the municipality of Fuxing and the traditional territory of Msbtunux—but found no suitable options. As will be seen below, the dam’s construction created calls to empty people from its watershed, rather than settle new ones. Next, Commission members and Atayal representatives traveled to central Taiwan, where they came across an experimental forestry site belonging to National Chung Hsing University in Renai, Nantou, within the vicinity of Sun Moon lake. Established by various Japanese universities during the colonial period—including Taihoku, Kyoto, Tokyo, and Hokkaido Imperial Universities—such locations for forestry studies exist across the island to this day. This particular area was some 70 hecatres in size, featured a coffee plantation, and was not too steep to farm. The university granted permission for this woodland to become a site for reservoir refugees, but Atayal elders rejected this proposal. Further attempts to find land for a new Atayal village based on settled agriculture in the hills of Miaoli or Taizhong (which echoed colonial-era Japanese relocation plans) failed to identify any viable alternatives.<sup>62</sup>

Official Commission accounts state that Atayal representatives proposed a move to the plains instead: not the littoral areas where other reservoir refugees were headed, but riparian land on the banks of the Dahan. If their riverside homes were to be flooded, the logic seemed to go, then it would make sense to simply relocate downstream. Zhongzhuang (中庄) was downstream of the Shimen dam, on the other side of the “stone gates,” but not terribly far away, and by 1958 plans were slowly taking shape to move Atayal from the various Msbtunux settlements to a new village there.<sup>63</sup> Oral historical evidence collected by the Atayal scholar Li Huihui/Aho Batu disputes the state contention that the initiative for this came from the Atayal community. Watan Pilaw reports

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<sup>62</sup> *Shimen shuiku jianshe zhi*, 610; Li Huihui (李慧慧 Aho Batu), “Shequn jingyan yu wenhua bianqian—Shimen shuiku yanmoqu Taiya ren yimin-shi” [Collective experience and cultural change: the migration history of Atayal in the Shimen reservoir inundation zone], MA Diss., (National Chengchi University, 2007), 26.

<sup>63</sup> *Shimen shuiku jianshe zhi*, 610.

instead that “Zhongzhuang was not something that Atayal people proposed of their own initiative,” and only after the government had made the decision were representatives from each village taken to inspect the site. These representatives gave their assent, and in April of 1958 signed a relocation agreement under circumstances Watan described as “half-coercion.”<sup>64</sup> Textual and additional oral historical evidence, likewise gathered by Li, corroborate that in official agreements and oral presentations alike, the government guaranteed that it would improve community living standards in the new Zhongzhuang settlement. Government representatives made no mention of the fact that the Commission had passed over Zhongzhuang and other riverside sites in its search for land that would be suitable for Han resettlement sites.<sup>65</sup> [Ibid 27-28]. Relocation could only proceed with assent from Msbtunux Atayal representatives, but they granted that assent with information that was, at best, incomplete.

As mentioned above, initial plans targeted other mountainous areas, and settling Atayal from the hills on the plains was not an initial goal for the Commission. Once lowland, riverine Zhongzhuang was set as the destination, however, it fit neatly into a broader logic of aligning the lifeways of “mountain comrades” (山地同胞, 山胞), as Taiwan’s indigenous peoples were called at the time, with those of the majority Han population. Since the early 1950s, a policy one might translate as “plainicization of the mountains” (山地平地化) steered GMD efforts to develop indigenous communities across political, cultural, and socioeconomic lines, and in doing so to minimize differences between indigenes and Han residents. According to Fujii Shizue, assimilationist ideology along with a state desire to foster economic self-sufficiency and thereby reduce expenditures explain this policy. It encompassed everything from replacing Japanese with Han

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<sup>64</sup> Li, “Shequn jingyan,” 26-27.

<sup>65</sup> Li, “Shequn jingyan,” 27-28.

Chinese as the highland *lingua franca* to eliminating atavistic customs such as the use of “witch doctor” healers. Settled, intensive agriculture—particularly wet-rice cultivation—was an important part of making the mountains more like the plains. Terraces, much championed by Joint Commission of Rural Reconstruction personnel, were essential for strengthening water and soil conservation and thereby reducing the threat of highland agriculture. For the most remote villages, relocation was also an important tool.<sup>66</sup>



Figure 5.5—Zhongzhuang Immigrant New Village, where 82 Atayal households were settled for a few months in 1963 prior to its destruction by Typhoon Gloria. Note the lack of obstructions between the residences and the Dahan river in the background of the photo. The village’s Christian church is visible near the center-left of the photo.<sup>67</sup>

Thus it was that the Shihmen Commission described Atayal relocation, in newspapers and

<sup>66</sup> Fujii Shizue 藤井静津枝, *Taiwan yuanzhumin-shi: zhengce-pian (3)* [The history of Taiwan’s indigenous peoples: government policy (volume 3)] (Nantou: Taiwan sheng wenxian weiyuanhui, 2001), 183-194.

<sup>67</sup> “Shimen shuiku yanmoqu jumin yizhi qingcheng dahui zhuanji” [Special collection for the celebration of successful transplantation of residents from the Shimen Reservoir inundation zone], December 10, 1962, Record Number 008-030604-00029-005, Academia Historica.



retrospective accounts, as “beneficial for the plainicization of the mountains policy that the government has implemented.”<sup>68</sup> Insofar as plans for relocation respected cultural difference, it was through foregrounding Christianity, a recent but prominent part of Atayal society that the GMD did not associate with backwardness. The center of the village at Zhongzhuang was a Christian church (as seen in Figure 5.5), identified in the press variously as Catholic or Presbyterian but in fact serving as a place of worship for members of both denominations. The church enclosed a kindergarten and became a hub for local and material exchange.<sup>69</sup> When Soong Mei-ling (Madame Chiang Kai-shek) visited Zhongzhuang in December, 1962, it was to cut a ribbon at this church.<sup>70</sup> The main GMD newspaper *Zhongyang Ribao* published a front page photograph of Soong, surrounded by photographers, taking scissors to a massive knotted bow at the portico to the church—a visual representation of state largesse in providing a better life for reservoir refugees. Reporters noted that the Atayal had agreed to relocation on the condition that the Commission build them a church.

At the occasion of this photo opportunity, Vice President Chen Cheng recognized that the Atayal had made an admirable sacrifice in leaving their beloved homeland but said that educational and economic opportunities in the plains ensured a “promising future” for them.<sup>71</sup> Belied by these official sources was the bleak reality of settling this marginal land. When the first 21 relocated households arrived in Zhongzhuang in May, 1962, they found that the land they were supposed to farm was covered in rock and silt, washed down the Dahan and onto the floodplain. As Silan Pilaw recalled, “Large and small rocks were everywhere, and we all wondered ‘How could the government

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<sup>68</sup> Xu, Shimen shuiku, 47; “Shimen shuiku yimin xincun” [Shimen reservoir new migrant villages], *Zhongyang ribao*, December 10, 1962.

<sup>69</sup> Li, “Shequn jingyan,” 31; “Ke nan jianshe” [Construction that overcame difficulties], *Lianhebao*, December 11, 1962.

<sup>70</sup> “Shimen shuiku yimin xincun jinianbei” [Shimen reservoir new migrant village memorial], *Zhongyang ribao*, December 11, 1962; “Shimen shuiku yimin xincun” [Shimen reservoir new migrant villages], *Lianhebao*, December 10, 1962.

<sup>71</sup> “Ke nan jianshe,” *Lianhebao*.

give us such desolate (鳥不生蛋) riparian land?”<sup>72</sup> Relocation policy officially made provisions for land improvement, but work to clear, irrigate, and otherwise prepare land around Zhongzhuang for farming was slow going. Nearby Han farmers made agreements to share water for irrigation that they later arrogated, and official sources noted that the distinctive appearance and language of Atayal relocatees made them targets of Han discrimination. Planners worried that some would simply abandon the relocated villages altogether and find new places to live in the mountains, even with all the state inducements provided.<sup>73</sup>

While Msbutunux Atayal requests for a Christian place of worship in Zhongzhuang had been met with a brick-and-mortar church, other appeals were not so successful. Community members protested the lack of irrigation to the land they were supposed to grow rice on. They pointed out that the amount of gravel on much of the Zhongzhuang “wasteland” made it impossible to plant even crops that did not require irrigation. Most pointedly, on six occasions between January and August of 1963, they lobbied the Shihmen Commission and other government authorities to build a levee to protect the new settlement.<sup>74</sup>

The conspicuous lack of infrastructure protecting this riverside settlement from the river was not the result of a lack of planning as much as neglect. Zhang Fu (張富), a Han representative to the Taiwan Provincial Council (臺灣省議會) from Taoyuan, was an advocate for the Shimen dam’s construction who spoke up on the issue of Zhongzhuang’s vulnerability in the Provincial Council. Zhang noted that following floods in central Taiwan in 1960, the Water Conservancy Bureau had redirected floods originally budgeted to complete a levee that it had started building along the Dahan

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<sup>72</sup> Li, “Shequn jingyan,” 31.

<sup>73</sup> Li, “Shequn jingyan,” 32.

<sup>74</sup> Li, “Shequn jingyan,” 168.

in Zhongzhuang. This left Zhongzhuang vulnerable—and threatened to hold up relocation.

Responding to Zhang, the Water Conservancy Bureau director explained that additional funds would be allocated to protect Zhongzhuang. Six months later, however, the Bureau stated that “because opinions in the area could not reach a consensus, there was no way to coordinate construction.” Rather than allow the funds to go unspent, it redirected them elsewhere—leaving Zhongzhuang vulnerable.<sup>75</sup> Downstream residents opposed the embankment of the river, which threatened to redirect floodwater towards their fields. How exactly they objected to the Water Conservancy Bureau is not clear, but it is little wonder that the interests of long-established Han communities prevailed over those of their recently relocated Atayal neighbors. In this case, neglect meant delay, and delay was dangerous.

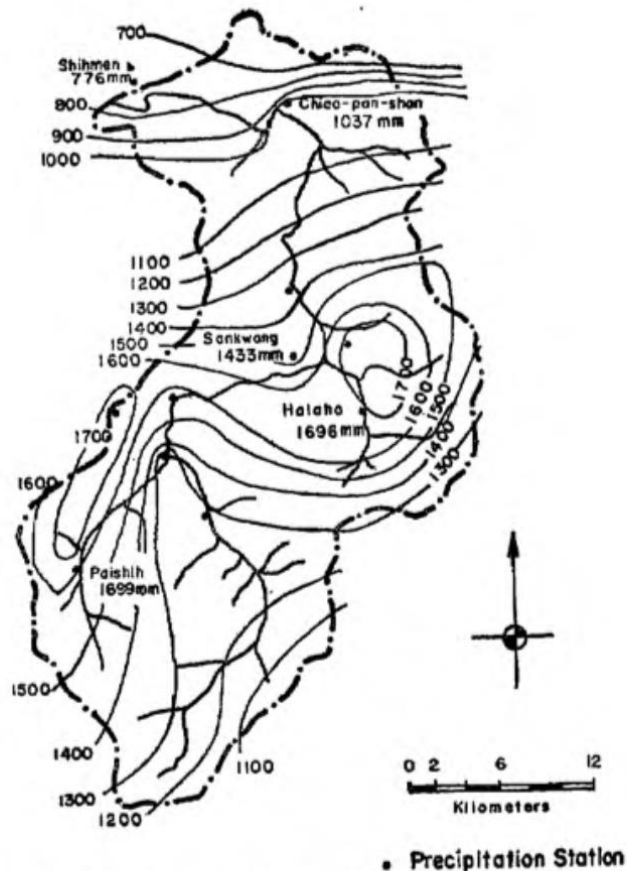
*Disaster Infrastructure: Shimen and Typhoon Gloria*

Beginning on September 5, 1963, a tropical depression formed over the Pacific northwest of Guam and began making its way westward. Growing and strengthening into a large typhoon, by September 9 it was blowing wind and rain to a wide area, including the northern Philippines and the Ryukyu Islands, but centered on northern Taiwan. In the mountains south of Taipei, rainfall intensified across September 10, reaching a torrential peak in the morning and early afternoon of September 11. To say that a great deal of rain fell in the upper watershed of the Dahan River—now identified chiefly as the Shimen Reservoir watershed—would be a major understatement. Between noon on September 10 and noon on September 11, the precipitation stations at Baishi (白石) and Galahe (嘎拉賀 Atayal: Qrahu), both high in the mountains along tributaries of the Dahan, recorded more

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<sup>75</sup> *Taiwan shengyihui gongbao di-5 juan di-12 qi* [Official report of the Taiwan Provincial Council, Volume 5, No. 12], 348, May 8, 1961, Record Number 003-02-03OA-05-6-4-03-00293, Digital Library of Local Council Journals; quote from *Taiwan shengyihui gongbao di-6 juan di-23 qi* [Official report of the Taiwan Provincial Council, Volume 6, No. 23], 1089, November 20, 1961, Record Number 003-02-04OA-06-5-4-03-01172, Digital Library of Local Council Journals; *Shimen shuiku jianshe zhi*, 611.

than one meter (1190 mm) of rainfall. This very nearly set a world record, being outdone in contemporary annals of meteorology only by old data from Réunion in the Indian Ocean.<sup>76</sup>



*Figure 3-3. Isohyetal Map of Typhoon Gloria (Sept. 9-11, 1963) of Shihmen Watershed*

Figure 5.6—This isohyetal map shows lines of mean precipitation. Note the high values throughout the watershed and the extremely high values in upland areas. Baishi is here spelled “Paishih.”<sup>77</sup>

On the morning of September 9, the Shimen reservoir sat at a height of 201 meters. As the dam had a minimum operating height of 190 meters and a maximum of 250, this was a fairly low level, particularly for the flood season. The deluge brought to the typhoon, however, quickly began

<sup>76</sup> J. L. H. Paulhus, “Indian Ocean and Taiwan Rainfalls Set New Records,” *Monthly Weather Review* 93, no. 5 (1965): 331-335. This record has since been surpassed by other data from Réunion.

<sup>77</sup> Ted C. Sheng (Tse Cheng Sheng), *Landslide Classification and Studies of Taiwan* (Taipei: Joint Commission on Rural Reconstruction, 1966), 41. This report originated as a master’s thesis written under the direction of Robert Dils (see below) at Colorado State University.

filling the reservoir. By design, there was no mechanism to drain the reservoir of floodwater until the water height exceeded the height of the spillway gate height of 235 meters. The dam's managers thus had to wait as the Dahan thundered into the reservoir, raising it higher and higher, until they could finally open the floodgates at 5:40 am on September 11. As rain was still coming down in historic levels at this point, opening the floodgates only slowed rather than stopped the reservoir's inexorable rise. By 7:00 pm on the same day, the reservoir level topped out at 249 meters. The flood thus came very close to overflowing the 250-meter high dam, which would have threatened its structural integrity.<sup>78</sup>

According to measurements taken at the reservoir and subsequent calculations, the Typhoon Gloria flood that coursed through the Shimen reservoir topped out at a discharge of 10,200 cubic meters per second, thus significantly exceeding the design flood of 8750 cubic meters per second but not the "maximum probable flood" of 11,500. What did this torrent mean for downstream areas? Before they opened the floodgates, dam personnel were in contact with police to issue warnings about the flood headed for Taipei. As it so happened, however, the same storm had dumped massive amounts of rain across the Xindian and Jilong River's catchment areas to the east, meaning that the initial waves of flooding had already hit the capital area. This flooding, which had funneled down several watersheds into the Taipei basin, soon brought desperate calls came to Shimen requesting that the floodgates be closed. Facing still-rising waters that could destroy the dam if allowed to overtop it, dam managers kept the gates open.<sup>79</sup>

Devastation was widespread. Later estimates would put the inundated area at 210 square

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<sup>78</sup> Xu, Shimen shuiku, 73-75; *Report on the Flood Forecasting and Warning Systems in the Tan-Shui River* (Tokyo: Overseas Technical Cooperation Agency, 1972), 14-16.

<sup>79</sup> Xu, Shimen shuiku, 75; Shihmen Development Commission, *Shihmen Reservoir Project* (Taoyuan: Shihmen Development Commission, 1958), 1.

kilometers, encompassing wide swaths of Taipei and New Taipei City.<sup>80</sup> Much of this fell within the “flood control region” that Shimen had been designed to protect (Figure 5.1), and this fact, in addition to the active decision taken to open the floodgates, thrust the relationship between Shimen dam and Taipei’s flooding to the center of intense concern. Below, I suggest the contours of the resulting controversy, which in its focus on the lowland city implicated highland practices and peoples. What was often overlooked here was the intermediate zone, particularly the newly settled village of Zhongzhuang. The Atayal residents there had just enough warning to escape before the Dahan swept through the village. Taguin Botu recalled police frantically alerting everyone to run to higher ground. Lives were saved, but the damage was profound: Botu escaped in a jacket and underwear, not even taking time to grab a pair of pants that had money stuffed in a pocket. Half of homes in Zhongzhuang suffered serious or complete structural damage while the other half were intact—but many of these were filled with sludge and stones. After briefly seeking shelter at a nearby school, most residents had nowhere to go but back into these damaged homes, which they tried to inhabit by covering the muddy floors in wooden boards. In these wet conditions, many developed skin issues. Quick assistance came not from the government or the Shihmen Commission, but only, testimonies indicate, from their church.<sup>81</sup>

Typhoon Gloria so thoroughly devastated the physical and built environment of Zhongzhuang that the Shihmen Commission did not seek to rebuild there. Instead, it planned to once again relocate the Msbtunux Atayal, this time to a seaside area adjacent to the settlement built for Han relocatees at Datan on the Taoyuan coast. Some 27 households demurred: they had places they could return to in msbtunux, with some owning land that was only partially inundated by the reservoir. Nine households went elsewhere. But 46 households, a majority, assented to the

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<sup>80</sup> *Report on the Flood Forecasting and Warning Systems*, 11.

<sup>81</sup> Li, “Shequn jingyan,” 34-37.

Commission's plans and moved to the settlement prepared for them there. A detailed account of this relocation is beyond the scope of this chapter. What assured it infamy in Taiwanese environmental history, however, was the ways in which the location at the terminal edge of a watershed brought new harm to Han and Atayal relocatees in Datan. Heavy metal pollution from industrial sites nearby eventually led to the dissolution of these communities by the 1980s, at which point 16 of the 46 households decided to “return to the mountains.”<sup>82</sup> (返山) Across the multiple relocations endured by Atayal Shimen reservoir refugees, there were always those who chose to return to msbtunux. Doing so may have represented an escape from the state schemes that sought to integrate them into lowland life. The mountains, however, were transformed by becoming part of the Shimen Watershed—a transformation accelerated if not caused by Typhoon Gloria.

#### *Conservation after Catastrophe*

The work of Huang Chieh (黃杰), Chairman of Taiwan Province, assured that upstream considerations would be a prominent part of flood control. In April 1964 he published a series of articles in which he defined the question of preventing future floods, such as the ones that had struck Taipei less than a year before, as inextricably connected to highland land management. Huang reiterated these points in a speech he gave the Provincial Assembly on June 8, 1964. The phrase Huang reiterated was “control mountains and prevent floods,” (治山防洪 or 治山與防洪) a slight adaptation of the “control mountains and control waters” (治山治水) that became so common under Japanese rule. While the ideas were not new, the precise phrasing was, and the prominence assigned it was a first for GMD rule. It is a mark of Huang's impact that “control mountains and prevent floods” entered Taiwan's political and media discourse at this point in 1964 and has endured

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<sup>82</sup> Li, “Shequn jingyan,” 38-50. For a recent work examining this fraught history, see Ji Jingfen 稽景芬 et al, *Lindong de shequn: Kalasbe zuyi shengming gushi* [Fluid community: the life stories of Qara descendants] (Taoyuan: Taoyuan shi zhengfu yuanzhu minzu xinzhengju, 2022).

through the present.

In addressing the Provincial Assembly, Huang presented the twinned goals of flood control and forest management as the first of five government priorities for the coming year. Three of the others were very general: “strengthening economic reconstruction,” “advancing societal reconstruction,” and “administrative reform.” The final goal, “reconstruction and flood control for the Taipei area,” reflected the human, material, and political damage Typhoon Gloria had wrought. Flooding in the wake of Typhoon Gloria and Shimen’s perceived failures are important context for Huang’s advocacy. Also shaping policy, however, was the work of the Joint Commission on Rural Reconstruction (JCRR). For two months in the summer of 1963, just before Typhoon Gloria’s arrival, the JCRR hosted Robert E. Dils for range of field trips, seminars, and meetings. Dils, a professor at Colorado State University, had experience as a consultant and could claim to have founded one of the only programs in Watershed Science that existed anywhere in the world. Dils’s report, titled *Watershed Conditions Problems and Research Needs in Taiwan* [sic], was published in 1964 in English and Chinese. According to the JCRR, this work—and a personal meeting between Dils and Huang—assured that government agencies adopted Dils’ suggestions, an account supported by Huang’s own testimony.<sup>83</sup>

Touring Taiwan, Dils was alarmed by what he described as “poor and often abusive land practices.” Hillside cultivation in foothill and highland areas was rarely accompanied by any protective measures, leading to a rapid loss of topsoil. From a national economic and ecological perspective, this made little sense: “the small economic gain made through such cultivation is far more than offset by the loss of the soil resource and the downstream damage it causes.”<sup>84</sup> The

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<sup>83</sup> *Tawain shengyihui di-3 jie di-3 ci dabui zhuanyì (2)* [Special Record of the Taiwan Provincial Council, Third Session, Third Meeting, Part II] (Nantou: Taiwan Provincial Government, 1964), 691-693; *15<sup>th</sup> General Report of the Joint Commission on Rural Reconstruction* (Taipei: Joint Commission on Rural Reconstruction, 1964), 66.

<sup>84</sup> Dils, *Watershed Conditions*, 9.



converse of overexploited hillside agriculture was *under*-exploited highland timber stands. Dils recognized that construction of mountain transportation infrastructure, both logging roads and the Cross-Island Highway, was a contributor to erosion, landslides, and downstream sedimentation. While stressing the importance of revegetation following road construction, Dils argued that logging Taiwan's vast mountains forests was not a significant environmental threat. Indeed, he wrote that with so much "overmature and often decadent" forest, timber harvest ought to be intensified. Some of this he attributed to an overly general application of conservation policy, whereby the Japanese and GMD designation of harvestable timber as "protection forests" effectively left money on the table.<sup>85</sup>

In Dils's presentation, Han "squatters" who farmed or logged illegally and had little incentive to practice sustainable methods were but one class of problematic watershed actor. Similar problems were caused by retired GMD servicemen whom the state had granted mountain land to farm. Indigenous shifting cultivation, while often occurring legally on reservation land, had "effects... the same as that of illegal farming."<sup>86</sup> For the first two groups, Dils prescribed stricter regulations and a huge expansion of fiscal support for government research and education programs. When it came to indigenous shifting cultivators, however, the erosive harm posed to streams and reservoirs justified, to Dils, stricter measures. Here, he drew from the example of Taipower providing indigenous men with vocational training after relocating them and their families away from Wushe reservoir. As mentioned at the close of Chapter IV, he suggested vocational training as a way to empty the mountains of human presence.<sup>87</sup>

As this dissertation has argued, this pyrophobic pathologization of indigenous shifting

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<sup>85</sup> Dils, *Watershed Conditions*, 10, 17-18.

<sup>86</sup> Dils, *Watershed Conditions*, 10-11.

<sup>87</sup> Dils, *Watershed Conditions*, 14-16.

cultivation as so harmful as to require removal of people from their land can be located among Japanese scientists as early as the 1920s. What Dils' report and ROC policy show is a shift in the target of this perceived threat from streams and rivers generally to reservoirs through sedimentation. Huang's advocacy to "control mountains and prevent floods," while drawing from Dils, did not directly call for indigenous removal. But this change towards a focus on protecting the infrastructure of dams was clear. The program Huang announced before the Provincial Assembly included a wide range of provisions. One allowed illegal cultivators to take possession of the land they farmed under the condition that they implement soil and water conservation techniques. Bamboo plantings on eroding land would quickly arrest topsoil loss, while improvements in forest physiognomy would reduce the stock of dense and dead plant matter that could cause forest fires to worsen. Fifty percent of the Forestry Bureau surplus transferred to the Provincial government each year was to be devoted to a fund for upper-watershed soil and water conservation. This would eventually support work across the island, but, Huang explained to the assembly, for 1965 the first order of business was the Shimen Reservoir Watershed.<sup>88</sup>

### *Watching Over the Watershed*

Just as the Shimen dam impounded the Dahan river to create the Shimen reservoir, so too did it create the Shimen reservoir watershed. While more abstract, the watershed was real enough—it could be neatly mapped, and the consequences of its existence were brought home with force during Typhoon Gloria. This was not merely due to the massive inflow of water rushing down through the Dahan and its tributaries that filled the reservoir so quickly and was soon released to cause devastation in the Taipei basin. The flood was not just water, but a turbid mix including stone and silt. Largely because of Gloria, the sediment deposited on the reservoir bed in 1963-1964 was

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<sup>88</sup> *Special Record of the Taiwan Provincial Council, Third Session*, 692-693. Baguashan 八卦山 in Zhanghua was also identified for urgent work.

19,500,000 cubic meters, or nearly 24 times the annual deposition that the reservoir had been designed for.<sup>89</sup> In terms of reservoir management after the typhoon, then, siltation from the upper catchment area was an immediate problem.

Erosion's threat to Shimen gained new prominence in the wake of Typhoon Gloria, but it was not a new concern. As early as 1956, Joint Commission on Rural Reconstruction soil conservation representative Ira K. Landon wrote to the Provincial Department of Agriculture and Forestry Commissioner to propose that a soil conservation program begin in the Shimen watershed, with a goal "to prolong the useful life of the reservoir by retarding siltation." One of the challenges, Landon wrote, was the presence of "900 aborigine [sic] families who make their living on some 4,600 hectares of cultivated land within the watershed.... It has been suggested that these farmers be moved out of the watershed. This is not feasible because there are no suitable lands to which to move them."<sup>90</sup> Landon was aware of the example of Wushe, but as the difficulty in settling Mshbutunux Atayal in Zhongzhuan demonstrates, relocation was itself an expensive process that required suitable destinations.

In 1958, Landon's suggestions were implemented as the Joint Commission on Rural Construction joined with the Shihmen Regional Development Commission (石門地方建設委員會) to establish a soil conservation field office responsible for the Shimen reservoir. Some of their efforts had to do with encouraging Han and Atayal farmers in the catchment area to plant legumes as cover crops to both protect topsoil and fertilize it through nitrogen fixation. Old tea plantations were a particular target, with many bench terraces constructed. Vast areas of the catchment area were also afforested: some 4037 hectares over seven years, planted with over one million seedlings of acacia confusa, bamboo, Horsetail pine, slash pine, and Formosan alder. Commission efforts to

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<sup>89</sup> Sheng, *Landslide Classification*, 42.

<sup>90</sup> Ira K. Landon, *Soil Conservation in Taiwan* (Taipei: Joint Commission on Rural Reconstruction, 1963), 50-51.

establish a “Reservoir Protection Belt” covering 2468 hectares around the reservoir’s edge were more fraught, as this entailed designating hundreds of hectares of active farmland as “forest reserve” and thus illegal to farm on. Facing the fact that this could impoverish over 2000 people, including hundreds of Atayal, and lacking the means to relocate them, the commission focused exclusionary conservation measures in the protection belt on the steepest—and thus most threatening—non-terraced farmland. Finally, a system of check dams promised to block sediment and slow the velocity of water entering the Dahan.<sup>91</sup>

In 1966, there were 14 check dams in the Shimen watershed. By 1979, there were 89. These small concrete structures, built across streams to slow water flow and catch sediment, became a ubiquitous feature along the streams flowing into the upper Dahan, and as years went on they spread farther and farther up the watershed.<sup>92</sup> Atayal scholar Da-Wei/Daya Kuan has done extensive ethnographic work on how state resource management shaped the physical and social landscape in Marqwang, which alongside Knazi and Gogan is an Atayal group of communities located along a river valley upstream of the Shimen reservoir and the Msbtunux Atayal who live there. Local testimonies describe the ecological damage that accompanied check dam construction. Crews mined sand locally, causing landslides and land subsidence. Construction waste and sediment in the stream beds killed fish. Social harms accompanied the influx of Han veteran construction workers as well, as one informant related to Kuan about a dam built in the late 1960s: “They even built a [brothel] on the dried riverbed... They took away many of our Atayal girls.”<sup>93</sup>

As the Shimen infrastructural complex snaked its way higher into the watershed, it implicated highland Atayal through both the waters they depended upon and the ways they used

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<sup>91</sup> *Shimen shuiku jianshe zhi*, 617-620.

<sup>92</sup> *Shimen shuiku jianshe zhi*, 620; 3.

<sup>93</sup> Kuan, “A River Runs Through It,” 194-199, quote on 196.

their local environments. The Shihmen Commission's report noted that "certain mountain compatriots still practice bad habits of shifting cultivation and reckless clearing (仍有遊耕濫墾的惡習)."<sup>94</sup> Native land use, particularly shifting cultivation, seemed to have attracted greater scrutiny from state conservation authorities after the 1976 passage of a law on the conservation and use of hillside land (山坡地保育利用條例). Grand proclamations about environmental protection and national laws did not always translate into local action, however. In the case of Marqwang, there was often tacit encouragement of highland agriculture, which was one of the only ways remote communities could sustain themselves. Commercial bamboo harvesting, for instance, flourished here beginning in the 1960s, even on protected forest land, for which local officials would issue permits despite the harvesting being technically illegal.<sup>95</sup> Bamboo cultivation only became a target of true state scrutiny when Shimen dam's limits were again tested by another typhoon: Typhoon Aere in August 2004. This typhoon filled the Shimen dam with so much sediment that it could no longer supply household-use water to Taoyuan—leading to millions of people going over a week with no water.<sup>96</sup> As one bamboo grower in Marqwang put it:

It became more difficult to get certification for bamboo logging after the Aeri [sic] typhoon. The bureau of Shih-Men and the county government denied many of our applications. They say our logging will cause landslides... but the bamboo will die around ten years old, and if you don't log it, no new bamboo shoots come out, and the whole bamboo forest will turn dried and dead. Isn't this worsening the soil and water conservation.<sup>97</sup>

The water management disaster brought on by Typhoon Aere threatened to revive conservationist relocation. The ruling Democratic Progressive Party (DPP) proposed abandoning infrastructure and moving residents out of the most environmentally sensitive highland areas to

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<sup>94</sup> *Shimen shuiku jianshe zhi*, 618.

<sup>95</sup> Kuan, "A River Runs Through It," 181-190.

<sup>96</sup> Chiu Yu-Tzu, "Taoyuan's Water Troubles Ease a Bit," *Taipei Times*, September 6, 2004.

<sup>97</sup> Kuan, "A River Runs Through It," 190.

“leave nature to recover itself.” This triggered a backlash among indigenous activists and their allies, which eventually ensured the passage of legislation that sought to align conservation policy in indigenous areas with Traditional Ecological Knowledge.<sup>98</sup> This dissertation has argued that the incomplete incorporation of Taiwan’s indigenous interior—what Paul Barclay has termed a “second-order geobody”—turned on the rivers that linked highland and lowland in material and discursive processes. The reorientation among certain Japanese scientists from controlling rivers towards governing the watersheds of those rivers was one such process. A later development involved a shift in focus from river watersheds as such towards *reservoir* watersheds. While initiated under Japanese rule, it came into maturity after World War II, when scientists, engineers, and GMD leaders built dams like Shimen. Watersheds were always reckoned as zones of both natural and human activity, both of which needed to be brought under to control for optimum reservoir management. State conservation policy dedicated to this goal was far from uniform in its reach across highlands. But as sedimentation continues to threaten Taiwan’s water supplies, many highland indigenous peoples have become indelibly marked as users—and often despoilers—of reservoir watersheds. The Shimen dam, as the crystallization of Japanese colonial schemes, American foreign aid, and GMD ambition, played a crucial role in enabling that shift.

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<sup>98</sup> Kuan, “A River Runs Through It,” 119-123, quote on 120.

### Conclusion—Colonialism’s Alluvium

When Sun Moon Lake’s waters began to recede during a serious drought in spring 2021, all manner of objects that had long languished underwater emerged into the open air. Some gave evidence of the lake’s status as dense transit and tourism hub: barrels, tires, and even a working iPhone 11.<sup>1</sup> Others spoke to an older history, a time before the lake was filled with water from the Zhuoshui river in 1934. Tombstones belonging to Han families who had lived and fished in the area in the 1800s were one such discovery. In late April, descendants of these families gathered on the dry earth surrounding the shrinking reservoir to demand compensation from the government and Taiwan Power Company for the land expropriated from their parents and grandparents. Land that Taiwan Electric, Taiwan Power Company’s Japanese-era predecessor, had supposedly bought from residents in the inundated zone was in fact marked as “donated” in archival documents, proving that it had been expropriated without recompense. The descendants knew that the drought, although the worst in the reservoir’s history, was temporary: they were not after the land itself. Rather they wanted the government to fulfill its avowed commitment to “transitional justice” by recognizing their claims as just and worthy of financial recompense.<sup>2</sup>

That same week, on another stretch of cracked lakeside ground, members of the Ida Thao community gathered to erect a ceremonial swing amidst scattered remnants of their inundated ancestral home. For the first time in over a half-century, they swung next to the lake to mark the spring planting festival, drawing crowds of tourists and reporters. Legislative Yuan member Sra Kacaw (鄭天財), who is Amis and officially represents Thao and other Lowland Aboriginal

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<sup>1</sup> “Riyuetan shuiwei chuangxin di” [Sun Moon Lake water levels hit new low], *Ziyou shibao* (Liberty Times Net), March 27, 2021; Venice Tang, “iPhone found 44 days after being dropped into Sun Moon Lake,” *Taiwan News*, April 23, 2021.

<sup>2</sup> “Shengtao zuxian bei duo Riyuetan tudi” [Condemning seizure of ancestor’s Sun Moon Lake land], Yahoo News (Taiwan), April 25, 2021. Between 2018 and 2022, Taiwan had a Transitional Justice Commission (促進轉型正義委員會) specifically tasked with investigating injustices that occurred under GMD rule between 1945 and 1992.

constituents in Taiwan's national legislature, took the opportunity to deny the legitimacy of the compensation claims being forwarded on the other side of the lake. Han settlers, he told reporters, were just that—settlers—and archeological or documentary proof of previous residence had no bearing on the status of Sun Moon Lake as the traditional territory of the indigenous Thao people. The only justice that might be done against a history of dispossession would be to return the lake and the land to the Thao.<sup>3</sup>

Sun Moon Lake's waters were still in retreat two weeks later, when Taiwan's Constitutional Court made announced a ruling that made headlines across the world. A Bunun man named Talum Suqluman had been arrested in 2013 for killing a muntjac and a serow while hunting for meat for his ailing mother. A distinct set of laws regulates indigenous hunting in Taiwan and allows indigenes to carry out hunts in areas and of animals that are otherwise protected. This requires obtaining advance permission and other procedures, however, which Talum did not follow. After a conviction and a series of appeals, which did not involve prison time for Talum, the court found him guilty on May 7, 2021 by affirming the constitutionality of most of the legal provisions he stood accused of violating. The court's chief justice stated, "The Constitution recognizes both the protection of Indigenous peoples' right to practice their hunting culture and the protection of the environment and ecology. Both fundamental values are equally important."<sup>4</sup> President Tsai Ing-wen soon issued an exceedingly rare pardon for Talum, ensuing that he would not serve a sentence. Although he was guilty of violating the law, pardoning Talum came, a presidential statement said, "out of respect for indigenous people's traditions."<sup>5</sup>

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<sup>3</sup> Umas Sualuman, "Shui qing gao ji" [Water situation calls for help], Yuanzhu minzu dianshitai meiri xinwen [Taiwan Indigenous Television daily news], aired April 22, 2021.  
[http://www.tipp.org.tw/news\\_article.asp?F\\_ID=104361&FT\\_No=1](http://www.tipp.org.tw/news_article.asp?F_ID=104361&FT_No=1)

<sup>4</sup> Amy Chang Chien and Amy Qin, "Taiwan Court Upholds Laws Restricting Hunting," *New York Times*, May 7, 2021.

<sup>5</sup> "Taiwan President Tsai Ing-wen issues rare pardon for indigenous hunter," *Strait Times*, May 20, 2021.



In both of these instances, appeals to tradition intersected with environmental threats such as drought and imperiled biodiversity. Concern over Taiwan's fragile ecology has grown amidst relentless development pressure and the recognition of planetary climate change. At the same time, recent years have seen unprecedented state recognition of past misdeeds, including against indigenous peoples. These have combined to provide a new context for an old question: what rights do different peoples have to Taiwan's land, waters, plants, and animals? Under Japanese and early Republican rule, colonial conservation offered one way of answering this question. Japan's violent conquest of Taiwan's interior enabled, by the mid-1910s, the *de facto* political integration of the island for the first time in history. Even so, the mountains remained, in many ways, a space apart: administratively separate, a colony within a colony. Rivers, and with them, floods, stone, and silt, transected the boundary between lowland and highland. Hydraulic destruction and hydroelectric potential were both mechanisms by which Taiwan's interior was knit into the scientific and economic geographies of the Japanese empire.

Environmental historians have long recognized rivers' fluidity as a force that troubles political—particularly international—borders. This dissertation has described not only this downstream physical motion but, equally, the upstream scientific gaze that defined it as significant. Forestry scientists and public works engineers emphasized connectivity: first between lower and upper branches of rivers and later across entire watersheds. Impounding and diverting rivers to create reservoirs altered the contours of these watersheds and created a new type of infrastructure that was particularly vulnerable to disruptions from upstream. This gave (often literal) concrete form to upstream-downstream relationships that had before been abstract. Postwar Taiwan's Republican government worked with American supporters to realize and build upon unfulfilled Japanese designs for the maximum utilization of the island's hydraulic potential.

At the beginning of colonial rule, designating areas inhabited by indigenous peoples as *terra nullius* had the formal implication of denying them any rights of ownership. Actually projecting and establishing Japanese authority, however, was a violent, contracted, and contingent process. Understanding how Taiwan's highland indigenous peoples came to be dispossessed *in practice* of the rights not only to hunt and practice swidden agriculture but, often, to even remain in their highland homes requires taking into account the work of Japanese scientists. Such conservationist curtailment of usufruct rights applied to many Han colonial subjects as well, though mass relocation policies did not. These relocations ought to be understood as part of the violence of harnessing rivers, alongside the expropriations of Han and indigenous residents who were cleared from reservoir inundation zones. Heightening the violence was the way in which Japanese scientists and officials relegated indigenous environmental knowledge to at best curiosity and at worst superstition. Colonial conservation demonstrates how state control justified its own expansion in the name of environmental protection. Beyond that familiar lesson, however, this case study highlights a path towards colonial conservation that depended less on animal protection, appeals to "nature," or a capitalist determination to continue resource extraction—though all were present in Taiwan—than on the rhetorical and technological construction of the watershed as a primary unit of environmental governance.

Colonial conservation was not a master plan hatched in Tokyo or Taipei. It emerged out of ad hoc adjustments, scientific advocacy, and technological interventions. It started small, although its focus on erosive effects at a remove meant that it was never solely focused on local environments. Still, it spiraled outwards slowly: only in the 1930s did highland water conservation in Taiwan become deeply connected to Japan's broader imperial strategy. This came with the completion of the Sun Moon Lake hydroelectric complex, which by generating electricity to power aluminum refining and other strategic concerns intensified scrutiny on soil management in points upstream. Also in the

1930s, highland development initiatives, forest hydrology surveys, and the forced relocation of indigenes to lower elevations served to integrate Taiwan's mountains into the lowlands and to integrate the island into the growing empire. Deleterious consequences of these initiatives, from reservoir displacement or rice paddy-associated malarial outbreaks, were often little more than afterthoughts to people in power.

Taking such consequences seriously requires digging into the messy instantiation of colonial conservation through a diverse source base and the actions of little-remembered individuals such as Kada Naoji and Anazawa Kenji. In doing so, this dissertation has striven to provide an alternative to two reductive views of Japanese colonial power in Taiwan. The first, common in Marxist scholarship and dating back to Yanaihara Tadao's 1929 *Teikoku shugi-ka no Taiwan* (Taiwan under imperialism), situates the undifferentiated power of capitalism as driving Japan's penetration of Taiwan's interior.<sup>6</sup> The second finds expression in accounts of science and state-building in colonial Taiwan that begin with head of civil affairs Gotō Shinpei (in office 1898-1906) and his dictum to rule according to "the principles of biology"—what scholars often call "scientific colonialism."<sup>7</sup> Both have their uses, but without gainsaying capitalist concerns or Gotō's influence in building a durable apparatus of state surveys we can observe that neither provides a satisfactory explanatory framework for the history treated in this dissertation. Part of the problem lies in overlooking the agency of individuals who

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<sup>6</sup> Yanaihara Tadao, *Teikoku shugi-ka no Taiwan* (Tokyo: Iwanami shoten, 1929); Nakamura Masaru, "Nihon shihon shugi no horyūchi seisaku to Taiwan kōchi senjūmin—ijū shūdanka to 'banchi kaihatsu chōsa jigyō' o chūshin ni" [Reservation policies of Japanese capitalism and Taiwan's highland aborigenes—centered on amalgamation by relocation and the "savage territory development survey project"], *Nagoya gakuin daigaku ronshū, shakai gakka-ben* 33, no. 2 (1996), 160-207; Roy, "The Camphor Question is in Reality the Savage Question?: Indigenous Pacification and the Transition to Capitalism in the Taiwan Borderlands."

<sup>7</sup> A concise treatment of Gotō's ideas in this realm is: Mark R. Peattie, "Japanese Attitudes Toward Colonialism, 1895-1945," in *The Japanese Colonial Empire, 1895-1945*, ed. Ramon H. Myers and Mark R. Peattie (Princeton: Princeton University Press, 1986), 83-85. Peattie introduces the phrase "scientific colonialism" as a Wilhelminian German category, not a Japanese one. Nevertheless, scholars sometimes credit Gotō with coining both the phrase and the concept. For an example that illustrates the elevation of Gotō in the history of colonial science, see Masumi Zaiki and Togo Tsukahara, "Meteorology on the Southern Frontier of Japan's Empire: Ogasawara Kazuo at Taihoku Imperial University," *East Asian Science, Technology, and Society* 1 (2007): 183-203, especially 186-188.

were neither political leaders nor powerful capitalists. A more specific issue arises with so-called scientific colonialism. Namely, narratives that emphasize a Japanese dedication to systematic research in policy formation risk giving the impression that such surveys necessarily guided actual policy. In my analysis, Japanese forestry scientists condemned indigenous swidden and hunting as a watershed threat on impressionistic, pyrophobic, and chauvinistic grounds. Physical studies of erosion were one *result* of such convictions—they were not its cause.

Contributions, for good or ill, of largely forgotten individuals to colonial conservation are likewise clear in the transition from Japanese to Republic of China rule. Forestry scientists with trans-World War II careers in Taiwan such as Hidaka Kōjirō ensured a measure of continuity from Japanese imperial administration as the GMD-led government took over the task of managing the island's waters and soil—still “national land,” but belonging to a different nation. The Republic of China adapted Japanese plans through completing the Wushe Dam and promoting the “plainicization” of highland indigenes. At the same time, the multi-purpose Shimen Dam represented a new vision for harnessing massive infrastructure to provide for diverse developmentalist goals. In the relocation process related in Chapter V, we can again observe instances of individual agency and contingency amidst the powerful forces of Nationalist development, American aid, path dependence on Japanese colonial plans. When Typhoon Gloria laid bare the limits of Shimen's flood-control capabilities in September 1963, however, it was relocated msbtunux Atayal who were the first to lose their homes to the torrent coursing through the dam's newly-completed floodgates. A different sort of vulnerability characterized Atayal lifeways in the Shimen reservoir watershed. Mirroring the Sun Moon Lake watershed, upstream land use became identified as a threat to the reservoir and its provision of electricity, flood protection, and water for agriculture, industry, and communities downstream.

If the GMD brought recolonization to Taiwan in 1945, then the democratic reforms that began in the late 1980s were steps towards decolonization. During this period, alternatives to colonial conservation emerged rapidly, if fragmentarily. Martial law ended in 1987, and 1988 saw the beginning of the “return our land” (還我土地) movement, which publicized and formalized indigenous redress demands for centuries of territorial dispossessions. In 1989, Sasala Taiban (台邦·撒沙勒, Rukai) founded the journal *Yuanbao* (Indigenous News), which became crucial in the mid-1990s for voicing Rukai and Paiwan opposition to the Majia reservoir (瑪家水庫) planned along the Ailiao river in southern Taiwan.<sup>8</sup> Around the same time, Hakka residents living in the vicinity of the proposed Meinong reservoir (美濃水庫) mobilized to stop the dam’s construction. In these two cases, activists drew attention to direct displacements, oppressive land use restrictions that would apply in reservoir watersheds, and habitat destruction of native flora and fauna. The conservationist argument repeated throughout the 20<sup>th</sup> century in Taiwan was turned on its head. In an outcome unthinkable even 15 years previously, both movements succeeded and neither dam was built.

As skepticism and resistance to dams grew worldwide, Taiwan’s indigenous and environmental movements came into their own in the democratizing 1990s. Cross-fertilization and cooperation between these two movements has been rich. Yet as suggested by the recent developments that introduced this chapter, tensions exist as well. The meanings and proper beneficiaries of “transitional justice” are highly contentious. Conservationist limits to the state deference have become clear. Heightening the stakes is the looming specter of anthropogenic climate change. Part of the 1990s anti-dam movement’s success can be attributed to the very short

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<sup>8</sup> Huang Chih Huei 黃智慧, “Taiwan senjūmin no kankyō-kan: damu kensetsu hantai undo no bunseki kara” [The environmental views of Taiwan’s aborigines: from an analysis of a dam construction opposition movement], in Yamaori Tetsuo, ed., *Ajia no kankyō, bunmei, ningen* [Asia’s environments, civilizations, humans] (Tokyo: Hōzōkan, 1998): 148-163.

lifespans that even optimistic estimates assigned to the reservoirs. Dreams of hydraulic plenty in Taiwan have dried up as reservoir after reservoir has begun to store more silt than water. Figure 6.1 shows Wushe reservoir in February 2023, after decades of steady decline in water levels. Water is barely visible in the photo. Tufts of scraggly grass have reclaimed the riparian land that was once submerged and, before that, was home to people and farms. Amidst a growing scarcity of water, threats of flooding and landslide remains present, particularly for highland indigenous communities.

A resilient response to global warming requires both understanding and imagination. Taiwan's environmental geography, infrastructure of water conservation, and the governing structure for state-owned forests that pervades the vast interior all have their origins in the Japanese colonial period. Colonialism's alluvium lies deep. What I have offered here is one way of understanding that historical inheritance. My hope is that this knowledge can prove fertile ground for imagination to take root.



Figure 6.1: Wushe reservoir, February 2023. Photo by author.

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