The Emergence of *Sō-on* : Factory Music, Noise, and An/aesthetic Strategies for Industrial Management

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Abstract: This article analyzes how early twentieth-century Japanese intellectuals, policymakers, and bureaucrats understood the nexus of sound, music, and labor in industrial management. Japanese authors considered how to contend with *sō-on* (noise) in factories, which, for managers, threatened productivity. We trace the development of *kōjō ongaku* (factory music) in response to *sō-on* in the context of Scientific Management and paternalism. Such management strategies are aesthetic, in contrast with anaesthetic ones like soundproofing. Through this an/aesthetic framework, we identify the paternalistic ideology behind *kōjō ongaku*'s practical implementation in industrial Japan and analyze the global historical dynamics of noise abatement, occupational health, and industrial music.

Industrial production is intimately related to the production of noise. As factories proliferate, populations multiply, machines become more powerful, and sounds impinge with greater frequency and force on more spheres of life. Workers and urban residents increasingly exposed to such sensory intensifications face greater risks to their well-being. This suite of problems applies to early twentieth-century Japan, where a range of mitigations were developed. Physicist Obata Jūichi, who studied acoustics and researched urban noises at Tokyo Imperial University, framed the problem in drastic

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terms when he claimed that early twentieth-century Japan was in the midst of an "era of noise terror" (*sō-on kyōfu jidai*).[1]

Physicists' understandings of noise and music informed much early discourse around noise as a matter of public health in Japan and elsewhere. Obata defined noise (*sō-on*) as sounds with "irregular vibration" or consisting of "multiple vibrations with unrelated frequencies" that consequently generate "unpleasant feelings."[2] Obata's study on noise referenced the works of British and American physicists such as G. W. C. Kaye, John C. Steinberg, and A. H. Davis.[3] Obata contrasted noise with musical tone (*gakuon*), which he defined as sounds whose waves are instead "regular" and which generate "pleasant feelings."[4] This dual classification of sounds into "unpleasant" noise and "pleasant" musical tone may be traced to the earlier writings of American neurologist George Miller Beard. In *American Nervousness* (1881), Beard contrasted the "unrhythmical, unmelodious and therefore annoying, if not injurious" noises caused by "the appliances and accompaniments of civilization" with the "[r]hythmical, melodious, musical sounds [that] are not only agreeable, but . . . beneficial, and may be ranked among our therapeutical agencies."[5] Beard's formulation constitutes a dual typology of industrial sound in which noise is injurious, in contrast to music which is therapeutic. Two decades later, this typology surfaces at the intersection of healthcare and Western physics as part of the *ijutsu kaigyō*

1. Obata Jūichi, "Kikai sō-on no seishitsu to sono sokutei," *Kikai*, No. 42 (1931), p. 4; see also Obata Jūichi and Morita Sakae, "Sō-on no kenkyū, I," *Tōkyō Teikoku Daigaku kōkū kenkyūjo ihō*, No. 92 (1932), p. 249. For more on Obata's work on *sō-on* at Tokyo Imperial University, see Obata Jūichi and Morita Sakae, "Sō-on no kenkyū, II," *Tōkyō Teikoku Daigaku kōkū kenkyūjo ihō*, No. 94 (1932), pp. 418–34, "Sō-on no kenkyū, III," *Tōkyō Teikoku Daigaku kōkū kenkyūjo ihō*, No. 98 (1932), pp. 791–803, and "Sō-on no kenkyū, VI," *Tōkyō Teikoku Daigaku kōkū kenkyūjo ihō*, No. 112 (1933), pp. 704–9; Obata Jūichi, Morita Sakae, and Dohi Kenzō, "Sō-on no kenkyū, IV," *Tōkyō Teikoku Daigaku kōkū kenkyūjo ihō*, No. 104 (1933), pp. 206–12; Obata Jūichi, Hirose Kin'ichi, Matsumoto Hiroshi, and Morita Sakae, "Sō-on no kenkyū, V," *Tōkyō Teikoku Daigaku kōkū kenkyūjo ihō*, No. 106 (1933), pp. 370–81.

2. See Obata and Morita, "Sō-on no kenkyū, I," pp. 249–50. While the *kanji* 騒音 was predominantly used for *sō-on*, physicists around that time, such as Obata Jūichi and Morita Sakae, also used 噪音 especially when they described sounds with "irregular vibration," regardless of whether they generated "unpleasant feelings." Nevertheless, Obata and Morita used the former in their study's title. For more on the distinction between 騒音 and 噪音, see Morita Sakae, *Sō-on* (Iwanami Shoten, 1937), pp. 1–3.

3. G. W. C. Kaye, "Noise and Its Measurement," *Nature*, Vol. 128 (1931), pp. 253–64; John C. Steinberg, "Noise Measurements," *Electrical Engineering*, Vol. 50, No. 1 (1931), pp. 42–45; A. H. Davis, "Noise," *Aeronautical Journal*, Vol. 35, No. 248 (1931), pp. 675–710. See Obata and Morita, "Sō-on no kenkyū, I," p. 250.

4. Obata, "Kikai sō-on no seishitsu to sono sokutei," p. 4; see also Obata and Morita, "Sō-on no kenkyū, I," p. 249.

5. George Miller Beard, *American Nervousness: Its Causes and Consequences* (G. P. Putnam's Sons, 1881), pp. 106–7.

shiken—tests conducted in Japan between 1875 and 1916 for physicians wanting to open a clinic. The May 9, 1903, issue of *Asahi shinbun* printed several such exam questions, including those from a Western physics section that asked examinees to identify the difference between noise/*sō-on* and musical tone/*gakuon*.[6] Western physics contributed to early conceptualizations of *sō-on* and shaped ethical attitudes toward this dual typology of sounds in modern Japanese society.

During the early twentieth century, the uptick of noise as an industrial by-product was a global problem that challenged industrialists to develop strategies for contending with its threat to work efficiency and productivity. Japanese intellectuals, policymakers, bureaucrats, and industrial management experts considered how to reduce noise in the workplace. Early models for Japanese intellectuals and factory managers were Frederick Winslow Taylor's *The Principles of Scientific Management* (1911) and Hugo Münsterberg's *Psychology and Industrial Efficiency* (1913).[7] Taylor's Scientific Management was developed in the United States and introduced to Japan as *kagakuteki kanrihō* at the beginning of the Taisho period (1912–26).[8] Scientific Management strongly influenced the work of managerial experts in early twentieth-century Japan such as Ueno Yōichi, Kanda Kōichi, Katsuta Hajime, and others. Their proposed strategies for reducing *sō-on* included relocating noisy machines, using soundproofing materials, and wearing earplugs. But other strategies asserted music's role in managing factories and mitigating noise.

This article provides an interpretive framework for sorting these proposed solutions into two categories: anaesthetic and aesthetic. We cull several emblematic works of industrial management, written mostly between the 1910s and the 1930s, and situate them within these two categories. By anaesthetic, we refer to strategies for reducing noise, including altering materials and implementing acoustical treatment. Such strategies are anaesthetic to the extent that their function is to dampen, quiet, or otherwise negate unwanted noise. Japanese authors who proposed this anaesthetic approach were all influenced by Taylor's Scientific Management. In contrast with anaesthetic interventions, aesthetic strategies for contending with industrial noise went beyond material mitigations; in such strategies, factory managers

6. "Ijutsu kaigyō shiken mondai," *Asahi shinbun*, May 9, 1903, morning edition, p. 1.

7. Frederick Winslow Taylor, *The Principles of Scientific Management* (Harper, 1914 [1911]); Hugo Münsterberg, *Psychology and Industrial Efficiency* (Houghton Mifflin, 1913).

8. In this article, we capitalize "Scientific Management" to refer to practices, works, and philosophies rooted in Frederick Winslow Taylor's work on industrial management, as distinct from factory management work that was scientific but not explicitly Taylorite. We have adopted William M. Tsutsui's approach in this regard. See William M. Tsutsui, *Manufacturing Ideology: Scientific Management in Twentieth-Century Japan* (Princeton University Press, 1998).

envelop industrial spaces—not only shop floors, but also employee dormitories, dining rooms, and factory yards—with recorded and live musical programs. Such musical interventions constitute what Lorraine Plourde has called "sound as atmospheric technique" for controlling workers' emotions and increasing production efficiency.[9] In this article, we focus on the development of factory music in Japan, or *kōjō ongaku*, from around 1920 as an aesthetic response to the problem of noise.

For those who helped codify *kōjō ongaku*, getting workers to listen to and perform factory music were techniques for increasing work efficiency in modern factory settings. Two important figures who expounded on *kōjō ongaku* were lyricist and poet Kobayashi Aiyū and composer Hirota Ryūtarō. Their writings demonstrate that *kōjō ongaku*'s function was to foster synchrony and harmony between factory workers and the workplace through the sounds, rhythms, and music they listened to and produced. This aesthetic approach reflected the practices and philosophy of Japanese paternalism (*onjōshugi*). In this strategy, factory workers were expected to participate in music making and fill their activities away from the shop floor with music. Taylorite approaches, such as noise abatement, focused their interventions on shop-floor production processes. In contrast, paternalist approaches attended to workers' experiences and emotional well-being, especially when not working. As we demonstrate, *kōjō ongaku* was further intended to reduce employee turnover and prevent strikes and slowdowns. In the early 1920s, Kobayashi and Hirota originally developed *kōjō ongaku* in the textile industry, which mostly comprised young female workers. But throughout the 1930s, *kōjō ongaku* spread across heavy industries which, in contrast, were the domain of male workers. Industrial music programs were widespread, especially during wartime, in Japan and other countries such as the United States, Canada, Mexico, and Britain.

The coeval emergence of Scientific Management, factory noise, and divergent strategies for contending with noise in early industrial Japanese factories are symptoms of modernity's broader impingements upon the sensorium. Distinguishing anaesthetic from aesthetic strategies helps us to understand large-scale industrial transformations and their effects at the scale of human bodies and sensory experiences. Susan Buck-Morss's analysis of late nineteenth-century European and U.S. factories and medical practices is a model for this an/aesthetic framework. She posits that sensory shock and the consequent need to cope are fundamental effects of modernity. To the extent that industrialization augments human capacities for speed, power, and productivity, it "thereby produces a counter-need to use technology as

9. Lorraine Plourde, *Tokyo Listening: Sound and Sense in a Contemporary City* (Wesleyan University Press, 2019), p. 78.

a protective shield" against the harms it creates.[10] We understand industrial noise as one such harm. Focusing on roughly the same period in Japan, Michael K. Bourdaghs has identified these corporeal effects as "a shift that occurred . . . from the 1870s to the 1940s, in which human bodies in Japan (and elsewhere) underwent a remarkable transformation" resulting from "the rise of new industrial, military, educational, and medical regimens."[11] We situate the primary sources within both the general sensory shock problematic that Buck-Morss identifies and the specific national and industrial transformations that Bourdaghs names. Doing so helps us to contextualize these sources within larger global historical processes, to understand how practitioners of industrial management proposed both anaesthetic and aesthetic interventions, and to identify the paternalistic ideology undergirding the development of *kōjō ongaku* in industrial Japan.

Though noise is intangible and does not accrue like other forms of waste, it is an "insidious pollutant" in industrial societies to the extent that it may cause hearing loss and other diseases.[12] Much public effort has been devoted to controlling such unwanted sounds, as the works of Karin Bijsterveld, Emily Thompson, and Marina Peterson, among others, have documented in their Western histories of noise in the twentieth century.[13] More recently, "orphic media" devices such as noise-canceling headphones and white-noise machines have emerged as technologies to foster feelings

10. Susan Buck-Morss, "Aesthetics and Anaesthetics: Walter Benjamin's Artwork Essay Reconsidered," *October*, Vol. 62 (1992), p. 33.

11. Michael K. Bourdaghs, *The Dawn That Never Comes: Shimazaki Tōson and Japanese Nationalism* (Columbia University Press, 2003), p. 50.

12. Clifford R. Bragdon distinguishes between "consciously perceived" and "insidious effects" of noise on human health. The former impairs thinking, communication, and productivity, while the latter may gradually cause hearing loss and stress-related diseases. Clifford R. Bragdon, *Noise Pollution: The Unquiet Crisis* (University of Pennsylvania Press, 1971). For more recent scientific and theoretical work on noise pollution, see Ahmad Ali Kheirandish and Hamideh Bidel, "Investigation of Noise Pollution Distribution in Different Parts of Yazd Textile Factories," *Archives of Occupational Health*, Vol. 5, No. 2 (2021), pp. 993–99; Leonardo Cardoso, *Sound-Politics in São Paulo* (Oxford University Press, 2019); Daniel Belgrad, *The Culture of Feedback: Ecological Thinking in Seventies America* (University of Chicago Press, 2019); Jennifer C. Hsieh, "Making Noise in Urban Taiwan: Decibels, the State, and Sono-sociality," *American Ethnologist*, Vol. 48, No. 1 (2021), pp. 51–64. David Novak's work, on the other hand, importantly highlights the aesthetic value of noise, noting that "noise is inherent in all musical sounds and their mediated reproductions"; David Novak, "Noise," in David Novak and Matt Sakakeeny, eds., *Keywords in Sound* (Duke University Press, 2015), p. 126.

13. Karin Bijsterveld, *Mechanical Sound: Technology, Culture, and Public Problems of Noise in the Twentieth Century* (MIT Press, 2008); Emily Thompson, *The Soundscape of Modernity: Architectural Acoustics and the Culture of Listening in America, 1900–1933* (MIT Press, 2002), pp. 115–68; Marina Peterson, *Atmospheric Noise: The Indefinite Urbanism of Los Angeles* (Duke University Press, 2021).

of safety and control over one's sonic environments.[14] We add to such global histories of the aural by organizing and analyzing Japanese authors' differing proposals within the an/aesthetic framework while also firmly rooting our study in the scholarly literature on modern management methods in industrial Japan.[15] We add to the work of scholars who have considered music's role in the dynamics of power and gender in Japanese factories and schools as well as to broader historical and ethnographic understandings of sound in the field of Japan studies.[16]

Regulating Noise and Preserving Public Morality in Industrial Society

Discussions about noise regulation emerged gradually in industrial Japan. In late 1872, an ordinance on public morals, called *ishiki kaii jōrei*, was first promulgated in Tokyo and was extended throughout the country the following year. The ordinance was designed to regulate behavior considered to flout public morals and security norms. A later revision to the ordinance regulated loud disturbances to daily life. For instance, in Ōita Prefecture, the 1876 revision prohibited loud singing in the street and making music after midnight that would disturb neighbors' sleep.[17] Sueoka Shin'ichi considers *ishiki kaii jōrei* in the late nineteenth century to be the first governmental attempt to regulate noise in the history of modern Japan.[18] Newspaper articles in the late nineteenth century attest to loud sounds from late-night construction and sporting events as sources of contention between neighbors.[19]

Early twentieth-century writings from the United States and Britain informed early Japanese writings on *sō-on*. Moses Nelson Baker's *Municipal*

14. Mack Hagood, *Hush: Media and Sonic Self-Control* (Duke University Press, 2019).

15. E.g., Sasaki Satoshi, *Kagakuteki kanrihō no Nihon teki tenkai* (Yuhikaku, 1998); Tsutsui, *Manufacturing Ideology*; Hazama Hiroshi, *Nihon teki keiei no keifu* (Bunshindō, 1989), and *The History of Labour Management in Japan*, trans. Mari Sako and Eri Sako (St. Martin's Press, 1997).

16. See, for example, Mariko Asano Tamanoi, *Under the Shadow of Nationalism: Politics and Poetics of Rural Japanese Women* (University of Hawai'i Press, 1998); Noriko Manabe, "Western Music in Japan: The Evolution of Styles in Children's Songs, Hip-Hop, and Other Genres" (PhD diss., CUNY, 2009); Raja Adal, *Beauty in the Age of Empire: Japan, Egypt, and the Global History of Aesthetic Education* (Columbia University Press, 2019); Joseph D. Hankins and Carolyn S. Stevens, eds., *Sound, Space, and Sociality in Modern Japan* (Routledge, 2014); Marié Abe, *Resonances of Chindon-ya: Sounding Space and Sociality in Contemporary Japan* (Wesleyan University Press, 2018); Plourde, *Tokyo Listening*.

17. See Haruta Kunio, "Ishiki kaii jōrei no kenkyū: bunmei kaika to shomin seikatsu no sōkoku," *Beppu Daigaku tankidaigakubu kiyō*, Vol. 13 (1994), p. 47.

18. Sueoka Shin'ichi, "Sō-on kisei no rekishi," *Sō-on seigyo*, Vol. 25, No. 2 (2001), p. 66.

19. See, for example, "Higashi-ku Uchiandōji-machi 2 chōme," *Asahi shinbun*, January 24, 1882, morning edition, p. 3; "Nanchi Hōzenji," *Asahi shinbun*, October 29, 1880, morning edition, p. 2.

Engineering and Sanitation (1901) was translated into Japanese by Inoue Shūji in *Toshi no keiei* (Municipal management) (1904).[20] In chapter 26, entitled "Suppression of Noises"/"Sō-on no yokusei," Baker considers city noises "the most serious offences against the sense of hearing."[21] The sounds of street traffic could be abated, he explained, through material alterations: asphalt and brick instead of rougher paving materials and rubber tires instead of wood. Baker recommended using subways for streetcar service, which would reduce street-level noise. Despite these suggestions, he ultimately considered such sounds "necessary noises" of industrialized society.[22] As early as the beginning of the twentieth century, noise/*sō-on* was considered harmful to one's health and something to be abated in society, both in the West and in Japan.

In his 1938 book *Hibiki* (Echoes), Obata Jūichi discusses at length the Tokyo Metropolitan Police Department's regulation of loud sounds.[23] In response to the proliferation of radios, phonographs, drums, and other electrical equipment that produced noise disturbances, the *kō-on torishimari kisoku* (regulation on loud sounds) went into effect on January 1, 1938, as a Metropolitan Police Board ordinance (*keishichō rei*).[24] Obata points out that *kō-on* was, in fact, an inappropriate word because it technically referred to high-pitched sounds, such as soprano voice and the flute used in the *nō* theater, and not loud sounds.[25] What the Metropolitan Police Department likely intended by *kō-on* was a "strong" or "large" sound—and not a musical tone—that disturbed work and sleep or reduced work efficiency. This terminological slippage implies that those with the institutional authority to regulate noise in early twentieth-century Japan did not yet clearly distinguish between the pitch and the intensity of sound.

In early twentieth-century Japan, physicists like Obata introduced different Western-derived methods of measuring noise. In his 1935 book *Oto* (Sounds), Obata explains instruments and three methods of measuring noise using an audiometer, a tuning fork, and a microphone together with an indicating noise meter. He used Western Electric's (U.S.) Audiometer to measure different kinds of noise in Tokyo City. He categorized some noises based on their machine sources (e.g., trains, subways, road vehicles, traffic bells, and construction machinery [50–95 dB]) or their human sources

20. Moses Nelson Baker, *Municipal Engineering and Sanitation* (Macmillan, 1906 [1901]), and *Toshi no keiei*, trans. Inoue Shūji (Kyotoshi Sanjikai, 1904).

21. See Baker, *Municipal Engineering and Sanitation*, pp. 196–98, and *Toshi no keiei*, pp. 183–85.

22. Baker, *Municipal Engineering and Sanitation*, p. 196.

23. See Obata Jūichi, *Hibiki* (Sagami Shobō, 1938), pp. 185–93.

24. See "Suimin, byōnin ni gai no aru kō-on wa rainen kara shobatsu: kō-on torishimari kisoku seitei," *Kokumin shinbun*, December 21, 1937.

25. Obata, *Hibiki*, p. 185.

(e.g., crowds [60–75 dB]). He also measured particular locations ranging from what he thought were the quietest in Tokyo City (e.g., the cemetery at Gokoku-ji, botanical gardens, Tokyo Imperial University, and the district of Ikenohata [30–35 dB]) to the loudest (e.g., Shinjuku Station [65–75 dB]).[26]

The Acoustical Society of Japan (Nihon Onkyō Gakkai), established April 15, 1936, helped disseminate knowledge about *sō-on*. Its 15 promoters came from diverse disciplines, such as physics, seismology, mechanical engineering, acoustics, physiology, and architecture. While acoustical studies had already been conducted in physics, physiology, psychology, and other applied sciences (e.g., electrical engineering and architecture), the society formed to promote exchange among these distinct disciplinary approaches. Beginning in 1939, the society's journal, *Nihon onkyō gakkai shi*, published research articles on urban noise, workplace sounds, and sound-measuring instruments. Obata Jūichi was among the Acoustical Society's founding members.[27]

Globally, the formation of the Acoustical Society of Japan corresponds with the formation of Euro-American acoustical societies and conferences in the early twentieth century. Such societies represented the institutional coalescence of scientific knowledge, ethical claims on how society should sound, and practices of sounding in and listening to urbanization and industrialization. For instance, contributors to the Acoustical Society of America, founded in 1929, translated their scientific knowledge into explicit ethical claims about how they envisioned their society ought to sound, or not sound.[28] John H. Girdner writes in *The North American Review*, "[The] question of noise is not confined to physical well-being; it is also one of morals. It is wrong to inflict needless pain and discomfort on others, no matter which one of the senses is made to convey the painful sensation."[29]

26. See Obata Jūichi, *Oto* (Iwanami Shoten, 1935), pp. 165, 168–75. The decibel was employed mainly in the United Kingdom and United States, while the phon was used in Germany; Obata, *Oto*, pp. 163–64. By the 1960s the decibel became the common international unit; Günther Flügge, "Sō-on no eikyō o hantei suru kijun'an ni tsuite," trans. Watanabe, *Gurukkuaufu* (Glückauf), Vol. 14, No. 4 (1965), p. 270.

27. On the foundation of the Acoustical Society of Japan, see Kikai Gakkai Shi, "Nihon Onkyō Gakkai no sōritsu," *Kikai gakkai shi*, Vol. 39, No. 230 (1936), p. 345. See, for example, Satō Takeo and Miki Shō, "Jimusho kenchikunai no sō-on: Daiichi Sōgo Kan ni okeru chōsa," *Nihon onkyō gakkai shi*, Vol. 3 (1941), pp. 4–6; Takada Minoru, "Tōkyō-shi ni okeru chika tetsudō sharyō nai no sō-on ni tsuite," *Nihon onkyō gakkai shi*, Vol. 4, No. 4 (1943), pp. 5–6; Hirokawa Genji, "Shiji sō-on kei no genjō," *Nihon onkyō gakkai shi*, Vol. 4, No. 11 (1943), pp. 1–8.

28. See, for example, Donald A. Laird, "The Effects of Noise: A Summary of Experimental Literature," *Journal of the Acoustical Society of America*, Vol. 1, No. 2A (1930), pp. 256–62; Steinberg, "Noise Measurements," pp. 42–45; Davis, "Noise," pp. 675–710.

29. John H. Girdner, "To Abate the Plague of City Noises," *North American Review*, Vol. 165, No. 491 (1897), p. 467; also see John H. Girdner, "The Plague of City Noises," *North American Review*, Vol. 163, No. 478 (1896), pp. 296–303.

Moreover, an unattributed article of the First International Acoustical Conference published in *Nature* in 1937 states:

> There is scarcely any subject which, during the last few years, has assumed greater commercial and social significance than acoustics. Alongside has come the steady growth of noise—that is, unwanted sound—which in its many aspects is beginning to stir the consciousness of the public to such an extent that it is demanding measures for relief in the more outstanding cases.[30]

Such statements along with the formation of acoustical societies demonstrate that during the early twentieth century, the issue of noise pollution in industrial society was a global concern. Noise regulation and abatement were techniques for the preservation of public morality.

The Factory Acts (Kōjō Hō) were first promulgated in 1911 for regulating sound in factory settings and came into effect in 1916. Although the Factory Acts did not specifically mention *sō-on*, they did highlight the importance of maintaining machines—which were main sources of noise—for workers' own safety (the ninth article) and of being cautious about any facilities that had negative effects on public health (the thirteenth article).[31] In addition to the Factory Acts, regulations for factories (*kōjō torishimari kisoku*) were implemented by prefectures across the country. Shizuoka Prefecture, in its own 1937 factory regulations, required that factory managers be cautious about any objects that produced loud noises and, if necessary, remove them from facilities (the eighth article).[32] Newspaper articles in the 1930s reported factory noises that disturbed neighboring residents. For instance, in 1937, *Asahi shinbun* reported on factory noise and noise pollution as public health matters in several issues. Some schools in Tokyo, including Ōtomi Elementary School in Fukagawa-ku, Izumo Elementary School in Kamata-ku, and Second Ōshima Elementary School in Jōtō-ku, were not able to conduct their regular operations due to nearby factory noise. A number of students in these elementary schools suffered from headaches or neurasthenia.[33] Such newspaper reports, the Factory Acts, and public ordinances are evidence of the need, in early twentieth-century Japan, for

30. "The First International Acoustical Conference," *Nature*, Vol. 140 (1937), p. 370.

31. See Kanda Kōichi, *Jissen kōjō kanri* (Kōbunkan, 1912), pp. 600, 601. For more on *kōjō hō*, see Watanabe Akira, "Kōjō-hō shi ga ima ni tou mono," *Nihon rōdō kenkyū zasshi*, No. 562 (2007), pp. 101–10.

32. Shizuoka-ken Kōjō-ka, *Kōjō torishimari kisoku kaisetsu* (Shizuoka Prefecture, 1937), pp. 20–21.

33. See, for example, "Kōjō no sō-on to baien de jugyō mo dekinai," *Asahi shinbun*, August 6, 1937, morning edition, p. 10; "Kondo wa Izumo-kō (Kamata) ni kōjō no sō-on ka," *Asahi shinbun*, July 2, 1937, evening edition, p. 3; "Rinsetsu kōjō no sō-on ga shōgakkō no jugyō bōgai: zutsū o uttaeru jidō," *Asahi shinbun*, June 19, 1937, evening edition, p. 3.

legislative and juridical regulation of noise because it was variously considered injurious to one's health, to public morality, and to work efficiency.

Anaesthetic Strategies

In the early twentieth century, a number of Japanese authors addressed the issue of noise in private factories. Influenced by Frederick Winslow Taylor's work on Scientific Management, their writings proposed practical methods for regulating noise on the shop floor and increasing work efficiency. Kanda Kōichi, in *Kōjō kanri* (Factory management, 1920), acknowledges the impossibility of eradicating *sō-on* from the modern workplace yet maintains the feasibility of reducing it by studying how it is generated.[34] Kanda is considered among the first advocates and practitioners of Scientific Management in Taisho Japan to find fame as a managerial expert.[35] For Kanda, one of the defining characteristics of modern factory work was the proliferation of machines; workers were surrounded by machines of various types and sizes that perpetually produced fierce noise and strong vibrations. Kanda refers to steam engines, gas engines, and electric motors but does not analyze the distinct sounds these machines produced. Such machines put workers at risk of hearing loss from high-pitched noise and nervous system dysfunction from low-pitched noise.

To mitigate such effects, Kanda suggests four approaches to noise abatement in factories: (1) physically isolate motor rooms that produce noise and erect walls with soundproofing materials; (2) avoid highly sound-reflective materials in workshops by using sound-absorbent materials for the floor, ceiling, and walls; (3) frequently lubricate machine parts that produce crepitation and use soundproofing materials for impact-generating parts; and (4) make technical adjustments to belts and other rotating parts to reduce friction and impact. In addition, he recommends that factory workers wear earplugs.[36]

In these suggestions, Kanda omits specifying which soundproofing materials to use. By contrast, the 1936 book entitled *Shinpen kōjō yōkō* (New edition of the factory guidelines) written by the Association for Industrial Education Development (Kōgyō Kyōiku Shinkō Kai) lists various materials and their sound-absorption coefficients.[37] Several materials were deemed particularly effective at reducing noise in factories including, from most to least absorbent, blankets, curtains, cork tiles, linoleum, varnished wood, plaster walls, glass, concrete, and marble (see Table 1). Like Kanda's

34. See Kanda Kōichi, *Kōjō kanri* (Jiji Shinpō, 1920), pp. 296–99.

35. Tsutsui, *Manufacturing Ideology*, p. 23.

36. See Kanda, *Kōjō kanri*, p. 298.

37. See Kōgyō Kyōiku Shinkō Kai, *Shinpen kōjō yōkō* (Kōgyō Kyōiku Shinkō Kai, 1936), p. 28.

Table 1
Soundproofing Materials and Their Sound Absorption Coefficients

Soundproofing Materials	Sound Absorption Coefficients (between 0 and 1)*
Blankets (with thickness of 1 cm)	0.55
Curtains	0.15–0.25
Cork tiles	0.03
Linoleum	0.03
Varnished wood	0.03
Plaster walls	0.03 (0.025–0.034)
Glass	0.03
Concrete	0.02
Marble	0.01

Note: The sound absorption coefficient of each material is between zero and one; in general, larger numbers represent better sound absorption. Coefficients are rounded to two decimal places.
Source: Kōgyō Kyōiku Shinkō Kai, *Shinpen kōjō yōkō* (Kōgyō Kyōiku Shinkō Kai, 1936), p. 28.

Kōjō kanri, *Shinpen kōjō yōkō* argues that *sō-on* deteriorates one's health and reduces work efficiency such that it necessitates abatement through soundproofing.

Another book highlighting factory noise is Katsuta Hajime's *Nōritsu zōshin kōjō setsubi* (Plant facilities that increase work efficiency, 1918). A bureaucrat in the Ministry of Agriculture and Commerce, Katsuta specialized in mechanical engineering and extensively studied factory management, sanitation, facilities, and other issues pertaining to factory workers. Before publishing this book, he had visited dozens of "advanced" factories overseas. Along with the Factory Acts, *Nōritsu zōshin kōjō setsubi* could be consulted as an instructive resource for factory owners and managers. Specifically, the ninth and thirteenth articles of the Factory Acts highlight administrative officials' authority to supervise factory owners to ensure that they have proper plant facilities and equipment that protect workers' health and safety while also preserving public morals. *Nōritsu zōshin kōjō setsubi* studies how to improve plant facilities and argues that proper maintenance yields increased work efficiency.[38]

In Katsuta's view, both noise and machine vibration are injurious and require anaesthetic solutions, as he writes in the section "Zawameki oyobi

38. Katsuta Hajime, *Nōritsu zōshin kōjō setsubi* (Dōbunkan, 1918). For the ninth and thirteenth articles of *kōjō hō*, see Kanda, *Jissen kōjō kanri*, pp. 600, 601.

shindō no yobō" (The prevention of both noise and vibration). The factories that produced the severest noise, Katsuta states, were those that manufactured machines or ships or that made use of caulking, riveting, and pneumatic tools. Like Kanda, Katsuta suggests material solutions: he encourages factory workers to wear cotton or paper earplugs, he advises factories to use soundproofing techniques such as double-glazed windows and double floorings, and he discourages the practice of building factories in city centers. The extent of this problem of urban noise is demonstrated in several 1930s newspaper articles that reported on noise pollution in Tokyo, specifically showing how factory noise could harm residents' health.[39]

For others, industrial competition on the global stage is a key motivator for addressing the inefficiencies of factory noise. For instance, in *Kōjō keiei no mikata* (Views on factory management, 1925), Horikawa Jun'ichirō, a journalist at the newspaper company Jiji Shinpō, addresses noise in relation to work efficiency. Horikawa thinks that Japan requires further innovations in the industrial sector because greater coordination between capital, enterprises, industrial theory, and labor is needed to compete against other nation-states in the international economic race. In Horikawa's view, the study of how to increase work efficiency (*nōritsu zōshin*) is aimed at realizing the following aims simultaneously: reduce working hours, increase wages, and decrease production costs.[40]

Despite its focus on international competition, *Kōjō keiei no mikata* seems to have been partly written from workers' perspective. In his introductory chapter, Horikawa treats worker issues at length.[41] He understands that, in Japan, labor issues emerged as factory-based industry (*kōjōsei kōgyō*) gradually replaced cottage industry (*kanai kōgyō*). The development of this factory-based industry was supported by machines from the European Industrial Revolution such as James Watt's steam engine, Edmund Cartwright's power loom, Robert Fulton's steamboat, and George Stephenson's steam locomotive. After the Meiji Restoration and in combination with the new banking and company systems, these Western technologies spurred Japan's industrial development. However, Horikawa views such progress as also yielding a deterioration of conditions for laborers who, in his view, deserve humane working conditions. Horikawa believes that the essence of worker issues is rooted in the claim that capitalists and workers should always be on equal footing and hold equal rights.[42]

39. See Katsuta, *Nōritsu zōshin kōjō setsubi*, pp. 404–5. See "Kōjō no sō-on to baien de jugyō mo dekinai," p. 10; "Kondo wa Izumo-kō (Kamata) ni kōjō no sō-on ka," p. 3; "Rinsetsu kōjō no sō-on ga shōgakkō no jugyō bōgai," p. 3.

40. Horikawa Jun'ichirō, *Kōjō keiei no mikata* (Nihon Hyōron Sha, 1925), pp. i, ii.

41. Ibid., especially pp. 16–31.

42. Ibid., pp. 24–25.

In the sixth chapter of *Kōjō keiei no mikata*, there is a short section on the relationship between noise and work efficiency. At the beginning, Horikawa remarks, "As civilization progresses, the number of noise cases increases; as our society moves faster and faster, noise becomes louder and louder."[43] He is particularly concerned with noise's negative effects on work efficiency in factory settings, as it can distract workers and hamper their work. Factory owners need to figure out exactly where noise is produced in factories and maximize the distance between its source and workers in order to increase work efficiency.

Psychologist and management consultant Ueno Yōichi—often called the "father of efficiency" and the "Taylor of Japan"[44]—has also discussed the issue of noise and how to combat it in the workshop. In 1922, Ueno became the director of the Harmonization Society's (Kyōchōkai; a semigovernmental organization) new Industrial Efficiency Institute (Sangyō Nōritsu Kenkyūjo) where he was responsible for disseminating Taylor's Scientific Management methods and philosophy.[45] In chapter 11 of *Sangyō nōritsu ron* (Industrial efficiency theory, 1929), Ueno proposes anaesthetic interventions to contend with noise. Ueno suggests three approaches: eliminate sources of noise, prevent sound transmission through walls, and, where the first two approaches are not viable, minimize noise levels by using sound-absorptive materials. Ueno understands noise not only as a threat to work efficiency but also as a disturbance to the peace of everyday life. He briefly mentions the development of U.S. municipal engineering and its attempts to address urban and industrial noise.[46] Ueno further indicates his awareness of current studies on soundproofing materials, such as the one conducted in a psychology laboratory at Colgate University in Hamilton, New York.[47]

In early twentieth-century Japan, those who proposed anaesthetic solutions to industrial noise in their writings were fundamentally influenced by Taylor's Scientific Management, especially sharing its value of maximizing efficiency. Despite its influence on such strategies for noise abatement in Japan, Taylor's *The Principles of Scientific Management* omits any discussion of noise, music, or sound. Ueno's work demonstrates that American and European developments in noise abatement technologies and techniques were

43. Ibid., p. 126.

44. Tsutsui, *Manufacturing Ideology*, p. 20.

45. Ibid., p. 27.

46. See Ueno Yōichi, *Sangyō nōritsu ron* (Chikura Shobō, 1929), pp. 246–50. Consider the case of New York, for example, which in 1929 established the Noise Abatement Commission; as Lilian Radovac puts it, the commission "undertook a landmark study of urban noise that framed unwanted sound as a primarily technological problem." Lilian Radovac, "The 'War on Noise': Sound and Space in La Guardia's New York," *American Quarterly*, Vol. 63, No. 3 (2011), p. 735. See also Thompson, *The Soundscape of Modernity*, chapter 4.

47. See Ueno, *Sangyō nōritsu ron*, pp. 249–50.

influencing Japanese industrial management theory throughout the 1910s and 1920s.

Aesthetic Strategies

Distinct from the material, anaesthetic approaches proposed by Kanda, Katsuta, and Ueno, Horikawa developed an aesthetic solution to industrial noise. In a short section of *Kōjō keiei no mikata* on the relationship between rhythm and work efficiency, he discusses the role and effectiveness of making music in factories. For Horikawa, one of the most effective ways to increase work efficiency is to unify workers' motions through rhythm: "[making music together] corrects each individual's motion and harmonizes it with others; it is aimed at reducing one's fatigue and increasing work efficiency." Repertoires of such music include work songs for rice planters, coal miners, and silk reelers, among others.[48]

Horikawa's theory of rhythmic coordination resembles the positive view of rhythm as conducive to labor as described by Karl Bücher in *Arbeit und Rhythmus* (Labor and rhythm, 1896) and which industrial psychologists such as Charles M. Diserens and Harry Fine would later cite in their own theories. Likewise describing the utilitarian function of sea shanties, William Saunders wrote in 1928 that "the rhythmical appropriateness of the song for the accompaniment of labor of this character is almost uncanny in its perfection." In fact, one such "folk-song of the sea" titled "Saucy Sailor Boy" made its way from being sung by men laboring on ships to becoming popular among "factory girls in the east of London" before World War I.[49] While developed under distinct circumstances, these examples all demonstrate a positively aesthetic approach to performing labor—namely, that music has significant value in countering the unpleasantries and inefficiencies of working, especially in industrial settings, value that anaesthetic and material approaches alone do not possess.

In early industrial Japan, aesthetic managerial strategies emerged based on the shared conviction that music, in contrast to noise, had positive effects on laborers. Like Obata Jūichi, psychologist Tanaka Kan'ichi in *Ningen kōgaku* (Ergonomics, 1921) classifies sounds into noise (*sō-on*) and musical tone (*gakuon*). Whereas unrhythmical or irregular noises threaten efficiency, according to Tanaka, regular or well-tuned sounds by contrast

48. Horikawa, *Kōjō keiei no mikata*, pp. 126–27.

49. See Karl Bücher, *Arbeit und Rhythmus* (S. Hertzel, 1896); Charles M. Diserens and Harry Fine, *A Psychology of Music: The Influence of Music on Behavior* (Cincinnati College of Music, 1939), pp. 216–17; Charles M. Diserens, *The Influence of Music on Behavior* (Princeton University Press, 1926); William Saunders, "Sailor Songs and Songs of the Sea," *Musical Quarterly*, Vol. 14, No. 3 (1928), pp. 344, 348.

positively affect work performance.[50] Tanaka's idea accords with George Miller Beard's conflation of the unmusical with the injurious and of the musical with the therapeutic, as mentioned previously.[51] Just as Japanese physicists and policymakers were concerned about industrial noise's injurious effects on public health, educators were concerned about how the proliferation of popular, "vulgar" music—especially the *ryūkōka* (popular songs) genre—might corrupt children's moral sensibilities.[52] In early industrial Japan, both noise and such "lowly" music were thus susceptible to regulation because the former was deemed injurious to health and the latter dangerous to the "heart." The dual typology we introduced earlier thus requires updating: music has not always been understood as a therapeutic panacea for modern industrial society's ills. In fact, late nineteenth-century teachers in Japan "had been concerned with the dangers of music" since "songs were potent means of both hegemony and resistance."[53]

The works of Tanaka and Horikawa indicate that *sō-on*—which had been defined by modern physics—and *gakuon*—developed in the domain of arts—were already circulating in factory management discourse during the 1920s. Both Tanaka and Horikawa imply that these two "sounds" developed mutually in modern industrial Japanese society. However, we think their discussion lacks a clear explanation of how music and noise could practically occur in the same physical space.[54] We suppose that each factory's operating machines produce different noises with their own loudness, and this variable significantly affects the practical implementation of listening to and performing workplace music. The issue was later addressed but

50. Tanaka Kan'ichi, *Ningen kōgaku* (Yūbunkan, 1921), pp. 368–69.

51. See Beard, *American Nervousness*, pp. 106–7.

52. The authors of a manual edited by the Tokyo City Atago Higher Primary School wrote in 1936 that "people living in modern cities are surrounded by a jumble of music, whether cultured or vulgar. . . . [M]odern man is forced to hear them [base songs] incessantly in the street and on the radio. This is why education in music appreciation should foster an independent attitude by adopting elevating and pure-hearted songs and abolishing lowly vulgar ones." Quoted in Adal, *Beauty in the Age of Empire*, p. 69. On the movement to eliminate *ryūkōka* from elementary schools, see Keisuke Yamada, "Mobilizing Citizens' Ears: Aural Training as Civil Defense, 1941–45," *Technology and Culture*, Vol. 64, No. 2 (2023), p. 366, note 33.

53. Raja Adal uses "heart" as an English catch-all for "*shinjō*, *shinzō*, *kokoro*, or *haifu*," all of which "referred to the child's inner life, which music was tasked with educating." Adal, *Beauty in the Age of Empire*, pp. 44, 68.

54. Buck-Morss calls such sensory overload "technoaesthetics," whose "goal is manipulation of the synaesthetic system by control of environmental stimuli. It has the effect of anaesthetizing the organism, not through numbing, but through flooding the senses. These simulated sensoria alter consciousness, much like a drug, but they do so through sensory distraction rather than chemical alteration, and—most significantly—their effects are experienced collectively rather than individually." Buck-Morss, "Aesthetics and Anaesthetics," pp. 22–23.

had still not been resolved by the early 1940s.[55] In *Psychology and Industrial Efficiency* (1913), Hugo Münsterberg appears to be aware of this problem: "Many factories in which the labor is noiseless, as in the making of cigars, have introduced gramophone music or reading aloud, and it is easy to understand theoretically that a certain animating effect results, which stimulates the whole psychophysical activity."[56] While during the 1920s a few Japanese authors were curious about music's capacity to improve work efficiency in theory, their work does not sufficiently explain the practical implementation of music in industrial workplaces.

Research on music's psychological effects in the workplace was conducted in the United States and published as early as the 1920s. For instance, American psychologist Esther L. Gatewood's study of the positive effects of music on productivity in an architectural drafting room made an important contribution to the development of an industrial psychology of background music. Contemporaneously, Charles S. Myers also studied music's psychological effects, served as president of the British Psychological Society, and was an important figure for the development of industrial psychology in Britain. Such early studies in industrial psychology led to the creation of the British Broadcasting Company's *Music While You Work* (MWYW), a daily radio show from 1940 until 1967 designed for millions of British factory workers. The musical program was intended to "resound appropriately through the large industrial spaces and above the constant mechanical noise which defined the factory's sonic landscape." MWYW consisted mostly of "light" music, or "melody-driven, instrumental compositions aimed at a popular audience." Winford Reynolds, director of MWYW, specified that "the worker . . . does not work to the rhythm of the music"; instead, Reynolds believed that musical programs in factories had a general enveloping effect throughout the workday that ultimately increased productivity and reduced boredom. In the aesthetic strategy, factory managers enveloped industrial spaces with melodic music as an industrial psychological technique for controlling workers' emotions.[57]

55. See Suzuki Shun'ichi, *Kinrō bunka* (Tōyō Shokan, 1942), pp. 202–3.

56. Münsterberg, *Psychology and Industrial Efficiency*, p. 233.

57. Keith Jones, "Music in Factories: A Twentieth-Century Technique for Control of the Productive Self," *Social and Cultural Geography*, Vol. 6, No. 5 (2005), p. 727; see Esther L. Gatewood, "An Experiment in the Use of Music in an Architectural Drafting Room," *Journal of Applied Psychology*, Vol. 5, No. 4 (1921), pp. 350–58; see C. S. Myers and C. W. Valentine, "A Study of the Individual Differences in Attitude towards Tones," *British Journal of Psychology*, Vol. 7, No. 1 (1914), pp. 68–111; Charles S. Myers, "Individual Differences in Listening to Music," *British Journal of Psychology*, Vol. 13, No. 1 (1922), pp. 52–71; on MWYW quotations, see Jones, "Music in Factories," pp. 724, 731; Winford Reynolds quoted in Doron K. Antrim, "Music in Industry," *Musical Quarterly*, Vol. 29, No. 3 (1943), pp. 284–85; on enveloping industrial space with music, see Jones, "Music in Factories," especially p. 729.

Having considered the broader development of musical practices in factories elsewhere, we turn to the use of *kōjō ongaku* in early twentieth-century Japan. According to *Ongaku nenkan, Taishō jūichinen ban* (Music yearbook, 1922 edition), *kōjō ongaku* first appeared around 1920 thanks to the contributions of two important figures: lyricist and poet Kobayashi Aiyū and composer Hirota Ryūtarō. This yearbook credits Kobayashi and Hirota with originating *kōjō ongaku* as a genre unto itself that was primarily aimed at easing factory workers' fatigue and stress amid frequent exposure to loud mechanical noises. The development of *kōjō ongaku* as a "genre" resembles what American acoustician Harold Burris-Meyer described as a distinct type of industrial music in which "the composer starts to think of his work as first and foremost performed in the factory." Hence, in aesthetic managerial strategies, factories were not only sites for playing recorded music but were also sites for developing distinct musical repertoires and practices for contending with industrial labor's inefficiencies and distractions—including noise itself.[58]

In his 1923 book *Kōjō ongaku tsūkai* (A commentary on factory music), Kobayashi Aiyū codifies a theory and repertoire of *kōjō ongaku*. He divides *kōjō ongaku* into two categories: music that workers themselves sing and music that workers listen to. The first category comprises several types of songs. The first type, *kōjō ka* (factory songs), includes songs about the company and its history, surrounding landscape, principles, and key products. Kobayashi argues that when sung by workers, *kōjō ka* inculcate in them a strong emotional attachment to the factory and the industry at large. Consider the following *kōjō ka* sung among workers of Fujibō's (or Fuji Bōseki's) Onagigawa factory, translated to English:

> In the east of the capital,
> Sits a lofty factory in this industrial district,
> Owned by Fuji Bōseki,
> Its name is old Onagigawa.

Kobayashi and Hirota instructed workers at this factory how to sing this song. The lyrics represent the Onagigawa factory as a landmark of the industrial district. Kobayashi noted that female workers were enthusiastic about learning the song.[59]

The second type that Kobayashi outlines is *sagyō ka* (work songs). In accordance with Horikawa Jun'ichirō's and Tanaka Kan'ichi's arguments,

58. Gakuhō-kai, ed., *Ongaku nenkan, Taishō jūichinen ban* (Takenaka Shoten, 1922), p. 33; Harold Burris-Meye quoted in Antrim, "Music in Industry," p. 290.

59. On Kobayashi's two categories, see Kobayashi Aiyū, *Kōjō ongaku tsūkai* (Aionkai Shuppanbu, 1923), p. 6; on emotional attachment, see pp. 7–8; on *kōjō ka* at Onagigawa and on workers' enthusiasm, see p. 40.

Kobayashi maintained that singing appropriate *sagyō ka* in the workplace positively affected work performance and helped increase work efficiency. Kobayashi recommends that the third type, *kyūkei ka* (songs during a break), be sung during breaks. The fourth type, *undō ka* (songs while exercising), often including choreographed dances, is to be performed, for example, at annual factory athletic meets in spring and fall. The fifth type is *kishukusha no uta* (songs in a dormitory). The sixth type is *bon odori no kaizō kyoku* (songs arranged for the Bon Festival [a summertime Japanese Buddhist custom in which people honor their ancestors]). In 1922, Kobayashi initially attempted to compose such a song for Fujibō's Hodogaya factory in Kanagawa Prefecture. The seventh type is *kōjo kageki* (operas performed by female workers). The then head of Fujibō's Hodogaya factory, Endō Sōroku, asked Kobayashi to compose operas to be performed by Fujibō's female

Figure 1. Female workers performing an opera entitled *Tsuki no sekai kara* (From the lunar world). Circa early 1920s.
Source: Kobayashi Aiyū, *Kōjō ongaku tsūkai* (Aionkai Shuppanbu, 1923), unpaginated. Preserved by the National Diet Library, Tokyo. https://dl.ndl.go.jp; open access.

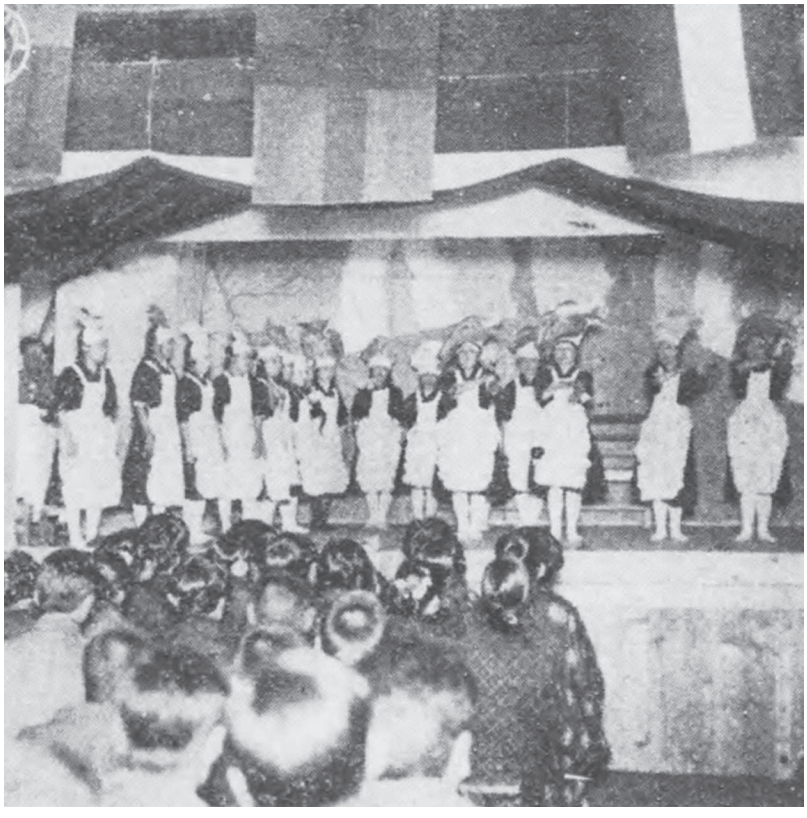

Figure 2. Female workers performing an opera entitled *Jiman kurabe* (Bragging contest). The music was composed by Hirota Ryūtarō. Circa early 1920s.
Source: Kobayashi Aiyū, *Kōjō ongaku tsūkai* (Aionkai Shuppanbu, 1923), unpaginated. Preserved by the National Diet Library, Tokyo. https://dl.ndl.go.jp; open access.

workers only (see Figures 1 and 2). This performance could also be called *kōjō kageki* (factory opera). Finally, Kobayashi mentions song types not belonging to these seven.[60] Except for *sagyō ka*, *kōjō ongaku* was primarily intended for nonwork time—during breaks and outside the shop floor.

Other sources attest to the variety of musical ensembles in *kōjō ongaku* by the early 1940s: wind ensemble, choir, harmonica ensemble, drum and fife band, orchestra, mandolin ensemble, band composed of trumpets and drums, and others. Ishikawajima Zōsen Jo's wind ensemble was featured in *Asahi shinbun*'s December 8, 1936, issue. Entitled "Sō-on no naka kara

60. See Horikawa, *Kōjō keiei no mikata*; Tanaka, *Ningen kōgaku*; on Kobayashi's Bon Festival song, see Kobayashi, *Kōjō ongaku tsūkai*, p. 11; on other song types, see Kobayashi, *Kōjō ongaku tsūkai*, pp. 6–14.

umareru kōjō ongaku" (Factory music born out of noise), the article claims that *kōjō ongaku* alleviated the fatigue and stress of factory workers who continually suffered from noise and thus increased work efficiency in factories.[61]

Regarding his second category (music that workers listen to), Kobayashi is less clear on the types of music he advocates. He clarifies that factory workers should listen to vocal music, particularly folk songs by Japanese composers, rather than instrumental music because, as Kobayashi puts it, natural voices stir the heart better than instrumental sounds do. Kobayashi thought that Western classical music—Ludwig van Beethoven's symphonies, Richard Wagner's large-scale operas, and Felix Mendelssohn's sonatas—was too complex for factory workers to follow and thus unsuitable for increasing work efficiency. Gramophones were sometimes installed where factory workers gathered in everyday life, such as dormitories and dining rooms. For Kobayashi, *kōjō ongaku* compels workers to attune to their workplace and to develop greater harmony between their life and the life of the factory.[62]

Hirota Ryūtarō discussed *kōjō ongaku* in terms of how to increase work efficiency. In 1925, he published an essay entitled "Seisan nōritsu o zōshin suru kōjō ongaku no honshitsu" (The nature of factory music that increases production efficiency) in a business journal called *Jitsugyō* (Business). In this essay, Hirota, an instructor at the Tokyo Music School, argues that factory owners should provide workers with "something spiritual" (*seishinteki*

61. Suzuki, *Kinrō bunka*, p. 211; on early formation of community and school bands in Japan, see David G. Hebert, *Wind Bands and Cultural Identity in Japanese Schools* (Springer, 2012), pp. 34–38; on the study of European instrumental ensemble types in Japan, see Bonnie C. Wade, *Composing Japanese Musical Modernity* (University of Chicago Press, 2014), pp. 139–76. "Sō-on no naka kara umareru kōjō ongaku," *Asahi shinbun*, December 8, 1936, evening edition, p. 3.

62. On vocal over instrumental music, see Kobayashi, *Kōjō ongaku tsūkai*, p. 15; on unsuitability of Western classical music, see pp. 14–15. Such gramophone installation resembles earlier factory listening practices in the United States, where for instance Elroy Curtis, president of Massachusetts's Ware Valley Manufacturing Company, described that twice a day during 12-minute breaks he played for his employees a varied musical program emanating from large phonographs with amplifiers on each factory floor, on which see Kenneth S. Clark, *Music in Industry* (National Bureau for the Advancement of Music, 1929), p. 38. Carol J. Oja describes how in the 1920s American and European composers such as Edgard Varèse and George Antheil "were seizing common tools of industrialism as radical ingredients in a budding modernist aesthetic." Such integration of machines into composers' compositional repertoire represents the inverse of what we are calling "aesthetic strategies" for contending with *sō-on*—namely, *kōjō ongaku*. For the composers Oja describes, industrial machines are to be integrated into already existing musical venues and paradigms. Inversely, for Kobayashi and Hirota, factories—i.e., the loci of industry—are converted into venues for musical performance. Carol J. Oja, *Making Music Modern: New York in the 1920s* (Oxford University Press, 2000), p. 61.

no aru mono) for their well-being. For Hirota, *kōjō ongaku* was such a form of art belonging to the spiritual world yet also appropriate for business owners and workers. Such an attempt to compel factory workers to perform and listen to *kōjō ongaku*, in his view, results in increasing production efficiency.[63]

Some of the intentions and values surrounding the use of *kōjō ongaku* in the workplace were rooted in Japanese paternalism, which is often contrasted with Taylor's excessive materialism. The paternalist paradigm strongly influenced Japanese industrial management and emphasized the welfare of factory workers beyond the shop floor. Its managerial strategies focused on providing worker housing facilities, meal services, company stores, company hospitals, and recreational and educational programs. Paternalist managers strove to provide for employees' mental and physical well-being. Within Kobayashi and Hirota's aesthetic intervention, factory workers themselves were expected to organize musical groups and participate in music making. Most spaces of workers' lives—dormitories, dining rooms, during break time—were to be filled with music for their emotional well-being. Such uses of *kōjō ongaku*, especially during nonwork time, is consistent with paternalistic management methods in industrial Japan.[64]

Uno Riemon and Mutō Sanji were important figures of paternalism in the 1920s. In *Nōritsu zōshin no riron to jissai* (Theory and practice for increasing work efficiency, 1921), Uno suggests that the study of Scientific Management is going out of fashion and instead supports Mutō's work on increasing work efficiency through "spiritual" (*seishinteki*) rather than "scientific" (*kagakuteki*) means. Uno proposes the cultivation of factory gardens (*teien*) while also upholding the aesthetic value of music and other arts.[65] He thought that the presence of "beautiful" gardens and other forms of arts, such as music, in factories would help workers cultivate their aesthetic and moral sentiments. To describe the emotional education workers would obtain through making and appreciating music in factories, Kobayashi used the words *kanjō kyōiku*, while Hirota used *jōsō kyōiku*.[66] Taylorite

63. Hirota Ryūtarō, "Seisan nōritsu o zōshin suru kōjō ongaku no honshitsu," *Jitsugyō*, Vol. 6, No. 5 (1925), pp. 78–81; quotation on p. 78.

64. On "emotional" paternalism and "mechanistic" Taylorism in Japanese industrial management, see William M. Tsutsui, "Rethinking the Paternalist Paradigm in Japanese Industrial Management," *Business and Economic History*, Vol. 26, No. 2 (1997), pp. 561–72; for an exemplar of British welfare strategies, consider the Cadbury Estate in Bournville, England, on which see Edward Cadbury, *Experiments in Industrial Organization* (Longmans, Green, and Co., 1912); on paternalist managerial strategies, see Tsutsui, "Rethinking the Paternalist Paradigm," p. 567.

65. Uno Riemon, *Nōritsu zōshin no riron to jissai* (Kōgyō Kyōikukai Shuppanbu, 1921), pp. 35, 96.

66. See Kobayashi, *Kōjō ongaku tsūkai*, pp. 16–17; Hirota, "Seisan nōritsu o zōshin suru kōjō ongaku no honshitsu," pp. 80–81.

"scientific" practices dealt with the techniques of production; for example, time and motion study was designed to optimize workers' efficiency on the shop floor. According to William M. Tsutsui, Scientific Management techniques paid little attention to welfare facilities. In contrast, paternalism's "spiritual" methods, together with detailed welfare and cultural programs, focused on workers' emotional and spiritual well-being.[67] Nonetheless, paternalism in this context amounts to "a coherent ideology of labor control" articulated by factory managers to produce more disciplined and manageable workers.[68]

In *Kōjō ongaku tsūkai*, Kobayashi acknowledges that using music in the workplace can prevent strikes and slowdowns. He further writes, "If factory workers adopt pure music that can bring heaven into this world, their ill feeling against capitalists naturally vanishes." Kobayashi's synthesis of spirituality, music, and emotional control relates to what Hazama Hiroshi has described as one of the reasons for the rapid development and spread of Japanese labor-management practices in the early twentieth century—namely, these management practices functioned "as a policy for countering the labor movement, which had become active at that time." Andrew Gordon explains that the labor movement grew enormously after World War I and workers who participated in the labor movement "repudiated the paternal ideology and structure of control directly." From managers' perspective, *kōjō ongaku* functioned as an aesthetic technique for asserting control over organizing workers, not just for cultivating their moral sentiments.[69]

The practice of making live music in factories was never unique to Japan. In fact, musical organizations were important features of Western "welfare capitalism," which, as Tsutsui has argued, was a basis for Japanese paternalism. Already in 1906, Edward Cadbury—of the namesake chocolate factory in Bournville, England—was convinced of the value of musical activity and singing in sustaining a whole-person, paternalist approach to management. In the 1920s, U.S. factories were sponsoring employee bands. In Chemung County, New York, the Eclipse Machine Company formed a band consisting of both union and nonunion employees. Active from 1919 to 1930, the band performed at company-sponsored events aimed at

67. Tsutsui, "Rethinking the Paternalist Paradigm," pp. 563, 569. According to Tsutsui, paternalistic practices and institutions served as complements to Taylorite managerial approaches in early twentieth-century Japan, on which see Tsutsui, *Manufacturing Ideology*, p. 54; see also Okuda Kenji, *Hito to keiei: Nihon keiei kanrishi kenkyū* (Manejimento Sha, 1985), pp. 387–93.

68. Andrew Gordon, *The Evolution of Labor Relations in Japan: Heavy Industry, 1853–1955* (Harvard University Press, 1985), p. 7.

69. Kobayashi, *Kōjō ongaku tsūkai*, pp. 2, 3; Hazama Hiroshi and Jacqueline Kaminski, "Japanese Labor-Management Relations and Uno Riemon," *Journal of Japanese Studies*, Vol. 5, No. 1 (1979), p. 74; Gordon, *The Evolution of Labor Relations in Japan*, p. 7.

"boost[ing] morale and increas[ing] worker satisfaction." In several southern U.S. textile factories, music instruction for employees' children and the formation of employee bands played important roles in sustaining their managers' paternalistic and welfare programs. In La Grange, Georgia, the Callaway Mills partially funded the public education of its employees' children, with daily music instruction and performance groups for children. By 1927, employees of the Pacolet Manufacturing Company had formed at least nine musical organizations among its two factories in Georgia and South Carolina, alongside a suite of religious, health, educational, athletic, and civic organizations. In a Mexican factory where 1,000 men and 700 women employees manufactured military uniforms and medical supplies, a 40-piece band played during lunches in a large dining hall. In Canada, employees of the National Railway in Montreal formed "a shop band of thirty men," and Canadian Pacific employees in Revelstoke formed instrumental and choral groups. Espousing the paternalistic value of unifying Canadian workers through cultural practices, Captain J. S. Atkinson of the Canadian Bureau for the Advancement of Music wrote that: "Canadian firms are using music greatly to their advantage in developing a better morale."[70]

In 1930s Japan, industrial management theorists began to seriously consider the effectiveness of employing *kōjō ongaku* in the workplace. Suzuki Munemasa's *Shin kōjō keiei ron* (New factory management theory, 1938), for example, contains a section on *kōjō ongaku* that introduces specific

70. On "welfare capitalism," see Tsutsui, "Rethinking the Paternalist Paradigm," p. 562. On music at Bournville, see Marek Korczynski, Michael Pickering, and Emma Robertson, *Rhythms of Labour: Music at Work in Britain* (Cambridge University Press, 2013), p. 176; Cadbury, *Experiments in Industrial Organization*, pp. 20–21. On Chemung County bands, see Chemung County Historical Society, "Factory Bands," https://cchsonlineexhibits.wixsite.com/music/factory-bands (accessed November 20, 2021). On music at Callaway Mills, see Clark, *Music in Industry*, pp. 105–6; see also "Contented Labor Plan Told by F. E. Callaway: Georgia Mill Owner Explains System That Keeps Hit 7,000 Employes [*sic*] Satisfied," *The Sun*, June 6, 1920, p. 14. On music at Pacolet, see Katharine Dozier, *The Pictured Story of the Community Activities: Pacolet Manufacturing Company, Spartanburg, South Carolina, 1882–1927* (c. 1927); while Dozier's pamphlet does not provide a publication date, it was probably published circa 1927 because Clark refers to it in *Music in Industry*, p. 107, which was published in 1929. On Mexican factory music, see ibid., pp. 44–45. For Atkinson's quotation, see ibid., pp. 43–44. Factory bands were not always used exclusively for boosting worker morale. Consider that as early as 1881 in the United States the musical instrument manufacturer Lyon and Hely Company formed a band that helped it advertise the quality of its instruments and wares. See Margaret Hindle Hazen and Robert M. Hazen, *The Music Men: An Illustrated History of Brass Bands in America, 1800–1920* (Smithsonian Institution Press, 1987), pp. 49–50. In an extension of this practice, today the Yamaha Corporation boasts its own company band whose musicians are company administrators and instrument manufacturers. The Yamaha Symphonic Band has been active since 1961. See Yamaha, "Band Members," https://www.yamaha.com/en/symphonic_band/members/ (accessed December 14, 2021); Yamaha, "Band Profile," https://www.yamaha.com/en/symphonic_band/profile/ (accessed December 14, 2021).

songs and types of music played at factories, describes how these were played, and argues that *kōjō ongaku* is highly effective at promoting the mental and physical health of workers across all age groups. Suzuki was a bureaucrat in the Ministry of Health and Welfare who, like Kobayashi and Hirota, believed that music making supported the cultivation of aesthetic and moral sentiments (*jōsō kyōiku*).[71]

In the field of industrial psychology, Natori Jun'ichi in *Rōdōshinri to hirō* (Work psychology and fatigue, 1954) discusses noise and factory music in the same chapter. His work contrasts musical tone with noise and asserts music's potential to increase work efficiency in the face of industrial noise, which needed to be controlled to reduce distraction, fatigue, and injury. However, in his section on *kōjō ongaku*, Natori remarkably omits any mention of Kobayashi or Hirota but instead introduces studies by S. Wyatt, J. N. Langdon, W. A. Kerr, and others from the first half of the twentieth century. Compared to anaesthetic strategies for contending with noise by Kanda, Katsuta, Ueno, and the Association for Industrial Education Development, Natori's focus on music's relative efficacy at increasing work efficiency constitutes factory management's aesthetic dimension. It represents a shift in factory management techniques toward the mobilization of sonic practices (song, rhythmic coordination, performance, listening) and technologies (gramophone) to contend with the intensification of noise in industrial Japanese society.[72]

Development of Factory Music

The study of factory music provides meaningful insights for understanding the evolution of labor management in the early twentieth century. *Ongaku nenkan, Taishō jūichinen ban* reported that as early as 1921, Kobayashi Aiyū and Hirota Ryūtarō composed new factory music specifically for Fujibō's textile spinning mills in Kawasaki, Oyama, and Oshiage. In the early 1920s, Kobayashi and Hirota were working with companies other than Fujibō, such as Odawara, Tōyō, and Kaikoku-kan, mostly in the textile industry. Around that time, they co-organized factory music concerts, or

71. See Suzuki Munemasa, *Shin kōjō keiei ron* (Nihon Kōron Sha, 1938), pp. 244–56; on music and moral sentiments, see p. 254.

72. See Natori Jun'ichi, *Rōdōshinri to hirō* (Sangyō Rōdō Fukuri Kyōkai, 1954), chapter 6; on Natori's omission of Kobayashi and Hirota and inclusion of Wyatt, Langdon, and Kerr, see pp. 108–9; see also S. Wyatt and J. N. Langdon, *Fatigue and Boredom in Repetitive Work* (Industrial Health Research Board, Report No. 77, 1937); W. A. Kerr, "Psychological Research in Industrial Music and Plant Broadcasting," *Journal of Psychology*, Vol. 17, No. 2 (1944), pp. 243–61. Kerim Yasar's recent work focuses specifically on technologies that recorded and transmitted sonic practices in modern Japan; see Kerim Yasar, *Electrified Voices: How the Telephone, Phonograph, and Radio Shaped Modern Japan, 1868–1945* (Columbia University Press, 2018).

kōjō ongaku ensōkai, at Fujibō's Kawasaki factory in Kanagawa Prefecture, which included lectures on factory music. Hirota once acknowledged that factory music itself had already existed since around 1880; however, he emphasized that he and Kobayashi contributed significantly to its development and popularity since the time they officially introduced it to the public at Fujibō's Kawasaki factory in the early 1920s.[73]

Kobayashi and Hirota's aesthetic strategy was developed from their local experiments and practices at Fujibō and elsewhere. It was then integrated into the body of industrial management theory at least by the late 1930s, when Suzuki Munemasa published *Shin kōjō keiei ron* (1938). Tsutsui has argued that Japanese paternalism was significantly shaped by developing ideas of "welfare capitalism" from the West and was in no way incompatible with Western management systems. Sheldon Garon and W. Dean Kinzley have similarly indicated that foreign models to a certain degree influenced Japanese managers. Fujibō was among the first to employ *kōjō ongaku* within a paternalist managerial approach; meanwhile, the company adopted Taylor's Scientific Management approach around the same time, as Sasaki Satoshi's study shows.[74] While acknowledging the importance of these global influences, we think it is equally meaningful to attend to local managerial experiments and practices, as in the case of Fujibō's *kōjō ongaku*, for a nuanced understanding of the evolution of labor management and its complex landscape in early twentieth-century Japan.

Earlier writings on *kōjō ongaku* like Kobayashi's *Kōjō ongaku tsūkai* reveal that this aesthetic management technique was at least partially targeted at female workers, or *jokō.* The earlier development of *kōjō ongaku* took place in Japan's major industry of that period, the textile industry. Within factory complexes, the female textile workers typically lived in dormitories that often encompassed elaborate surveillance and limited their freedom to leave the factory. According to Elyssa Faison, textile company owners and managers claimed to act as female workers' surrogate parents and "provided (and often enforced) moral, civic and educational instruction for their 'daughters' in keeping with these girls' and women's future roles

73. Gakuhō-kai, *Ongaku nenkan, Taishō jūichinen ban*, p. 34. On Kobayashi and Hirota's concerts and lectures at Fujibō's Kawasaki factory, see "Kōjō ongaku ensōkai," *Yomiuri shinbun*, August 11, 1921, morning edition, p. 4; "Kōjō ongaku kai," *Yomiuri shinbun*, April 10, 1922, morning edition, p. 4; "Ongaku," *Asahi shinbun*, August 11, 1921, morning edition, p. 6. On Hirota's views, see Hirota, "Seisan nōritsu o zōshin suru kōjō ongaku no honshitsu," p. 78.

74. Tsutsui, "Rethinking the Paternalist Paradigm," p. 562; Sheldon Garon, *The State and Labor in Modern Japan* (University of California Press, 1987); W. Dean Kinzley, *Industrial Harmony in Modern Japan: The Invention of a Tradition* (Routledge, 1991); see also Tsutsui, "Rethinking the Paternalist Paradigm," p. 561. Sasaki, *Kagakuteki kanrihō no Nihon teki tenkai*, p. 37.

as wives and mothers." Such practices demonstrate the overlap of paternalism with patriarchy; *kōjō ongaku* targeted at *jokō* helped sustain patriarchal ideologies and dynamics of control.[75]

As Janet Hunter has shown, the labor market itself was highly gendered, with a "sharp [distinction] between 'men's jobs' and 'women's jobs.'" While men worked mostly in heavy industries (e.g., metalworking, building machinery, shipbuilding, mining, and engineering), women typically worked in light industries such as silk reeling and spinning. Women's labor in these industries was responsible for an outsized share of Japan's industrial output. According to Hazama Hiroshi, "[l]ight industries still remained more significant as a proportion of the total industrial output after the First World War, but heavy industries headed for gradual expansion." Penelope Francks has similarly argued that workers in heavy industries comprised a relatively small part of Japan's industrial labor force until well into the interwar years.[76]

Such gender dynamics may explain why early 1920s discussions of *kōjō ongaku* mostly concern female workers, their moral training, and their work efficiency. Consider, for example, the April 11, 1922, issue of *Asahi shinbun*, which included an article entitled "Jokō-san no butō: Fujibō no Kawasaki kōjō de kokoromiteiru atarashii kōjō ongaku" (The dance of female workers: factory music attempted at Fujibō's Kawasaki factory). According to this article, *kōjō ongaku* was first introduced at Fujibō's Kawasaki factory in February 1921 after the head of the factory had asked Kobayashi Aiyū to compose songs for its workers. The factory manager who had sympathized with the "miserable" life of young female workers viewed musical performance as offering them comfort or relief. Every day from 11:00 to 11:40 a.m. these female workers gathered outside the workshop and performed Kobayashi's music. This routine attests to paternalist managers' endeavors

75. Hazama and Kaminski, "Japanese Labor-Management Relations," p. 85; Janet Hunter, "Introduction," in Janet Hunter, ed., *Japanese Women Working* (Routledge, 1993), p. 2. In the United States, by 1915 more women than men worked in textile mills and garment manufacturing, though white women earned twice the wages that black women did in some industries, on which see Thomas J. Schlereth, *Victorian America: Transformations in Everyday Life, 1876–1915* (Harper Perennial, 1992), pp. 47, 57. Elyssa Faison, *Managing Women: Disciplining Labor in Modern Japan* (University of California Press, 2007), p. 14. Patriarchal ideology should be understood in this context within the ideology of *kokutai* in which "Japan constitutes one homogeneous space for a single extended family with the emperor as its supreme and patriarchal head." Tamanoi, *Under the Shadow of Nationalism*, p. 93. See also Yoshiko Miyake, "Doubling Expectations: Motherhood and Women's Factory Work under State Management in Japan in the 1930s and 1940s," in Gail Lee Bernstein, ed., *Recreating Japanese Women, 1600–1945* (University of California Press, 1991), pp. 267–95.

76. Hunter, "Introduction," p. 7. On "heavy" and "light" industries, see Hazama, *History of Labour Management in Japan*, pp. 44, 61; Penelope Francks, *Japanese Economic Development: Theory and Practice* (Routledge, 1999), pp. 221–30.

to look after workers' spiritual well-being while also regulating their behavior outside the production process. According to the *Asahi shinbun* article, the installation of *kōjō ongaku* in the factory resulted in workers' improved moral character and increased work efficiency.[77]

Kobayashi himself—in "Kōjō ongaku no kōchō" (The harmony of factory music, 1924) published in the women's magazine *Fujokai* (Women's world)—explains how *kōjō ongaku* effected positive outcomes. According to Kobayashi, making and listening to *kōjō ongaku* fosters harmony between male factory directors and female workers as well as among female workers whose moral being and development it supports. He argues that *kōjō ongaku* helps increase production efficiency and reduces employee turnover. Since this essay was written for a women's magazine, *kōjō ongaku* may have been promoted and installed as a technology to control the gendered physical labor of *jokō*, optimize their labor productivity, and maximize profit in a modern capitalist society.[78]

The October 1921 issue of *Shufu no tomo* (The friend of housewives)—a magazine aimed especially at housewives—contains three photographs of female workers performing an exercise song (upper), a new Bon Festival song (middle), and a break-time song (lower) at Fujibō's Kawasaki factory (see Figure 3). As these images show, all three performances included choreographed dances with piano accompaniment. A break-time song performed at Fujibō's Oyama factory in Shizuoka Prefecture was called "Kokoro o kometa tsutome no ato ni" (After toiling for the company):

> After toiling for the company,
> Here comes an enjoyable break.
> The steam whistle blows.
> Hark, the steam whistle blows.

77. See "Jokō-san no butō: Fujibō no Kawasaki kōjō de kokoromiteiru atarashii kōjō ongaku," *Asahi shinbun*, April 11, 1922, morning edition, p. 5; see also "Ongaku," *Asahi shinbun*, May 31, 1921, morning edition, p. 7. The "miserable" conditions of female workers in early twentieth-century Japan were represented in Hosoi Wakizō's *Jokō aishi* (The pitiful history of female factory workers) originally published in 1925; see Hosoi Wakizō, *Jokō aishi* (Iwanami, 1954). The Kawasaki factory, in particular, was well equipped with welfare facilities, such as a dormitory, bath, kitchen, hospital, school, recreation room, and company house. Sawada Ken and Ogimoto Seizō, *Fuji Bōseki Kabushiki Kaisha gojūnenshi* (Tokiwa Shoin, 1977 [1947]), p. 158.

78. Kobayashi Aiyū, "Kōjō ongaku no kōchō," *Fujokai*, Vol. 30, No. 4 (1924), pp. 215–18; for Kobayashi's view on increasing efficiency, see p. 218. For previous works that critically examine the exploitation of female labor in industrial Japan, see Sandra Schaal, "Another Point of View on the 'Pitiful History of Women Workers': The Life-World of Female Silk Reeling Operatives in Prewar Japan," *Nippon Oral History Kenkyū*, Vol. 1 (2006), pp. 136–62; E. Patricia Tsurumi, *Factory Girls: Women in the Thread Mills of Meiji Japan* (Princeton University Press, 1990), especially pp. 92–102, and "Yet to Be Heard: The Voices of Meiji Factory Women," *Bulletin of Concerned Asian Scholars*, Vol. 26, No. 4 (1994), pp. 18–27.

Figure 3. Female workers performing *kōjō ongaku* at Fujibō's Kawasaki factory.
Source: "Kōjō ongaku no bokkō," *Shufu no tomo*, Vol. 5, No. 10 (1921), unpaginated. Used with permission of the National Diet Library, Tokyo. https://dl.ndl.go.jp.

Such lyrics were introduced in Kobayashi's *Kōjō ongaku tsūkai*, from a managerial perspective, as a model of *kyūkei ka* that were partly intended to reduce the hardships of labor. However, such breaks would have in fact demanded further physical exertion through coordinated singing and choreographed movement.[79]

Mariko Asano Tamanoi's work helps us to interrogate the sincerity with which workers may have performed such songs as well as to ask, "how did factory women perceive themselves and assert their subjectivities?" As Tamanoi demonstrates, in some cases workers used songs to countermand control. In early industrial Japan, women—specifically those who worked at an early age as nursemaids, or *komori*, and who later grew up to work in silk factories—used songs to protest their working conditions and their employers. For instance, women modified the lyrics of a *komori* song ("Bye-bye, my master and mistress, I do not want to see your faces any more") to better reflect their own attitudes toward factory conditions ("Bye-bye, chimneys, I do not want to see the face of my foreman any more"). When *komori* quit their jobs to work at silk-spinning factories, they "changed the verses of their songs to reflect the thoughts and emotions of their entirely new situations at factories and dormitories." A ballad sung by the factory women of a Nagano silk mill is further evidence of "factory women's pride as the nation's producers" and of their simultaneous use of song to "protest against their actual treatment":

> We are not grasshoppers,
> But we are always fed squash.
> With such food,
> How can we spin a lot of thread?

Tamanoi's ethnographic conversations with former factory women highlight how performative and transgressive meanings can variously disappear or emerge when oral and musical practices are transcribed and understood as texts independent of their performative contexts.[80]

Throughout the 1920s and 1930s, this aesthetic strategy spread from light to heavy industries. Newspapers documented public performances of music groups owned by factories, such as the August 25, 1934, issue of

79. Kobayashi, *Kōjō ongaku tsūkai*, pp. 44–45.

80. Tamanoi, *Under the Shadow of Nationalism*, p. 86; on *komori* changing lyrics to reflect their attitudes, see p. 85; on *komori* changing lyrics upon quitting, see p. 77; on the Nagano song, see p. 109. This song was recorded by Katō Sōichi, "Seishi kouta to sono rekishi," *Rekishi hyōron*, Vol. 65 (1955), p. 42. In contrast with these examples, Sandra Schaal reveals how female workers expressed affirmative attitudes toward their life at silk factories through singing work songs such as "Ito hiki uta" (Silk reelers' song); see Sandra Schaal, *Jokō aishi o saikō suru: ushinawareta josei no koe o motomete* (Kyoto University Press, 2020).

Asahi shinbun article entitled "Genkina kōjō ongaku" (Lively factory music), which informed readers of an upcoming performance of *kōjō ongaku* to be broadcast by NHK Radio 2. This one-hour program featured performances of the female choir at Kurihara Bōshoku Gōmei Kaisha (textile production business) and the wind ensemble at Tōkyō Ishikawajima Zōsen Jo (shipbuilding business). The choir consisted of approximately 300 young women enrolled at the Kurihara company's training school, of whom 30 were selected for this performance. Established in January 1933, the wind ensemble at the Ishikawajima dockyard was made up of 25 young men. The composition of these local music groups represents the broader gendered division of the labor market in industrial Japan.[81]

One source of quantitative data about music groups in Japan is a 1942 book by the Tokyo Metropolitan Police Department's labor inspector Suzuki Shun'ichi. Entitled *Kinrō bunka* (The culture of labor), Suzuki's book contains statistics on the number of ensembles established in factories and mines each year between 1911 and 1939. Figure 4 reproduces and consolidates this data, collected by the Department of Industrial Welfare of the Harmonization Society and published in late 1940. As its name suggests, this organization aimed to promote cooperation and harmony between capitalists and laborers. According to this data, as early as 1911 music was already being performed in factories, with the earliest example at the Yahata Steel Works in Fukuoka Prefecture, which, like other companies, had its own music club. Beginning in 1933, the year following the Manchurian Incident (1931–32), there was a notable increase in the number of newly established factory music groups in Japan. For Suzuki, the need for music in the workplace grew in proportion to Japan's priority to expand its labor power in wartime. As Suzuki further noted, in the early 1940s, factory workers performed *kōjō ongaku* during military farewells and welcome events for soldiers. A further site of music's role in wartime nationalism was in schools. Under the National School Order (Kokumin Gakkō Rei) issued by the Japanese government on March 1, 1941, music was to be taught to promote nationalism and cultivate children's aesthetic sensibility.[82]

Similar wartime applications of industrial music took place in North America and Britain. Karin Bijsterveld explains that increased wartime

81. See "Genkina kōjō ongaku," *Asahi shinbun*, August 25, 1934, morning edition, p. 10.

82. Suzuki, *Kinrō bunka*, pp. 192–94; in the data that Suzuki reproduced, there is a minor discrepancy between the recorded total of 157 newly established music groups between 1911 and 1939 and the actual total of 169 groups. On music and the 1941 National School Order, see Manabe, "Western Music in Japan," p. 212. Already in the late nineteenth century, the bureaucrat Isawa Shūji contributed to introducing Western music into the national school system in Meiji Japan; for more on Isawa, see Adal, *Beauty in the Age of Empire*, p. 39; Seth Jacobowitz, *Writing Technology in Meiji Japan: A Media History of Modern Japanese Literature and Visual Culture* (Harvard University Press, 2016), especially pp. 152–67; Manabe, "Western Music in Japan," especially pp. 98–137.

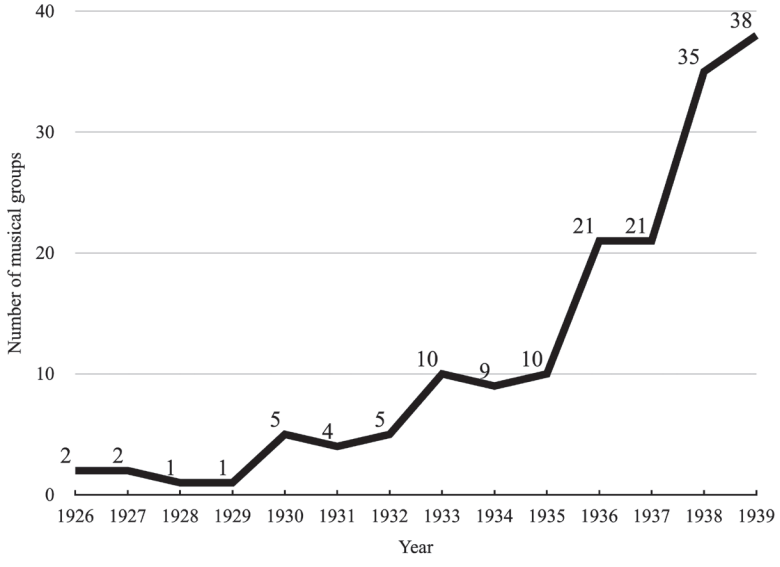

Figure 4. Number of musical groups newly established in factories and mines in Japan, 1926–39. Discontinuous data from 1911 to 1925 are not represented in graph; these data include 1911 (1 group), 1919 (1 group), 1922 (2 groups), and 1924 (1 group).
Source: Suzuki Shun'ichi, *Kinrō bunka* (Tōyō Shokan, 1942), Table 14, p. 192.

industrial production stimulated the further development of factory music. For instance, aircraft plants such as Douglas, Lockheed, North American, and Consolidated as well as California shipbuilders frequently booked bands through Music Corporation of America (founded in 1924) for their parties. Music Corporation of America hired a number of male musicians/bandleaders such as Charlie Barnet, Jan Garber, Matty Malneck, and Bob Crosby, among others. Doron K. Antrim credited World War II for factory music's proliferation in Britain: "The war has given impetus to an idea [music in factories] that I believe will be carried on after the conflict ends. I look for the time when music will be considered as essential to a plant as proper lighting." The historical development and contemporary global prevalence of Muzak—a background music provider created in 1934 and initially intended to boost morale during and after the war—attests to Antrim's prediction. In the United States, the October 1943 issue of *The Journal of the Acoustical Society of America* is devoted to music's effects on industry during the war.[83]

83. Bijsterveld, *Mechanical Sound*, p. 86; see also John C. Hajduk, "Tin Pan Alley on the March: Popular Music, World War II, and the Quest for a Great War Song," *Popular Music and Society*, Vol. 26, No. 4 (2003), pp. 497–512; "War-Factory Band Dates Bring Cash: Coast War Plants Use Music," *The Billboard*, Vol. 56, No. 28 (1944), p. 16; Antrim, "Music in Industry," p. 289. For studies of Muzak, see Stephen H. Barnes, *Muzak: The Hidden Messages in*

According to Suzuki's study of music in factories and mines, wind ensembles, choirs, and harmonica ensembles constituted more than 83 per cent of *kōjō ongaku* ensembles in Japan around 1940 (see Table 2). In the world of *kōjō ongaku*, males constituted about 60 per cent of the total number of performers, while females constituted the other 40 per cent.[84] With few exceptions, larger instrumental ensembles—namely wind ensembles and orchestras—mostly comprised male performers. Meanwhile, a number of female performers participated in marching bands. *Kōjō ongaku* was primarily performed by younger people, with more than 90 per cent of performers under 31 years old (see Table 3).

Table 2
Number of Male and Female Workers Who Performed *Kōjō Ongaku* and Types of Ensembles

Ensemble	Percentage	Male	Female
Wind ensemble	38.1	1,867	14
Choir	35.1	879	857
Harmonica ensemble	10.5	360	162
Drum and fife band	6.0	71	221
Orchestra	4.1	199	4
Other	6.2	NA	NA

Source: Suzuki Shun'ichi, *Kinrō bunka* (Tōyō Shokan, 1942), Table 15, p. 212.

Table 3
Kōjō Ongaku Participation by Age

Age Group	Percentage of All Groups
Under 21	53.2
21–30	37.8
31–40	6.4
41 and above	0.3
NA*	2.3

Note: Suzuki does not account for the missing 2.3 per cent, which we label as "NA."
Source: Suzuki Shun'ichi, *Kinrō bunka* (Tōyō Shokan, 1942), p. 212.

Music (Edwin Mellen Press, 1988); Joseph Lanza, *Elevator Music: A Surreal History of Muzak, Easy-Listening, and Other Moodsong* (University of Michigan Press, 2004). On recent listening practices in corporate Japan, see Plourde, *Tokyo Listening*, especially pp. 78–102. Contributions to Vol. 15, No. 2 (1943) of the *Journal of the Acoustical Society of America* include: R. L. Cardinell, "The Statistical Method in Determining the Effects of Music in Industry," pp. 133–35; Dan D. Halpin, "Industrial Music and Morale," pp. 116–23; Edith Hough, "Music as a Safety Factor," p. 124; W. A. Kerr, "Attitudes Toward Types of Industrial Music," pp. 125–30; and Ben Selvin, "Programming Music for Industry," pp. 131–32.

84. Suzuki, *Kinrō bunka*, p. 211.

In the early 1920s, *kōjō ongaku* was developed in the textile industry. As heavy industries began to expand, the influence of *kōjō ongaku* also permeated throughout the industrial sector in the 1930s. The December 8, 1936, issue of *Asahi shinbun* noted that the boom in the arms industry around that time stimulated the growth of brass band music in Japan. Fighting a war required labor power, and industrial music was increasingly demanded in Japan and other countries such as the United States. As *kōjō ongaku* developed, it was performed by various types of instrumental and choral ensembles from Western classical, military, and band traditions.[85]

Conclusion

Focusing on the interplay of acoustics, music, and worker health, this article offers a new perspective for understanding the history of industrial management in Japan. A dual typology of sound—noise and musical tone—emerged first in the discourse of physicists and later in that of factory managers and industrial theorists who attempted to regulate sounds to increase work efficiency, reduce employee turnover, and control workers' emotions. Within this typology, theorists and managers understood noise as a formidable detriment to worker health, to factory output and profitability, and to the modern capitalist nation-state at large. Divergent local experiments for contending with this ubiquitous problem developed into widespread practices ranging from the anaesthetic elimination of noisy machines and the use of soundproofing materials to the aesthetic use of recorded music to aid workers' physical coordination and the formation of factory music ensembles with live performances.

The anaesthetic strategy of factory management encompassed only material solutions and focused on managing production processes on the shop floor. Its practitioners aimed to dampen or remove unwanted noises that not only hampered industrial efficiency but also became a public nuisance and moral issue of urban governance addressed through regulation. Japanese proponents of this material approach were widely influenced by Frederick Winslow Taylor's notion of Scientific Management. By contrast, others, including Horikawa Jun'ichirō and Tanaka Kan'ichi, were proponents of music as an aesthetic technique for contending with the problems posed by industrial noise. In this aesthetic strategy, managers sought to envelop industrial spaces with music considered effective in controlling workers' emotions.

Such aesthetic managerial techniques describe the work of poet-lyricist Kobayashi Aiyū and composer Hirota Ryūtarō, who led the development of *kōjō ongaku* from around 1920. As consultants, Kobayashi and Hirota were personally connected to private factories and, more important, shared with

85. "Sō-on no naka kara umareru kōjō ongaku," p. 3.

proponents of Scientific Management the goal of increasing work efficiency and productivity. Aesthetic strategies that expected workers themselves to participate in music making and that sought to fill every aspect of workers' lives with music, especially outside working hours, also synergized with the practices and philosophy of Japanese paternalism. Paternalist managers paid particular attention to workers' spiritual well-being in order to increase motivation and efficiency. And as Kobayashi understood it, *kōjō ongaku* was a musical technique that factory managers and owners could deploy to deter strikes and slowdowns. Through such aesthetic managerial practices, the social life of factory workers was thoroughly controlled by their employers in a modern capitalist economy. Preliminary interrogation of the Fujibō songs introduced in Kobayashi's *Kōjō ongaku tsūkai* suggests that such aesthetic strategies were designed to foster physically and emotionally submissive postures toward the workplace, its manager, and its surrounding environment. However, given performance practices of women factory workers elsewhere in Japan and the body of scholarship on the exploitation of gendered labor in industrial Japan, it is possible that such songs were used as outlets for countermanding managers' authority.[86]

From the perspective of occupational health and safety, this aesthetic practice only perpetuated workers' life-long exposure to occupational hazards. In the post–World War II period, Japan's industrial sector began emphasizing anaesthetic strategies for contending with noise; since the 1960s, articles on occupational noise measurement and abatement, particularly at mines, have increasingly appeared in industrial publications. Likewise, a growing number of articles in Japanese medical journals discussed the impact of *sō-on* on health conditions, especially hearing loss.[87]

86. See Kobayashi, *Kōjō ongaku tsūkai*, pp. 40, 41, 43, 45, 47; Schaal, "Another Point of View," pp. 136–62, and *Jokō aishi o saikō suru*; Tsurumi, *Factory Girls*, and "Yet to Be Heard," pp. 18–27; Tamanoi, *Under the Shadow of Nationalism*, chapters 3 and 4.

87. On occupational noise measurement and abatement, see P. W. Sherwood, "Kōzan sagyō ni okeru sō-on no kanri [1961]," trans. Takata Akira, *Saikō to hoan*, Vol. 8, No. 5 (1962), pp. 260–66; Takata Akira, "Kōzan sagyō to sō-on no kanri (jō)," *Saikō to hoan*, Vol. 10, No. 10 (1964), pp. 479–84, and "Kōzan sagyō to sō-on no kanri (ge)," *Saikō to hoan*, Vol. 10, No. 12 (1964), pp. 585–89; Morita Tomio, Itō Takeshi, and Yazawa Kazuyoshi, "Kōnai oyobi kōjō sō-on no sokutei to sono hyōka," *Nihon kōgyō-kai shi*, Vol. 80, No. 915 (1964), pp. 805–6; Reinhard Köhler, "Tankō ni okeru sō-on bōshi no genjō [1959]," trans. Fusamura, *Gurukkuaufu* (Glückauf), Vol. 9, No. 7 (1960), pp. 416–24; Flügge, "Sō-on no eikyō," pp. 269–73. For medical articles on *sō-on*'s impact, see Sakaguchi Toshiyuki, "Sō-on kankyō: tankō rōmusha no ōjioguramu [audiograms] ni tsuite," *Jibi inkōka*, Vol. 25, No. 7 (1953), pp. 14–19; Sakai Kuranoshin, "Kōjō sō-on no chōryoku ni oyobosu eikyō: sō-on nai ni sagyō suru mono no chōki ni kansuru uttae," *Kōtsū igaku*, Vol. 3, No. 1 (1950), pp. 1–12; Taketomi Yoshimasa, "Tankō jūgyōin no shokugyōsei nanchō no kenkyū: daiyonpō, shokuba sō-on to jibi inkōka rinshō shoken tono kankei," *Jibi to rinshō*, Vol. 4, Supplement No. 3 (1957), pp. 178–88, and "Tankō jūgyōin no shokugyōsei nanchō no kenkyū: daigohō, sō-on kankyō tankō rōmusha no chōryoku jōtai narabi ni kakushu chōsa seiseki tono kankei, zenpen no sōkatsu," *Jibi to rinshō*, Vol. 4, Supplement No. 3 (1957), pp. 189–222, especially pp. 213–14; Tanaka Nobuo, "Bō tankō

The nexus of health, sound, music, and power in the workplace has endured through and beyond the global economic transformations of the late twentieth century. By the late 1970s in countries including Japan, the proliferation of electronics, robots, and automated processes sparked an economic paradigm shift from manual to intellectual labor that persists today. In the contemporary workspaces of this white-collar knowledge economy, background music (BGM) streaming services are widespread, such as the Japanese company USEN's Sound Design for Office. As Lorraine Plourde has documented, such programs market BGM as a palliative against the physiological and psychological stressors that office workers face today. Even as BGM is "deployed to heal and affectively manage office workers" through a "collective sonic experience" for coping with the ills of modern office spaces, Plourde demonstrates that such aesthetic practices still constitute "ambient labor control that exploits a particular mode of sonic engagement." In the global history of labor and the aural, this contemporary mode of corporate aurality in spaces of intellectual labor is a development of the aesthetic managerial strategies of early industrial spaces of manual labor. By understanding the conditions from which various industrial music programs emerged in Japan and elsewhere, we can better contextualize the contemporary dynamics of music in corporate workplaces. Doing so expands the genealogy of aesthetic practices and their role in the enduring nexus of managerial control, worker health, and the aural.[88]

Because it was essentially aimed at increasing production efficiency, even *kōjō ongaku*'s mobilizations of the aesthetic through music, listening, and performance functioned as a disciplinary operation "to keep every possible ounce of worker energy and every possible moment of worker time devoted directly to producing."[89] Through this aesthetic-managerial intervention into the domain of audibility, the intellectuals who developed and codified *kōjō ongaku* and the factory managers who enforced it exerted disciplinary power over workers. Our hope is that the an/aesthetic framework used to interpret the primary sources presented here will help generate critical insights into understanding the aural technologies of control by which modern capitalist nation-states exploit human labor.

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ni okeru kōnai sō-on ni tsuite," *Igaku kenkyū*, Vol. 30, No. 8 (1960), pp. 21–30, and "Bō tankō ni okeru kōnai sō-on ni tsuite (zokuhō)," *Igaku kenkyū*, Vol. 30, No. 10 (1960), pp. 263–70.

88. On economic effects of increasing automation, see Ernst Mandel, *Late Capitalism* (Verso, 1978), especially p. 208. On the shift from manual to intellectual labor relative to the use of robotic automation in 1970s and 1980s Japan, see Tessa Morris-Suzuki, "Robots and Capitalism," *New Left Review*, Vol. 147 (1984), pp. 109–21. On BGM, see Plourde, *Tokyo Listening*, pp. 80, 82.

89. Tsurumi, *Factory Girls*, p. 97.