Chapter———2

The Coal-mining Industry

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In pre-war Japan, coal-mining, along with textile manufacturing, was among the leading industries employing women. The proportion of women working in these two industries differed greatly: in mining, the overwhelming majority of workers were men, while in textiles women far outnumbered men. The working conditions of women in the textile industries have been the subject of much research, while this aspect of coal-mining has received little attention, for two major reasons. First, the mining communities were located in geographically isolated areas, they were hostile to outsiders, and their women were reclusive. Second, there is a lack of documents and other materials upon which to base research. Such publications as *Shokkō jijō* [Conditions of Workers], edited by the Ministry of Agriculture and Commerce in 1903, provide an in-depth understanding of the labour conditions of female textile workers. There are no such materials on coal-mining, and statistics on women workers in nationwide industries are available only from 1914. This chapter examines the rise and decline of the female labour force in coal-mining against the backdrop of development and change in mining technology.

Several considerations should be kept in mind in analysing the data in this study. First, we must pay attention to regional differences in mining techniques and in the working conditions of women, stemming from the size of the coalfields and the scale of the mines. Second, because the study of mining technology and female workers falls in the category of labour management, such issues as the level of technical skills, the adoption of new technology by the management, and the relationship of these factors to the rise and eventual decline of women workers must be addressed. Third, because the introduction of new technology generally brings about conflict between labour and management, whether the new technology is adopted successfully or not largely depends on labour–management relations. There are numerous examples in modern history of workers obstructing the adoption of new technology. The mechanization of the coal-mining industry was

relatively smooth, and although it resulted in the eventual exclusion of women from its workforce, it is important to understand what conditions made the smooth transition possible.

I. Characteristics of Female Mine Labour

1. Development of the Labour Force

Evidence of women working in mines can be traced back to relatively old documents. For example, *Kōzan shiryōchō* [Survey Materials of Mines], published by the Industrial Department of Nagasaki Prefecture in 1884, states:

> Higashi Matsuura county, Kishiyama village, Aza Hase leased land, 1,500 *tsubo*.
> 1. Miners' wages: men, 25 sen; women, 18 sen.
> 2. Average number of workers per year: 700, of which 350 men, 350 women.
> 3. Coal extracted per work unit (a work unit consists of one man and one woman) 800 *kin* (480 kg) per month.[1]

From the above, we can surmise that women were already well incorporated into the two-person work teams. However, before the industrial revolution, mines were small in scale, and there were fewer women working in them. The majority of miners were part-time farmers who lived in adjacent areas and commuted to the mines or took on mine work during the slack season. Mining was not considered a full-time occupation, and it was not until after the industrial revolution, when mining no longer was a part-time job, that women became a significant part of the labour force in the mines.

The mechanization of coal transportation was a major development that marked the beginning of the industrial revolution in mining. Specifically, this meant the installation of a winch in the shafts. The use of the winch spread rapidly between 1890 and 1900, around the time of the Sino-Japanese War. Notably, however, mechanization in coal-mining did not go beyond the mechanization of the conveyance system in the main shafts. The coal-extracting process continued to be done by hand, with the use of simple tools.

Except when working on very thin seams, the most common digging method at the time was the pillar method. A main shaft was bored along the slant of the coal seam, and smaller shafts dug in checkerboard fashion at 10-*ken* (18-metre) intervals perpendicular to the main shaft. Three *ken* were used as the coal face, and seven as pillars to protect the shafts (fig. 2.1). The kind of labour involved in chipping out and extracting the coal was extremely isolated and dispersed. Each coal face was hewed with a pick, and

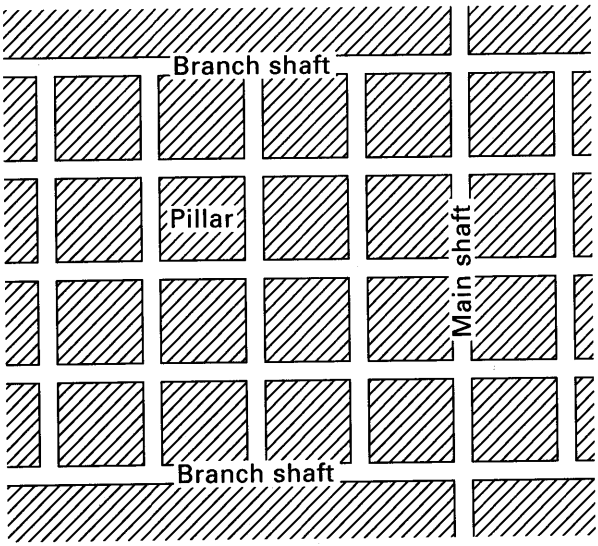

Fig. 2.1.

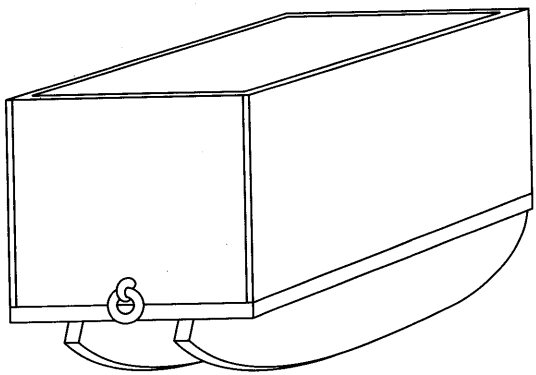

Fig. 2.2.

the pieces were carried by hand to a coal car. In the thicker seams, the coal thus extracted from the coal face was loaded into baskets holding between 50 and 100 *kin* (30 to 60 kg), and two of these baskets were balanced on a shoulder carrying pole, or buckets were hauled one at a time to the main shaft. In the thin seams, 100–200 *kin* (60–120 kg) of coal were extracted and loaded into bamboo baskets placed on sledges (fig. 2.2), which were pushed to the main shaft. One of the most demanding methods of carrying

these baskets involved assuming a stooped position and balancing two baskets suspended from a pole balanced diagonally across the lower back.[2]

Ironically, because there were no advances in removal techniques, the more mechanized the conveyance system became, the greater the demands on the workers at the coal face. As the burden increased and working conditions deteriorated, more rigorous labour management became necessary, and the *naya* (stable) system came into being. *Naya* foreman recruited their own miners, settled them in bunkhouses, controlled their lives, allotted jobs, supervised work, and patrolled the mines. By making available various types of loans to workers, the foremen were able to keep the miners in virtual human bondage. The intensification of coal-collecting work demanded by mechanization of the conveyance system was perpetuated by the coercive supervision and control of the *naya* system.

The new conveyance system had a great impact on the composition of the workforce. Mining could no longer continue as a seasonal occupation sustained by part-time farmers; the new system demanded regular output. A stable workforce was required, and in the course of the industrial revolution following the Sino-Japanese War, the recruiting of professional, full-time miners, with preference for those with families, began. A 1906 recruitment announcement for Mitsui's Tagawa mine clearly illustrates this trend: "First preference to families consisting of a couple with a child of 12 or 13, all three of whom will be required to work; plus one elderly person to serve as cook."[3] At Mitsui's Miike mine, a 1905 recruitment announcement offered contracts mainly to couples or miners with families.[4] As a result of this recruitment policy, the percentage of miners with families rose: in 1903, at Meiji mine, 50.8 per cent of all miners and 60.2 per cent of coal collectors had families; in 1906 at Futase mine, the figure was 72.6 per cent of all miners; in 1909 at the main mines in Chikuhō, Kyushu, it was 65.3 per cent of all miners.[5]

There are two reasons why miners with families were preferred. First, the morale of the workers was higher.[6] Second, it was obviously more efficient, in view of the way the coal was extracted, to have the men digging and the women hauling. Thus it was that the industrial revolution brought women into the workforce and made the hiring of working couples and families the dominant recruitment pattern. The increase in women miners can be seen in tables 2.1 and 2.2.

The establishment of the *naya* system and the formation of the female mine workforce were developments that went hand in hand. (The Miike mine, where the *naya* system was abolished in 1908, was an exception, indicating that female workers and the *naya* system were not always compatible.) As said of the Chikuhō mine, the work contracts were essentially not between foreman and the individual miner but between the foreman and the miner and his family.[7]

Social relations in mining communities followed the patriarchal system, and women worked long and exhausting hours: besides the demands of

Table 2.1. Gender Composition of Miners at Mitsui Kōzan's Miike Mines, 1896–1991

Year	Male (A)	Female (B)	Total (C)	$\frac{B}{C}$ (%)
1896	4,734	83	4,817	1.7
1897	5,080	81	5,162	1.6
1898	4,936	79	5,015	1.6
1899	5,077	75	5,152	1.5
1900	4,520	572	5,092	11.2
1901	5,205	681	5,886	11.6
1902	6,018	871	6,889	12.6
1903	6,235	1,136	7,374[a]	15.4
1904	5,895	1,253	7,148	17.5
1905	6,098	1,423	7,521	18.9
1906	7,322	1,619	8,941	18.1
1907	7,871	1,679	9,550	17.6
1908	8,352	1,971	10,323	19.1
1909	9,985	2,159	12,144	17.8
1910	10,031	2,409	12,437	19.3
1911	10,460	2,626	13,086[b]	20.1

a. Total uncorrected.
b. Total corrected.
Source: *Mitsui Kōzan 50-nenshi kō* [A Fifty-year History of Mitsui Kōzan], vol. 16 (Labour), Mitsui Bunko Collection.

their jobs in the mines, they performed all the household chores. Yamamoto Sakubei writes of their plight:

> The life of the female coal-miner was appalling. Returning black and grimy from a day's work in the pits with their husbands, they immediately had to start preparing meals. In those days there were no nursery facilities, so infants were placed in the care of others. Mothers returned from the mines to nurse their babies. Men would return from their work to bathe and sit back and relax, displaying their tattoos and drinking sake. This was the accepted behaviour of these lowly people, and no man would be found helping with what were designated as women's tasks. If a woman so much as protested, she would be beaten.[8]

The heavy double workload on women, as well as the restrictions placed on their work in the mines (e.g. women were prohibited from entering the mines when menstruating), contributed to the decrease in working rates of women miners.[9]

Table 2.3 provides statistics on labourers at Namazuta mine between 1914

Table 2.2. Gender Composition of Miners at Mitsubishi's Shinnyū and Namazuta Mines, 1894–1912

	Shinnyū				Namazuta			
Year	Male (A)	Female (B)	Total (C)	B/C (%)	Male (A)	Female (B)	Total (C)	B/C (%)
1894	1,200	200	1,400	14.3	1,015	342	1,357	25.2
1906	3,250	1,227	4,477	27.4	1,262	544	1,806	30.1
1908	—	—	—	—	1,480	728	2,208	33.0
1912	3,937	1,572	5,509	28.5	—	—	—	—

Source: Hayama Saburō, "Shinnyū tankō" [Shinnyū Mine] and "Namazuta tankō," [Namazuta Mine], unpublished manuscripts.

Table 2.3. Working Ratios of Miners at Mitsubishi Namazuta Mine by Job, 1914–1917 (percentages)[a]

	1914		1916		1917	
Job	Male	Female	Male	Female	Male	Female
Digger	52.0	48.0	57.0	51.0	53.0	49.0
Bracer	79.0	—	75.0	—	78.0	—
Hauler	86.1	—	85.8	—	86.7	—
Dresser	—	81.9	—	82.0	—	76.5
Mechanics	94.0	—	93.5	—	96.5	—
Operators	93.9	—	94.1	—	91.3	—
Misc.	77.6	74.0	78.0	77.2	78.4	77.1

a. Figures for April–September of years given.
Source: Hayama Saburō, "Shinnyū tankō" [Shinnyū Mine] and "Namazuta tankō," [Namazuta Mine], unpublished manuscripts.

and 1917. The working rates of women in the pits were extremely low, compared to the surface workers who dressed the coal or performed miscellaneous chores. With fewer women haulers, the workload on male diggers generally increased, and this in turn restricted the management's dependence on the family recruitment system.

2. Regional Differences[10]

The proportion of women workers, the jobs they were assigned, and the work-unit formations were all dependent on the location of the coal—whether the seams were highly dispersed or concentrated—and the labour market of the region. Differences can be noted between one mine and another. A breakdown of mines and work positions at major mines is given in table 2.4. The three main jobs filled by women were pitman (hauler, sub-hauler), coal dresser, and bracer. Four mines (Joban, Chikuhō, Miike, and Karatsu) employed women in the pits (haulers, sub-haulers), while in three mines (Chikuhō, Miike, and Karatsu) they worked as bracers. Women miners were concentrated in the above four mines, but Miike differed from the other three in its work-unit formations. At Joban, Chikuhō, and Karatsu, the basic one digger/one hauler work unit was the rule, and the rate of working couples was high—38.3, 39.9, and 33.9 per cent respectively, as of the end of 1910. The working conditions were better at Miike because the seams were deep and the work units were made up of two diggers to two haulers, which did not necessarily conform to the family recruitment pattern; the rate of working couples at Miike was a low 12.5 per cent (fig. 2.3).

In contrast to the four mines mentioned above, the mines of Hokkaido and Nishisonoki (Nagasaki Prefecture; see figure 2.3) employed very few

Table 2.4. Miners at Major Mines by Job, 1906

		Hewers	Bracers	Haulers	Pit operators	Misc. (underground)	Total (underground)	Dressers	Haulers (surface)	Surface operators	Misc. (surface)	Total (surface)	Grand total
Hokkaido (6 mines)	Male	3,076	188	1,733	49	1,408	6,454	1,074	184	151	1,383	2,792	9,246 (86.0)
	Female	—	—	—	—	—	—	1,293	74	—	17	1,384	1,384 (12.9)
	Minor	—	—	—	—	—	—	29	—	—	93	122	122 (1.1)
	Total	3,076 (28.6)[a]	188 (1.7)	1,733 (16.1)	49 (0.5)	1,408 (13.1)	6,454 (60.0)	2,396 (22.3)	258 (2.4)	151 (1.4)	1,493 (13.9)	4,298 (40.0)	10,752 (100)
Jōban (7 mines)	Male	2,226	246	441	129	297	3,339	76	211	338	495	1,120	4,459 (73.0)
	Female	1,099	—	12	—	145	1,256	345	—	—	25	370	1,626 (26.6)
	Minor	—	—	—	—	13	13	10	—	2	—	12	25 (0.4)
	Total	3,325 (54.4)	246 (4.0)	453 (7.4)	129 (2.1)	455 (7.4)	4,608 (75.4)	341 (7.1)	211 (3.5)	340 (5.6)	520 (8.5)	1,502 (24.6)	6,110 (100)
Chikuhō (25 Mines)	Male	17,570	2,418	1,224	949	1,646	23,807	985	1,131	3,404	3,828	9,348	33,155 (73.2)
	Female	8,316	293	6	—	510	9,125	2,115	71	—	600	2,786	11,911 (26.3)
	Minor	115	—	—	—	1	116	72	—	8	8	88	204 (0.5)
	Total	26,001 (57.4)	2,711 (6.0)	1,230 (2.7)	949 (2.1)	2,157 (4.8)	33,048 (73.0)	3,172 (7.0)	1,202 (2.7)	3,412 (7.5)	4,436 (9.8)	12,222 (27.0)	45,270 (100)
Miike (1 mine)	Male	1,906	269	738	285	553	3,751	32	409	1,423	768	2,632	6,383 (77.5)
	Female	997	28	—	—	222	1,247	269	3	—	313	585	1,832 (22.3)
	Minor	3	—	—	—	—	3	—	—	11	2	13	16 (0.2)
	Total	2,906 (35.3)	297 (3.6)	738 (9.0)	285 (3.5)	775 (9.4)	5,001 (60.8)	301 (3.7)	412 (5.0)	1,434 (17.4)	1,083 (13.2)	3,230 (39.2)	8,231 (100)

Karatsu	Male	3,153	1,343	268	106	279	5,169	148	431	537	421	1,537	6,706 (68.7)
(6 mines)	Female	1,561	248	18	—	34	1,861	786	130	—	52	968	2,829 (29.0)
	Minor	144	12	—	—	4	160	55	—	7	4	66	226 (2.3)
	Total	4,858 (49.8)	1,603 (16.4)	306 (3.1)	106 (1.1)	317 (3.2)	7,190 (73.7)	989 (10.1)	561 (5.7)	544 (5.6)	477 (4.9)	2,571 (26.3)	9,761 (100)
Nishiso-		1,111	—	69	153	56	1,389	—	96	178	399	673	2,062 (92.7)
noki	Male	—	—	—	—	—	—	—	—	—	163	163	163 (7.3)
(1 mine)	Female	—	—	—	—	—	—	—	—	—	—	—	—
	Minor												
	Total	1,111 (49.9)	—	69 (3.1)	153 (6.9)	56 (2.5)	1,389 (62.4)	—	96 (4.3)	178 (8.0)	562 (25.3)	836 (37.6)	2,225 (100)

a. Figures in parentheses are percentages.

Source: Ogino Yoshihiro, "Nihon shihonshugi kakuritsuki ni okeru tankō rōshi kankei no 2 ruikei" [Two Patterns of Labour Management Relations in Mines during the Establishment of Japanese Capitalism], *Enerugii kenkyū nōto*, 10. With corrections. Original data from Ministry of Agriculture and Commerce, Bureau of Mining, *Kōfu taigū jirei* [Examples of Treatment of Miners] (1908).

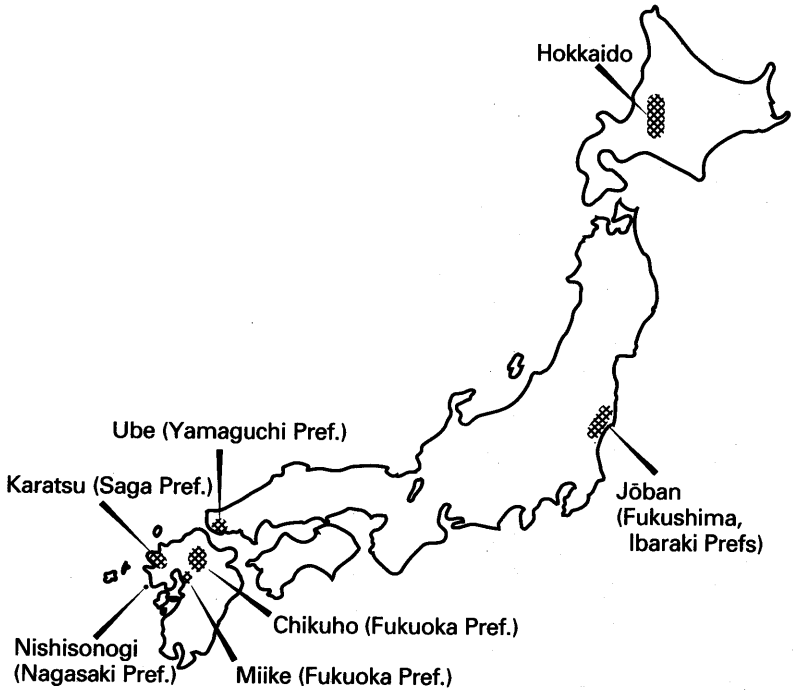

Fig. 2.3. Major Japanese coalfields.

women, and none worked underground. At the Hokkaido mines, women were surface workers, mostly coal dressers, and comprised 13 per cent of the total workforce. At Nishisonoki, the few women who were employed did miscellaneous surface chores. The labour market in these two areas posed difficulties for the recruitment of miners, particularly women. Nishisoniki was an island off Kyushu and its geographic location was a drawback. Hokkaido mines recruited from Tohoku, in northern Kyushu, where the farming class was undifferentiated. Thus it was that the single men who went as seasonal workers formed the majority of miners. Slope mining was employed, so that the hauling of coal did not require women labourers. Again in contrast to Chikuhō, Jōban, and Karatsu, the *naya* system was abolished in both Hokkaido and Nishisonoki during the early stages of the industrial revolution, and recruitment and management of the miners was done directly by the mine owners.

It can thus be seen that the jobs assigned to women and their percentage in the mines differed greatly by mine. Considering that Jōban, Chikuhō, Miike, and Karatsu mines produced 86 per cent of the nation's coal in 1906, and that Hokkaido produced only 10 per cent, and Nishisonoki even less, it

is clear that women workers played a central role in the Japanese coal mining industry.

3. Characteristics of Women Miners: The 1920s

How do women miners compare with women in textiles, an industry that had a very high concentration of women before the Second World War? An examination of the nationwide statistics for the 1920s—which are very thorough—will shed light on the characteristics of women miners, their work, and and their lives.

(1) Age and Marital Status

The age and marital status of women miners and textile workers is given in table 2.5. The age range of the miners is older than that of textile workers: 71 per cent of textile workers were under 20, and the proportion of young women was overwhelmingly greater. Miners under 20 comprised only 24 per cent of the total, and 58 per cent were over 25. This contrast in age composition shows that young women made up the core of the textile workforce, while in the mines it was the middle-aged women. This contrast is also seen in the marital status of the women in these two industries: only 12 per cent of the textile workers, as opposed to 75 per cent of the miners, were married.

A closer look at the figures reveals that the age composition of women working in the three underground jobs (digger, hauler, supporter) differed from that of the coal dressers, who were surface workers. A large proportion (36 per cent) of the coal dressers were young girls under 20, but the figure is far lower than that for women over 25 working underground. As might be expected, more of the women working underground were married: 80 per cent, as opposed to 58 per cent of the coal dressers. Thus it can be concluded that the jobs underground were generally carried out by working couples (the family recruitment pattern), and that the proportion of young, unmarried coal dressers was high.

(2) Length of Employment

The average number of years women worked as miners is given in table 2.6. In the case of textile workers, half worked for less than three years, indicating a very low professional rate. In contrast, over half the miners were employed for over five years, indicating a high rate of professionalism. As with age composition and marital status, there were differences between the underground and surface workers. Those who worked over five years underground were close to 60 per cent (70 per cent in the case of supporters), but only 37 per cent of the surface workers worked for that length of time; 45 per cent of them left their jobs within three years. This difference in years of employment can be explained by the relatively high level of skills that the underground workers had to master; coal dressing was a simple task that required no training.

Table 2.5. Age and Marital Status of Women Miners, 1924

Age	Mining industry					Women textile workers
	Digger	Hauler	Dresser	Bracer	All	
<15	438 (6.1)[a]	1,917 (6.3)	1,728 (14.0)	242 (4.5)	4,880 (7.5)	211,002 (35.7)
16–19	1,152 (16.0)	4,915 (16.3)	2,725 (22.0)	546 (10.2)	10,586 (16.3)	206,715 (35.0)
20–24	1,476 (20.5)	5,834 (19.3)	1,996 (16.1)	864 (16.1)	11,530 (17.7)	99,332 (16.8)
25–29	1,303 (18.1)	5,383 (17.8)	1,355 (11.0)	1,090 (20.4)	10,463 (16.1)	29,149 (4.9)
30–39	1,850 (25.7)	7,876 (26.1)	2,105 (17.0)	1,571 (29.3)	16,023 (24.7)	24,371 (4.1)
40–49	888 (12.3)	3,922 (13.0)	1,870 (15.1)	952 (17.8)	9,761 (15.0)	14,010 (2.4)
>50	91 (1.3)	352 (1.2)	591 (4.8)	90 (1.7)	1,717 (2.6)	6,596 (1.1)
Total	7,198 (100.0)	30,199 (100.0)	12,370 (100.0)	5,355 (100.0)	64,960 (100.0)	591,175 (100.0)
Married	5,695 (79.1)	23,964 (79.4)	7,193 (58.1)	4,549 (84.9)	48,655 (74.9)	71,123 (12.0)
Single	1,503 (20.9)	6,235 (20.6)	5,177 (41.9)	806 (15.1)	16,305 (25.1)	520,052 (88.0)

a. Figures in parentheses are percentages.

Source: Cabinet Statistics Bureau, *Rōdō tōkei jitchi chōsa hōkoku* [Report of a Survey on Labour Statistics] (1924).

Table 2.6. Length of Employment of Women Workers, 1924

Age	Coal-mining industry					Women textile workers
	Digger	Hauler	Dresser	Bracer	All	
<1	522 (7.3)[a]	2,068 (6.9)	2,097 (17.0)	262 (4.9)	6,210 (9.6)	126,370 (21.4)
1–3	1,341 (18.7)	5,173 (17.1)	3,533 (28.6)	648 (12.1)	12,928 (19.9)	193,548 (32.8)
3–5	1,243 (17.3)	4,947 (16.4)	2,138 (17.3)	723 (13.5)	10,576 (16.3)	119,728 (20.3)
5–10	2,380 (33.2)	10,193 (33.8)	2,798 (22.6)	1,749 (32.8)	19,823 (30.6)	115,015 (19.5)
10–15	976 (13.6)	4,375 (14.5)	983 (8.0)	985 (18.4)	8,372 (12.9)	24,311 (4.1)
>15	715 (10.0)	3,412 (11.3)	806 (6.5)	973 (18.2)	6,945 (10.7)	10,758 (1.8)
Total	7,177 (100.0)	30,168 (100.0)	12,355 (100.0)	5,340 (100.0)	64,854 (100.0)	589,728 (100.0)

a. Figures in parentheses are percentages.
Source: Cabinet Statistics Bureau, *Rōdō tōkei jitchi chōsa hōkoku* [Report of a Survey on Labour Statistics] (1924).

(3) Educational Background

Coal-miners, both men and women, had low educational backgrounds (table 2.7). The lack of formal education of women is particularly conspicuous. About 70 per cent of women miners had either not gone to school at all or had not finished primary school. The contrast with the educational level of textile workers is striking. Taking into consideration the age range of the women in the two industries, this discrepancy is to be expected. (The younger the women, the more educated they were.) From these figures, we can see that the social status of women miners was very low. The stigma that marked coal-miners as criminal elements (*gezainin*) and social dropouts throughout the history of modern Japan is probably related to their low education level.

(4) Areas of Recruitment

From where and from what levels of society were these low-class miners recruited? Although it is difficult to distinguish the men from the women in the materials available, the information has been tabulated for the miners of Chikuhō, where the family recruitment pattern was dominant (table 2.8). The largest number of Chikuhō miners was recruited from Fukuoka Prefecture, where the mines were located, then from the neighbouring prefectures in Kyushu, and finally from Shikoku and south-west Honshu. From the information available on the counties and prefectures from which large numbers of miners were recruited, we are able to tell whether the rate of tenancy was high, how fair tenant–landowner relations were, and what the productivity and rice yield of the area was. The proportion of miners who were tenants and impoverished farmers from poor farming areas was high. Whole families had uprooted themselves and gone to work in the mines. What was it that attracted them to this harsh work?

(5) Wages and Expenses

Women haulers and sub-haulers earned 1.5 to 2 times what women in textiles were making. The figures for 1906 show that the average daily wage of women in silk mills and cotton-spinning factories was 23 sen, and in 1924 the former earned 96 sen, and the latter 1 yen 10 sen (table 2.9). But surface workers earned less than the textile workers (see the 1906 and 1924 figures). Thus there was a difference between the wages of the underground and surface workers. A graphic representation of the wage differentials is shown in table 2.10.

If the shorter working hours of women miners resulting from the demands made on them in the home are taken into account, the difference in the monthly and annual incomes of underground workers and surface and textile workers is much less. But of the women who worked in the mines, those who performed the job of pitman received the highest income. It was for the high pay that the women went into the mines, despite the hardship. Their educational backgrounds marked them as low-class citizens, but they earned the highest wage among women workers.

Table 2.7. Education of Miners, 1924

Education[a]	Female textile workers	Male metal/machine workers	Male miners	Female miners
No schooling	38,903 (6.5)[b]	6,977 (2.7)	28,299 (15.7)	23,115 (35.5)
Elementary, partial attendance	105,216 (17.6)	23,338 (9.0)	46,655 (25.9)	22,534 (34.6)
Primary, graduates	409,994 (68.6)	97,818 (37.9)	62,087 (34.5)	16,718 (25.7)
Upper elementary, partial attendance	14,351 (2.4)	20,614 (8.0)	10,378 (5.8)	1,028 (1.6)
Upper elementary, graduates	16,138 (2.7)	81,607 (31.6)	28,610 (15.9)	1,481 (2.3)
Vocational, partial attendance	2,572 (0.4)	3,936 (1.5)	244 (0.1)	27 (0.0)
Vocational, graduates	1,123 (0.2)	7,118 (2.8)	228 (0.1)	24 (0.0)
Middle, partial attendance	3,320 (0.6)	8,781 (3.4)	1,561 (0.9)	40 (0.1)
Middle, graduates	523 (0.1)	5,630 (2.2)	495 (0.3)	25 (0.0)
Other	5,393 (1.0)	2,590 (1.0)	1,429 (0.8)	155 (0.2)
Total	597,533 (100.0)	258,409 (100.0)	179,986 (100.0)	65,147 (100.0)

a. Elementary school represents grades 1–4, and upper elementary school grades 5–6; middle school is equivalent to high school under the post-war education system.

b. Figures in parentheses are percentages.

Source: Cabinet Statistics Bureau, *Rōdō tōkei jitchi chōsa hōkoku* [Report of a Survey on Labour Statistics] (1924).

Table 2.8. Home Prefectures of Chikuhō Miners, July 1928

Prefecture[a]	County[b]	Miners	Tenancy rate (%)	Rice yield (in *koku*)
Fukuoka (28,280 miners, 44.4%)	Tagawa	6,713	58.3	1.95
	Kaho	5,650	52.1	1.87
	Kurate	3,981	55.3	1.75
	Asakura	1,768	47.2	2.00
	Onga	1,447	50.4	1.79
Prefectural average		—	49.7	2.04
Kumamoto (5,973 miners, 9.4%)	Aso	823	27.0	1.69
	Yatsushiro	743	54.3	1.82
	Tamana	676	52.5	2.02
	Amakusa	520	43.6	1.17
	Ashikita	516	46.8	1.17
Prefectural average		—	43.7	1.79
Oita (5,933 miners, 9.3%)	Hita	1,149	51.4	1.85
	Usa	767	51.8	1.94
	Shimoge	691	38.6	1.90
	Hayami	597	40.3	1.56
	Kusu	526	50.6	1.74
Prefectural average		—	41.1	1.80
Hiroshima (4,278 miners, 6.7%)	Takata	646	42.3	1.74
	Kamo	458	38.4	1.57
	Yamagata	457	35.2	1.55
	Hiba	399	42.9	1.96
	Futami	371	40.8	1.88
Prefectural average		—	39.8	1.76
Ehime (3,337 miners, 5.2%)	Nii	625	72.0	1.87
	Kami Ukena	507	34.9	1.67
	Shūsō	404	53.6	2.15
	Uma	338	47.6	2.14
Prefectural average		—	42.5	2.01
Saga (2,853 miners, 4.5%)	Saga	533	45.8	2.44
	Miyaki	528	50.6	2.14
	Kanzaki	423	37.9	2.16
	Ogi	327	46.4	2.14
Prefectural average		—	41.1	2.09

Table 2.8. (*continued*)

Prefecture[a]	County[b]	Miners	Tenancy rate (%)	Rice yield (in *koku*)
Kagoshima (2,202 miners, 3.5%)	Aira	447	52.0	1.66
Prefectural average		—	38.5	1.52
Nagasaki (1,494 miners, 2.3%)	Nishisonoki	302	29.0	1.43
Prefectural average		—	35.2	1.67
Shimane (1,317 miners, 2.1%)	Ochi	405	?	1.76
	Naka	314	?	1.54
Prefectural average		—	?	1.89

a. Figures in parentheses represent number and percentage of miners at Chikuhō from that prefecture. Not included are: Koreans (5,626, 8.8 percent), Miyazaki Prefecture (1,305 miners, 2.1 per cent), and Yamaguchi Prefecture (1,048 miners, 1.6 per cent).

b. For Fukuoka, Kumamoto, and Ōita, the five counties from which the largest number of miners came are tabulated; for other prefectures, only counties with over 300 miners are included.

Source: Compiled from Fukuoka Chihō Shokugyō Shōkai Jimukyoku, *Chikuhō tankō rōdōsha shusshinchi shirabe* [Survey of Home Prefectures of Chikuhō Miners] 1931; *Kakuken tōkeisho* [Statistics by Prefecture] (1928). For Shimane, *Kakuken tōkeisho* (1927) was used.

Table 2.9. Average Daily Wages of Women Miners, 1906 and 1924 (yen)

	1906				1924 (June)			
					Underground		Surface	
Mine Average	Miner	Sub-hauler	Bracer	Dresser	Digger	Other	Worker	Average
Jōban	0.350	0.304	—	0.189	1.845	1.180	0.666	1.359
Chikuhō	0.551	0.492	0.508	0.278	1.834	1.269	0.739	1.390
Karatsu	0.466	0.382	0.430	0.216	1.817[a]	1.338[a]	0.664[a]	1.383[a]
Miike	—	0.404	0.240	0.202				

a. All Kyushu excluding Chikuhō.

Source: Compiled from Agriculture and Commerce Ministry, Bureau of Mining, *Kōfu taigū jirei* [Examples of Treatment of Miners] (1908), p. 57; Nihon Ginkō Chōsa Kyoku, *Kōzan rōdō tōkei* [Statistics on Labour in Miners] (June 1924).

Table 2.10. Household finances of a Mining Family, 1925 (yen)

		Hewers (incl. fixers)[a]			Transporters (incl. pole carriers)		Factory workers	
		Only household head works	One woman from household works		Only household head works	One woman from household works	Only household head works	One woman from household works
			Hauler	Other				
Income	Wages							
	Household head	63.23	56.19	54.55	49.66	47.04	61.83	53.87
	Family	—	32.77	27.98	—	18.51	—	18.29
	Subsidies/relief aid	1.82	2.84	2.79	0.69	0.94	0.05	0.11
	Bank balance	13.76	16.60	15.15	8.49	11.00	15.61	9.71
	Bank withdrawals/loan collection	5.23	6.92	5.81	3.64	5.80	6.77	5.55
	Loans/pawns	3.02	3.73	2.93	2.92	2.01	1.54	1.33
	Total (incl. misc.) (A)	89.87	120.46	111.36	69.31	86.49	90.14	90.85
Expenses	Work equipment	1.80	2.95	2.39	0.54	0.84	0.48	0.84
	Food	31.12	36.13	35.78	28.68	30.83	30.21	33.05
	Housing	3.79	4.11	3.94	2.50	3.06	2.60	3.68
	Clothing	6.12	7.08	6.98	3.92	6.00	6.52	7.75
	Education/medical expenses	3.18	6.59	5.75	2.57	4.46	3.62	5.47
	Entertainment	9.51	10.73	9.99	7.06	7.71	9.11	8.99

Savings	9.12	15.40	13.86	6.21	8.50	9.44	9.11
Loan payments	3.46	6.36	4.73	5.64	6.12	5.12	6.96
Total (incl. misc.) (B)	73.70	96.36	89.88	60.91	73.05	73.29	80.98
Difference (A–B)	16.17	24.10	21.48	8.40	13.44	16.85	9.87
Engel coefficient	42.2	37.5	39,8	47.1	42.2	41.2	40.8
No. of households surveyed	80	70	33	47	42	73	41

a. Fixers are miners who fix tunnels and hewing sites.
Source: Compiled from Shakai Kyoku, Sekitan Kōgyō Rōdō Jijō Chōsakai [Social Affairs Bureau, Study Group on Labour Conditions in the Coal-mining Industry], *Tankō kōfu kakei chōsa* [Survey of Household Finances of Miners] (1926).

The household expense budget was greatly influenced by the income of a woman working underground. The household budget of relatively high-income miner families in large mines has been tabulated (table 2.10). None of the families can cover their expenses with their monthly incomes; savings, loans, and pawns provide a sizeable proportion of income. The high annual savings rate seen under expenses does not indicate a surplus in funds. These were mostly forced savings, enforced by the mine operators to stop miners from leaving.[11] All the households were on a tight budget, but those with women haulers had the highest incomes. These women helped boost their family incomes by 27.2 per cent. Their Engel coefficient and clothing, social and entertainment expenses indicate that their families enjoyed a more comfortable life than other mining families.

In sum, women miners can be characterized as middle-aged, long-term, skilled workers when they worked underground as haulers and supporters; as surface workers, they were young and did not stay in their jobs for long. Notwithstanding their social status, underground workers endured debilitating hardships for a standard of living that was, in relative terms, higher than that of their counterparts in the textile industry.

II. Technological Innovations and Women Workers

1. Background Factors

The advances made during the industrial revolution in the mechanization of the coal industry were only in the conveyance system. They had stopped short of revolutionary changes in the hand tools used to hew coal. Full-scale mechanization of the actual mining process did not begin until the 1920s, particularly from the latter half of the decade.

First, let us examine the historical factors that helped usher in the innovations. The chronic recession of the 1920s caused a drop in the market price of coal (table 2.11). For example, in 1920, Type 1 Kyushu coal (Moji) cost 28.55 yen per ton, and a year later had dropped to 20.20 yen. Following the establishment of the Federation of Coal Industries in 1921, restrictions were placed on the amount of coal sent, and the price per ton settled at over 16.00 yen.[12] But the Tokyo prices for Type 1 Kyushu coal, Type 1 Iwaki coal, and Yūbari coal continued to fall in 1922 and after, placing the whole industry in severe financial straits.[13] The situation deteriorated with competition from imported coal. As the figures in table 2.11 show, coal imports rose from 1922, and in 1923 and 1924, and from 1927 onward they exceeded coal exports. Mining was an industry that had grown to meet domestic demands and had tried to meet export requirements as well. But it reached a turning-point when coal began to be imported in large volume. The imported coal, which came mainly from Guandong Province (particularly the Fushun mine), had been mined by cheap colonial labour and the easier mining conditions of surface mining.[14] The competition brought by low-cost

Table 2.11. Domestic Coal Yield and Quantity of Exported/Imported Coal, 1914–1929 (1,000 tons)

Year	Yield	Export	Import	Import sources			
				Rep. of China	Kwangtung Province	French Indochina	Other
1914	22,293 (100)[a]	3,589 (100)	958 (100)	701	191	48	17
1915	20,491 (92)	2,923 (81)	615 (64)	426	67	107	14
1916	22,902 (103)	3,017 (84)	556 (58)	315	111	124	7
1917	26,361 (118)	2,813 (78)	713 (74)	490	125	94	4
1918	28,029 (126)	2,197 (61)	768 (80)	539	136	88	5
1919	31,271 (140)	2,017 (56)	705 (74)	467	125	108	5
1920	29,245 (131)	2,147 (60)	810 (85)	567	87	152	4
1921	26,221 (118)	2,407 (67)	790 (82)	418	214	157	2
1922	27,702 (124)	1,704 (47)	1,187 (124)	410	575	184	18
1923	28,949 (130)	1,587 (44)	1,713 (179)	647	735	196	134
1924	30,111 (135)	1,725 (48)	2,012 (210)	577	1,139	192	104
1925	31,459 (141)	2,698 (75)	1,768 (185)	302	1,285	168	13
1926	31,427 (141)	2,611 (73)	2,045 (213)	311	1,418	244	71
1927	33,531 (150)	2,191 (61)	2,703 (282)	560	1,743	346	54
1928	33,860 (152)	2,185 (61)	2,779 (290)	537	1,759	377	107
1929	34,258 (154)	2,044 (57)	3,254 (340)	628	2,016	488	123

a. Figures in parentheses based on 1914 as 100.

Source: Compiled from *Nihon kōgyō hattatsushi* [History of the Development of Coal-mining in Japan], vol. 2 (Kōzan Konwakai, 1932), pp. 174–75, 181–82.

imported coal pushed the domestic industry into a quagmire. As the recession worsened, the competition intensified. This was the first major factor that helped accelerate the technological renovation of the industry.

The second factor was protective legislation for coal-miners. As a participant in the first International Labour Conference (October–November 1919), Japan undertook to adopt the agreements made by reforming its 1916 legislation on miners, the Regulations concerning Relief for Coal-miners. This was one of the most important labour issues that the government acted on in the post-First World War era. The important reforms were the prohibition of late-night labour and underground work by women and minors. These reforms undermined the basic structure of the workforce—the working couple and family recruitment. For the mine operators, for whom this mean further financial restraints, the reforms were unacceptable. The union of coal mines in Chikuhō started an opposition movement against the reforms.[15] But from the viewpoint of owners of large mines, the removal of women and children from the mines became an opportunity to implement technological changes to raise productivity and cut costs.

On 1 September 1928, the reform of the Regulations concerning Relief for Coal-miners was adopted by the Home Ministry as Order No. 30. Although there was a five-year period of grace before its final enforcement, the reforms helped accelerate the implementation of technological reforms. The mines that had been dependent solely on family and couple work teams were forced to revamp their employment patterns, raise their productivity, and improve their technology.

There were two important exceptions to the 1928 reform. One concerned the prohibition of night work. The surface workers, the coal dressers, could work at night for the time being provided there were three shifts a day, and that this was for a predetermined period of time. For the mining of thin seams, women and children were allowed to work underground with the permission of the mine superintendent.[16]

Secondly, as the enforcement of the reforms approached the final year of grace, there was a movement to postpone the date by the smaller and medium-sized mines (Coal Mine Mutual Aid Association). The Home Ministry consequently issued another order (5 June 1933), which allowed underground work by women and children, mainly in pits with limited reserves.[17]

2. Technological Reforms

The first major reform involved the mining method—from the pillar method to the longwall method (fig. 2.4). The pillar method required boring directly into the seams, leaving pillars in the resulting holes as support. The longwall method involved mining the coal along the whole seam at the angle it was in, while leaving pillars for support. Eventually, the pillars were eliminated, and the *sobarai* longwall method was employed. This had been used earlier during the industrial revolution, in mines with thin seams where

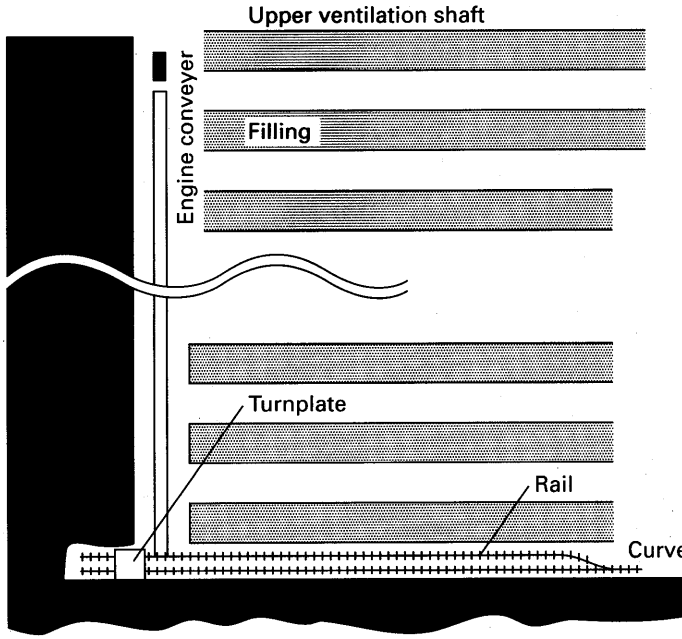

Fig. 2.4. Diagram of Longwall-type Mine
Source: Compiled from *Nihon kōgyō hattatsushi* [History of the Development of Coal-mining in Japan], vol. 2 (Kōzan Konwakai, 1932).

geological pressures were controllable. Improvements in filling made it possible to use longwall mining in thick seams as well as piled seams. This changed the nature of the work from small teams working in isolation to one in which greatly enlarged working space, group work, and the use of machines became possible.[18]

Another improvement in mining techniques was in blasting. Explosives had been used primarily to wedge thin spoil and petrified roots from the seams.[19] The widespread use of safer explosives (table 2.12) following the Second World War and the adoption of boring machines and drills firmly established blasting as a technique. Before the boring machine, it would take 20 to 30 minutes to bore one hole 90 cm deep, and now it took just a few minutes to bore a hole 120 to 150 cm deep; where one blast had opened 20 to 40 holes, now 20 to 40 could be bored.[20]

Thirdly, the coal cutter and pick were made obsolete by the adoption of mechanized tools. The adoption of machinery was extremely difficult when the pillar method was used and working space was severely limited; but with the longwall method, which was becoming increasingly popular, mechanization became possible.

Table 2.12. Use of Explosives in Mining, 1923–1929

Year	Dynamite	Black powder	Cotton powder	Safety explosives
1923	763,483 (26)[a]	105,518 (3.6)	11,430 (0.4)	122,636 (4)
1924	769,788 (26)	79,855 (2.7)	10,798 (0.4)	497,641 (17)
1925	812,856 (26)	53,598 (1.7)	13,688 (0.4)	745,913 (24)
1926	693,230 (22)	55,386 (1.8)	8,513 (0.3)	977,914 (31)
1927	708,927 (21)	33,605 (1.0)	2,188 (0.1)	1,453,136 (43)
1928	654,731 (19)	23,979 (0.7)	1,507	1,954,843 (58)
1929	669,503 (20)	20,668	?	3,822,314 (112)

a. Figures in parentheses indicate the amount of explosives (in grams) used to extract one ton of coal.

Source: *Nihon kōgyō hattatsushi* [History of the Development of Coal-mining in Japan], vol. 2, table 60.

Fourthly, as blasting and mechanization increased efficiency, improvements in transport mechanisms were in heavy demand. A variety of hauling apparatus was tried. The adoption of new equipment was widespread and immediate, as it was more efficient and cheaper by far than the woman haulers.[21]

Other innovations included the switch from steam to electric power in slope mining, and use of a coal-washing machine to enhance the quality of coal production for the market.

The degree to which technological innovations were adopted varied from mine to mine. The number of new mining machines acquired nationwide rose at dramatic rates in 1926, 1927, and 1933 (see table 2.13). The peak years for the acquisition of new machinery were, by prefecture, 1926 for Hokkaido and Fukuoka, 1928 for Nagasaki, and 1931 to 1933 for Fukushima, Ibaraki, and Yamaguchi. The discrepancy between prefectures with the most new machinery (Hokkaido) and those with the least (Fukushima, Ibaraki, and Yamaguchi) was great, an indication of the regional differences between the technologically advanced Hokkaido and the three other prefectures, which were slow developers. This was also seen in the productivity per miner (fig. 2.5): from 1920 on, there was a dramatic in rise productivity in Hokkaido, Nagasaki, and Fukuoka; for Fukushima, Ibaraki, Yamaguchi, and Saga, there was a slow rise; and for Ibaraki, there was actually a drop in productivity from 1933 on.

The size of the coal mines was one of the reasons for this discrepancy. Hokkaido mines were generally large, while those in Fukushima, Ibaraki, and Yamaguchi were proportionally small- and medium-sized. One can see that the level of mechanization was directly linked to the economics of each mine and the extent of capital outlay. This is apparent in the case of Chikuhō: new machinery was concentrated in the big-capital mines run by Mitsui, Mitsubishi, Meiji, and Kaijima Gomei. This is reflected in the productivity

Table 2.13. Installation of Coal-mining Machinery (rock drills, augers, coal cutters, coal picks) by Prefecture, 1925–1935

Prefecture	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935
Machines installed											
Hokkaido	44	102	111	145	198	300	228	238	500	659	896
Fukushima, Ibaraki	30	29	39	6	24	16	70	44	88	107	129
Yamaguchi	1	—	—	5	2	16	—	4	47	27	41
Fukuoka	32	152	176	461	429	341	190	378	520	667	619
Sago	57	8	138	46	45	21	—	58	34	55	40
Nagasaki	6	—	5	66	100	82	160	96	138	190	119
Nationwide total	170	291	467	730	861	776	648	818	1,327	1,749*	1,850*
Machines installed per mine[a]											
Hokkaido	1.47	3.64	3.83	5.18	7.07	10.34	6.91	6.61	14.29	17.34	24.22
Fukushima, Ibaraki	1.20	1.45	1.86	0.29	1.14	0.84	3.33	2.00	4.00	4.65	5.16
Yamaguchi	0.09	0	0	0.45	0.14	1.23	0	0.36	3.92	1.93	2.93
Fukuoka	0.41	1.92	2.23	5.84	6.74	4.87	2.50	4.91	6.75	8.23	7.11
Sago	5.70	1.00	17.00	5.88	6.43	3.50	0	9.67	5.67	7.86	6.67
Nagasaki	0.35	0	0.29	3.14	4.76	4.32	8.89	5.33	6.90	7.60	4.41
Nationwide total	0.96	1.80	2.76	4.32	5.22	4.91	3.90	4.81	7.72	9.25	9.34

a. Figures for machines per mine calculated by dividing the number of machines installed by the number of mines that yield more than 10,000 tons annually.

Source: Compiled from Commerce and Industry Ministry, Mining Bureau, *Honpō kōgyō no sūsei* [Mining Trends in Japan].

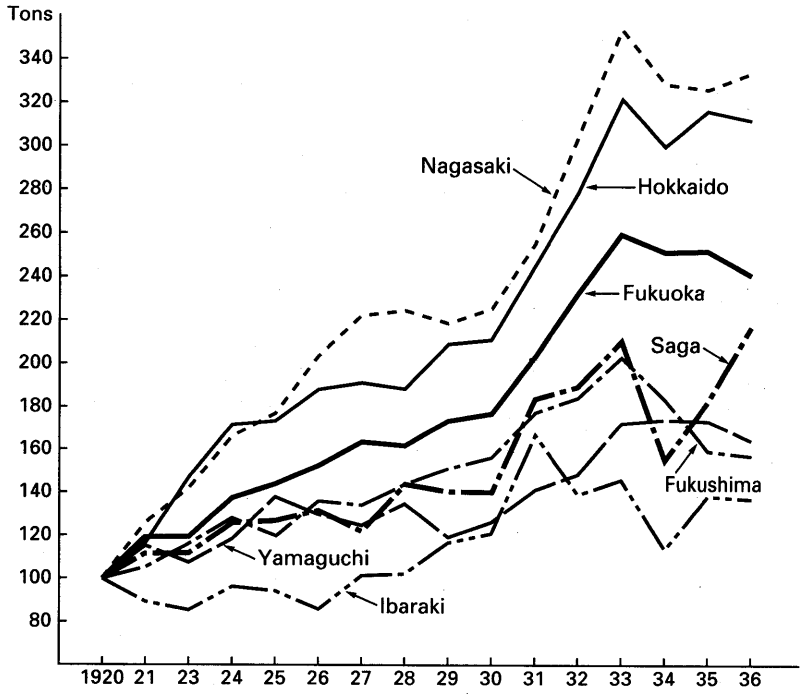

Fig. 2.5. Trends in Mine Productivity per Miner, 1920–1936 (1920 = 100)
Note: Figures for 1922 are unknown.
Source: Compiled from Commerce and Industry Ministry, Mining Bureau, *Honpō kokyō no sūsei* [Mining Trends in Japan].

of the mines (fig. 2.6); from the second half of the 1920s and into the 1930s, the large mines established supremacy in productivity over the smaller mines.[22]

The machines that were purchased by the mines, particularly from the latter 1920s, were mostly imported. In 1932, only 20 per cent of the machines were domestic products, and the mines thus depended on foreign machines for the most part. The technological revolution apparently had little impact on the domestic machine industry. But from 1933, a sudden increase in machine production is seen, and by 1935 the country was 50 per cent self-sufficient.[23] There were three major types of machinery manufacturers: the large manufacturers, such as Hitachi Seisakujo and Komatsu Seisakujo; the companies that ran mines as well as manufacturing companies, such as Sumitomo Kikai Seisakujo, Miike Seisakujo, and Ashio Seisakujo; and the small- and medium-sized manufacturers (including companies that specialized in mining machinery) (table 2.14). From 1933 on, a

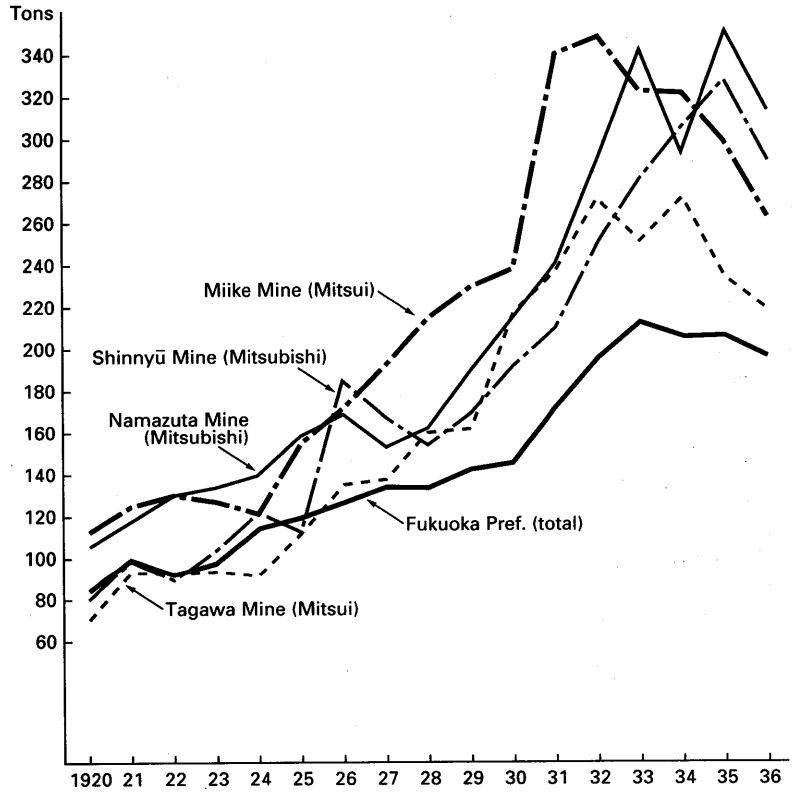

Fig. 2.6 Trends in Productivity per Worker in Fukuoka Prefecture, 1920–1936
Note: Calculated by dividing output by the number of miners. Figures for Fukuoka for 1922 are unknown.
Source: Compiled from Commerce and Industry Ministry, Mining Bureau, *Honpō kōgyo no sūsei* [Mining Trends in Japan] for each year; *Mitsubishi kōgyō shashi* [History of the Mitsubishi Mining Company] (1976), documents, tables 14 and 15; and *Mitsui kōzan gojūnen shikō* [Manuscript for 50-year History of the Mitsui Mines], vols. 5–2 and 16.

complementary relationship developed as technological advances encouraged domestic machine manufacturers, and vice versa.

3. The Decline of Women Workers

The prohibition of late night and underground work by women and minors by the reform of the Rules for Relief of Miners and the rationalization of the work process brought about by technology drastically influenced the reduction of women workers. As the statistics in table 2.15 indicate, the pro-

Table 2.14. Domestic Production of Mining Machinery, 1936

Company	Workers as of Oct. 1936[a]	Rock drill, auger	Coal-cutter	Pneumatic hammer, pick
Hitachi Seisakujo	7,261	—	50	—
Komatsu Seisakujo	1,095	195	—	—
Sumitomo Kikai Seisakujo	1,163	4	—	—
Miike Seisakujo		325	41	—
Ashio Seisakujo		206	—	144
San'ei Seiki Seisakujo	181	234	—	177
Taisei Seisakujo	117	254	—	136
Kaneshiro Sakuganki Seizō	149	297	—	—
Kurita Seisakujo		112	—	42
Yamamoto Tekkōjo	105	135	—	200
Uryū Seisakujo		57	—	103
Nihon Kūki Kikai Seisakujo		60	—	154
Seikōsha	62	49	—	—
Teikoku Sakuganki Seisakujo		48	—	7
F.K. Seisakujo	76	73	—	—
Kyōritsu Kikai Seisakujo	79	—	—	28
Nihon Sakuganki Seisakujo	68	5	—	—
Nakayama Kōgyōshō	114	7	—	—
Seibu Denki Kōgyōsho	164	475	—	—
Ōsaka Tokki Seisakujo		142	—	—
Chiyoda Seisakujo	75	28	—	—
Other (4 manufacturers)		45	—	—
Total		2,751	91	1,525

a. Columns are blank when information unavailable.
Source: Compiled from Commerce and Industry Ministry, Mining Bureau, *Honpō kōgyō no sūsei* [Mining Trends in Japan] (1936); figures for workers are from Kyōchōkai Sangyō Fukuribu, *Zenkoku kōjō kōzan meibo* [Directory of Factories and Mines in Japan] (1937).

portion of women starts to decline in 1925, and 1928 and 1931 were years in which the decrease was considerable. The drop was especially prominent in underground workers: in the 11 years between 1920 and 1931, the proportion fell by 19 per cent.

The labour system entirely dependent on a family recruitment system was fast disintegrating. But even after 1934, the year in which the relief measures prohibiting underground work went into effect, 4 per cent of the pitmen were still women—which was, as discussed above, possible because of the exceptions that were allowed. The decrease in women working on the surface was not as noticeable, and in the 17 years between 1920 and 1936 the percentages dropped by only 5 points. This is partly because the technological innovations for surface work did not progress so rapidly and part-

Table 2.15. Women Miners, 1920–1936

Year[a]	Women miners			Percentage of women miners[b]		
	Underground	Surface	Total	Underground	Surface	Percentage of workforce
1920	66,396	28,474	94,870	26.6	30.6	27.7
1921	50,695	21,927	72,622	26.3	29.2	27.1
1923	54,898	22,151	77,049	26.8	30.0	27.6
1924	47,948	20,504	68,452	26.2	30.0	27.3
1925	46,072	19,330	65,402	24.8	28.8	25.9
1926	42,214	18,815	61,029	24.6	29.8	26.0
1927	41,701	18,039	59,740	23.6	29.0	25.0
1928	37,730	16,947	54,677	21.3	27.9	23.0
1929	32,977	16,300	49,277	19.4	27.8	21.5
1930	24,002	13,438	38,440	15.8	27.4	18.8
1931	10,992	10,599	21,591	9.8	24.9	14.0
1932	7,202	9,420	16,622	7.2	24.6	12.0
1933	6,573	9,437	16,010	6.3	24.5	11.1
1934	6,598	12,327	17,925	4.5	27.3	10.6
1935	5,308	12,539	17,847	4.1	26.8	10.2
1936	4,841	13,427	18,268	3.3	25.9	9.2

a. Figures for 1922 not available.
b. Percentages calculated by dividing number of women workers by total workers.
Source: Compiled from Commerce and Industry Ministry, Mining Bureau, *Honpō kōgyō no sūsei* [Mining Trends in Japan].

ly because late-night work, as long as a three-shift work schedule was used, was permitted.

There were regional differences in the decline in women miners (fig. 2.7), closely following the pattern of regional differences in implementation of new technology. In the mines where the slope transport system was prevalent, women haulers were almost non-existent. In Hokkaido, the proportion of women workers, which was low from the outset, began gradually to decrease further in the 1920s. Fukuoka and Saga prefectures witnessed dramatic drops in 1928 and 1929, while in Nagasaki, Fukushima, Ibaraki, and Yamaguchi, the decrease was not as great. In 1931, Ibaraki Prefecture hit its all-time low, and from 1932 increased again. We can conclude that in areas where mine operations were run on a small scale (Fukushima, Ibaraki, Yamaguchi), the implementation of labour reforms, i.e. the curtailment of female labour, had not been thorough.

This can been seen in by comparing the percentages for the decline of women miners in large mines and in small and medium mines in the Chikuhō area (table 2.16). Because specialization was slow in developing in the smaller mines, the proportion of workers underground averaged a high 60

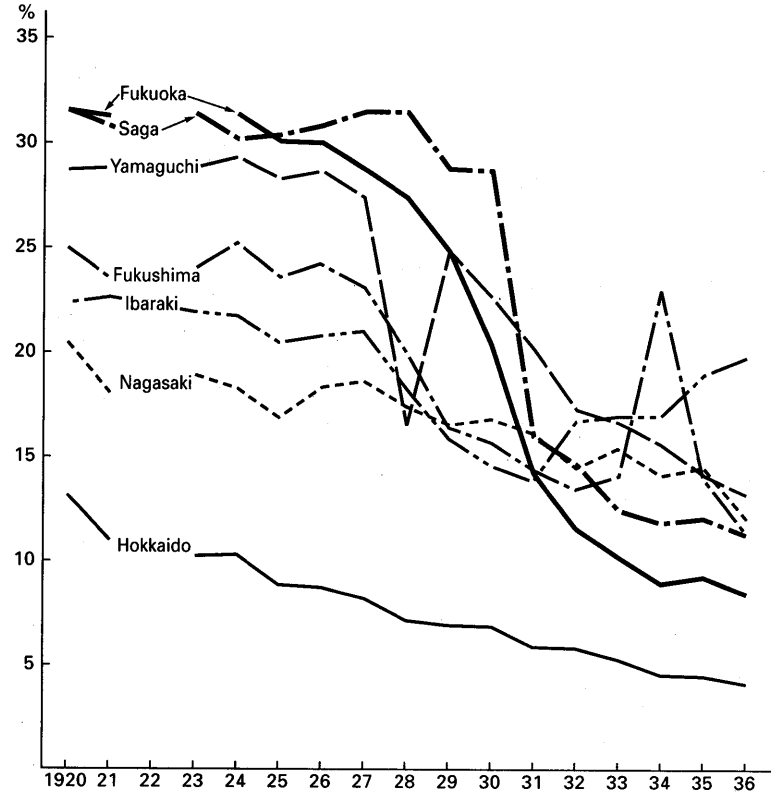

Fig. 2.7. Fluctuations in Proportion of Women Miners in Hokkaido and Other Prefectures, 1920–1936
Note: Figures for 1922 unknown.
Source: Compiled from Commerce and Industry Ministry, Mining Bureau, *Honpō kōgyō no sūsei* [Mining Trends in Japan].

per cent. In 1930, this drops, but in the following year, the proportion increases to the 60 per cent range again. In contrast, sharp declines are seen in the following mines: from 1924 in Hōkoku, from 1928 in Tagawa and Ōnoura, and from 1930 in Namazuta and Tadakuma. Because of their inability to join the technological revolution the smaller mines were still dependent on women, and had not eliminated female labour at the rate the large mines had.

The legal restrictions and the technological revolution that contributed to the decline of women miners have been examined, but the following two developments need to be mentioned as well. The first is that during the industrial revolution, when recruitment of women workers and whole families

Table 2.16. Hewers and Haulers, Chikuhō Area, 1920–1932[a]

Year	Tagawa (Mitsui)	Namazuta (Mitsubishi)	Tadakuma (Sumitomo)	Ōnoura (Kaijima)	Toyokuni (Meiji)	Small mines with 100–499 workers (no. of mines)[b]
1920	36.4	62.4	54.2	37.9	44.0	55.3 (13)
1921	38.5	61.5	51.2	34.9	48.7	63.8 (14)
1922	38.9	65.3	53.7	43.7	48.5	66.4 (7)
1923	39.1	61.6	57.1	42.1	47.3	58.1 (5)
1924	38.1	60.4	56.6	36.9	39.9	60.0 (17)
1925	39.6	59.5	58.2	36.3	40.6	62.5 (14)
1926	40.3	53.4	57.7	33.9	41.9	63.7 (14)
1927	39.7	59.0	56.3	36.7	41.9	65.9 (9)
1928	33.3	61.6	55.3	32.0	39.1	66.6 (22)
1929	31.0	57.4	56.9	32.4	36.6	68.5 (20)
1930	28.0	41.1	47.0	31.4	33.4	59.5 (9)
1931	23.9	42.8	45.6	26.6	32.4	63.2 (14)
1932	22.8	37.6	46.4	24.4	34.7	60.0 (21)

a. Figures for 1919–1923 are as of end of May; for 1929, end of June; all others, except Tagawa, as of end of September.

b. Figures in parentheses are percentages.

Source: For Tagawa, compiled from *Mitsui kōzan gojūnen-shi kō* [A Fifty-year History of the Mitsui Mines], vol. 16, "Labour," Mitsui Bunko; for the rest, *Chikuhō sekitan kōgyō kumiai geppō* [Monthly Newsletter of Chikuhō Miners' Union].

was prevalent, the *naya* system came into being to accommodate the situation, but with the demise of the female labour force, this system declined, and the management of labour was undertaken directly by the mine operators. In 1922, for example, it was decided at a Mitsubishi Kogyo meeting of work supervisors that the *sewanin* system (a subcontractor-supervisor system similar to the *naya* system) would be abolished. In February 1929, in the mines at Shinnyū, Namazuta, Hōjō, and Kamiyamada, which were all managed by Chikujo Kōgyōsho, 43 *sewanin* and 39 wakers (*hitoguri*), whose job it was to wake the miners up and encourage them to go into the mines, lost their jobs. In March, Ōchi and Yoshinotani mines, run by Karatsu Kōgyōsho, and, in August, Iizuka Kōgyōsho followed suit.[24] And in October 1929, even Sumitomo's Tadakuma mine, which had prided itself on having the oldest and most authentic *naya* system in the Chikuhō area, fired 14 stable foremen, 27 subforemen, 17 wakers, and 13 accountants working for the foremen.[25] Other mines in Kyushu (such as the Shakano'o and Shimoyamada mines of Furukawa Kōgyō and the Yoshikuma Tsunawake, Mameta, and Yoshio mines of Aso Shōten) dismissed their foremen in 1929, and the *naya* system almost completely disappeared from the major mines of Kyushu.[26]

There are two factors that brought about the end of the *naya* system. The

first concerns work organization. Under the longwall method, the task of hewing coal became a cooperative job, and the mechanization of the process changed the nature of the work. When the pillar method was used, work units were isolated and dispersed; their work was done entirely by hand, and supervision of the workers by foremen who patrolled the mines was necessary. New technology spelled the end for women workers, but at the same time it also forced a change in labour management. Secondly, as women were being excluded from their jobs, mechanization decreased the demand for a large workforce. The emphasis shifted to enhancing the quality of the workforce. The recruiting methods of the *naya* foremen, who had hired indiscriminately, became obsolete.

The second development is the increase in Korean miners that accompanied the elimination of women miners. There was a high concentration of Korean miners in Fukuoka Prefecture, as can be seen from table 2.17.[27] Eighty-six per cent of them had underground jobs, the important part of mining work. What made this possible was the longwall method and the change to team work involving simultaneous work by many miners, as opposed to the old units of two or three working separately. A survey from Mitsubishi Namazuta mine reports: "Koreans are patient, strong workers. Although they are untrained, they can be hired for team work." "The adoption of the longwall system eliminated jobs for haulers, and thus couples could not work together. Where two incomes could not be had, with the woman's job eliminated, Japanese men seeking mine work declined."[28]

Thus the adoption of the longwall system contributed to the exclusion of women haulers and brought in team work; and this in turn made the recruitment of Koreans possible. One other fact can be gleaned from table 2.17: the Koreans were unevenly distributed in the mines. They were numerous in the four Mitsubishi Kōgyō mines of Shinnyū, Namazuta, Kamiyamada, and Hōjō and at Iizuka, which was also a Mitsubishi-affiliated mine. Eighty per cent of Fukuoka Korean miners worked in these five mines, and represented a large proportion of the workforce there: over 30 per cent in Shinnyū, Namazuta, and Iizuka. In a sense, the Korean miners were hired at a time of technological change, and they did replace the women, but this is not the only factor. Circumstances surrounding each mine, e.g. the labour practices and the situation of coal dispursement (the degree of difficulty in extracting the coal—also played a role in their recruitment.

We have discussed the decline of women workers and the relationship this had with the decline of the *naya* system and the hiring of Koreans. The question of why there was no resistance to the elimination of women from the workforce still remains unanswered. There was not a single labour dispute involving the firing of women. The women underground workers earned a substantial amount of the mining family's income, and it is difficult to understand why there was no resistance.

Two pertinent factors should be examined. First, in order to assist the miners whose incomes were suddenly to fall, the women who had been dis-

Table 2.17. Korean Miners by Mine in Fukuoka, March 1928

Mine	All miners			Korean miners			Percentage of Korean miners		
	Under-ground	Surface	Total	Under-ground	Surface	Total	Under-ground	Surface	% of total workers
Shinnyū (Mitsubishi)	2,102	744	2,846	873	71	944	41.5	9.5	33.2
Namazuta (Mitsubishi)	3,207	1,336	4,543	1,494	244	1,738	46.6	18.3	38.3
Kami-Yamada (Mitsubishi)	2,132	525	2,657	218	121	339	10.2	23.0	12.8
Katashiro (Mitsubishi)	1,926	820	2,746	392	21	413	20.5	2.6	15.0
Iizuka (Nakajima Kōgyō)	4,687	1,114	5,801	1,687	81	1,768	36.0	7.3	30.5
Ōnoura (Kaijima)	6,684	2,828	9,512	58	154	212	0.9	5.4	2.2
Yoshio (Asō)	2,401	594	2,995	48	90	138	2.0	15.2	4.6
Tsunawake (Asō)	761	222	983	110	16	126	14.5	7.2	12.8
Yoshisumi (Asō)	1,273	341	1,614	96	—	96	7.5	—	5.9
Arameo (Pvt.)	112	17	129	115	20	135	102.7	117.6	104.7
Other (21 mines)	—	—	—	513	89	602	—	—	—
Total	—	—	—	5,604	907	6,511	—	—	—

Source: Compiled from Fukuoka Chihō Shokugyō Shōkai Jimukyoku, *Kannai zaijū Chōsenjin rōdō jijō* [Working Conditions of Korean Miners in the District] (1929), and *Chikuō sekitan kōgyō kumiai geppō* [Monthly Newsletter of Chikuhō Miners' Union].

charged were encouraged to work in subsidiary jobs. For example, Mitsui's Miike Kōgyōsho adopted a policy in 1928 to alleviate the pressures on miners by establishing a work centre [29] where a variety of side jobs were encouraged; the products manufactured at the centre were sold on commission through the Miike Cooperative sales department.[30] The types of jobs offered, the numbers of workers, and wages in 1930 are summarized below.[31]

1. Manufacturing of products purchased by the company: average daily wage, 50 sen; 3,518 workers in the past five months.
2. Bamboo mat making: average daily wage, 80 sen; 1,518 workers in the past five months.
3. Sewing-machine work (53 machines available, either borrowed from the company or purchased on instalment): 80 sen per day.
4. Sewing: 35 workers averaging 180 articles of clothing per month; average daily wage 1.13 yen.
5. Weaving: 6 workers; average daily wage 38 sen.
6. Production of dynamite balls: 6 workers; average daily wage, 50 to 60 sen.

Miike Kōgyōsho's work centre expanded in 1932 to become Miike Cooperative Union for Subsidiary Work.[32] The encouragement of subsidiary work was not limited to Miike: other mine companies had similar programmes. In June 1929, the Navy's Shimparu mine, in response to the prohibition of underground work by women, established a Home Industries Committee.[33] In December of the same year, the Onga County Labour Managers' Group, organized by 14 mines in Onga county, Fukuoka, met to deliberate an unemployment policy for women miners. It decided to adopt straw-weaving and pig-farming as subsidiary lines and to launch a campaign for the establishment of a spinning factory.[34] Meiji Kōgyō undertook, in 1930, as an unemployment relief measure for women, a project to expand an athletic field and establish a fish market.[35] In July 1932, in Kaijima Onoura mine, unused housing was remodelled into a factory producing baskets (used for the outer enclosure of mine holes), coal conveyances, fishing nets, and straw mats.[36]

The above examples show that mine operators encouraged multi-occupation families,[37] and that efforts were made to aid the finances of families affected by the dismissal of workers. This progressive policy pursued by the management made for a transition free of conflict as new technology was adopted and women were discharged.

The second reason for the lack of resistance was that the management provided welfare facilities and educational and cultural organizations which were much better than in other industries during the inter-war period. These were established to unify the mine workers. This policy proved to be crucial in checking resistance against the drastic changes that accompanied the implementation of new technology. The mining companies set aside a large proportion of their budget for these activities: the percentage of welfare expenses over total wages was 24.1 per cent in mining (1926) and 23.5

Table 2.18. Chronology of Labour–Management History at Mitsui Kōzan's Miike Mine, 1919–1935

May 1919	Women's group established in miners' housing complex
Sept. 1919	Miike Mines Vocational Night School established
March 1920	Mitsui Miike Mutual Aid Society established Youth group established in miners' housing complex
May 1922	Household heads' group established in miners' housing complex
Nov. 1922	Miike Mines Veterans' Association reorganized
Oct. 1924	Boys' and girls' group established in miners' housing complex
Nov. 1924	Workers' school established.
Dec. 1925	Young women's group established at Miike Kōgyōsho
July 1926	Youth Training Centre opens
Jan. 1929	Night school for supplementary education for workers opens
Feb. 1929	Middle-age group established in miners' housing complex
Dec. 1929	Pilgrimage group established; trips to Ise Shrine and Tokyo organized
March 1930	Working Girls' School opens
January 1932	Youth group from housing group reorganized into Mutual Aid Youth Group
June 1933	Miike Kan'yūkai established
Jan. 1935	Branch of Women to Defend the Country League established in housing complex
April 1935	Family Association established for families living outside miners' housing complex

Source: Compiled from *Miike Kōgyōsho enkakushi* [History of Miike Kōgyōsho], vol. 7, Mitsui Bunko.

per cent in spinning—both extremely high figures when other industries did not reach even 10 per cent.[38] All mines surveyed in 1932 had training centres, placing them far beyond other industries.[39] Mining communities were geographically isolated: many of the large mines were closely knit and their activities were self-contained. They built barriers around themselves that stopped the spread of any labour movement into the mines. An example of the way in which policies were implemented for the integration of the workforce at Mitsui's Miike Kōgyōsho is given in chronological form in table 2.18. This chronology demonstrates how the management typically adopted policies embracing the whole community and all family members.

III. Conclusion

The decline in women miners was brought about by the mechanization of the coal-mining process. This was in turn due to a change in labour policy, under the resolutions adopted by the first International Labour Conference. In 1920, the relief measures were implemented as a legal sanction for the protection of coal-miners. The decline in women miners can be seen macro-

scopically as the beginning of world capitalism, following the First World War, in the framework established by the Versailles Treaty. This suggests that if that framework were eliminated, the phenomenon of women miners could reappear.

In July 1937, after the beginning of the war in China, Japan's economy was placed on a war footing. In the following year, Japan withdrew from the International Labour Organisation, and all policies that sought a cooperative stand in international politics were abandoned. With the outbreak of the war in China, conscription withdrew all able-bodied men, thus reducing the number of men in the mines. With the country no longer restrained by the labour laws, the way was open for the reinstitution of women miners. In 1937, the Federation of Coal-mining Industries and the Mutual Aid Association for Coal-miners decided to appeal to the Ministry of Industry for policy changes to counter the shortage of workers.[40] Five items were listed in the appeal, including a lifting of the ban on late-night work and on underground work for women and minors. In August 1939, in an ordinance issued by the Welfare Ministry, concerning legislation on pit work by women (Rules on Relief for Miners, Article 11, clause 2(1)), underground work by women was permitted under certain conditions.[41]

The fact that it took Japan only one year after its withdrawal from the ILO to reverse its labour policies is symbolic of the times. The proportion of women mine workers, which had been decreasing steadily, hit a low of 8.3 per cent in 1937, and then rose to 10.6 per cent in 1940 and 18.5 per cent in 1945.[42] Here again we must take note of regional differences. Hokkaido had countered the labour shortage by hiring Koreans, and hence there was little need to hire women: only 3.7 per cent of its workforce in 1940 were women. In Fukushima, Ibaraki, and Yamaguchi prefectures, where the small- and medium-sized mines were concentrated, 15–20 per cent of the workers were women in 1940.[43]

Thus the coal mines under the wartime economy, through the recruitment of women and of labourers forcibly brought to Japan from Korea, managed to increase production. In spite of this, labour productivity declined. During the war, the domestic machinery industry had to produce munitions. This factor limited the further development of coal-mining technology, which had been making progress since the late 1920s. Between 1932 and 1937, one miner extracted 200 tons of coal; in 1940, the figure fell to 174 tons; and in 1944, it dropped to 126 tons. Technological advance came to a standstill, but the wartime economy managed to sustain itself by depending on the large influx of cheap labour from women and Koreans.

Notes

1. Sumiya Mikio, *Nihon sekitan sangyō bunseki* [An Analysis of the Japanese Coal-mining Industry](Iwanami Shoten, Tokyo, 1968), p. 163.
2. *Nihon kōgyō hattatsushi* [A History of the Development of Japanese Mining], vol. 2 (Kōzan Konwakai, 1932), p. 332.

3. Ogino Yoshihiro, "Sangyō kakumeiki ni okeru Chikuhō tankōgyō no rōshi kankei" [Labour Management Relations at Chikuhō mines during the Industrial Revolution], part 3, *Sangyō keizai kenkyū*, vol. 21, no. 1 (1980): 29–30.
4. Hashimoto Tetsuya, "1900–1910-nendai no Miike tankō: sekitan sangyō no sangyō shihon kakuritsu o megutte" [Miike Mine, 1900–1910: The Coal Industry and the Establishment of Industrial Capital], *Mitsui Bunko Ronsō*, vol. 5 (1971): 45–47.
5. Ogino, "Sangyō kakumeiki ni okeru Chikuhō tankōgyō," p. 31.
6. Sumiya, *Nihon sekitan sangyō bunseki*, p. 318.
7. Ibid., p. 320.
8. Yamamoto Sahei, "Chikuhō tankō monogatari" [The Tale of Chikuhō Mine], in *Chikuhō tanko emaki* [Picture Scroll of Chikuhō Mine] (Ashi Shobō, Tokyo, 1973), p. 29.
9. Ministry of Agriculture and Commerce, Bureau of Mines, *Kōfu taigū jirei* [Rules for Treatment of Miners] (1908), p. 40.
10. See Ogino Yoshihiro, "Nihon shihonshugi kakuritsu ki ni okeru tankō rōshi kankei no ni ruikei" [Two Patterns in Labour Management Relations in Mines during the Era of the Establishment of Japanese Capitalism], *Enerugii shi kenkyu noto*, vol. 10 (1979).
11. Housing was provided by the mine operators, hence the low proportion of total expenses spent on housing (4–5 per cent).
12. Uno Kōzō, comp., *Kōza teikokushugi no kenkyū* [Library of Studies on Imperialism], vol. 6: *Nihon shihonshugi* [Japanese Capitalism] (Aoki Shoten, Tokyo, 1973), p.151.
13. *Nihon kōgyō hattatsushi*, vol. 2, pp. 1923-93.
14. Uno, *Kōza teikokushugi no kenkyū*, vol. 6, p. 149.
15. See Tanaka Naoki and Ogino Yoshihiro, "Hogo Kōfu mondai to saitan kikō no gōrika" [Protection of Miners and the Rationalization of Coal-mining], *Nihon Daigaku Seisan Kōgakubu Kenkyū Hōkoku*, vol 11, no. 1 (1978).
16. Ministry of Labour, *Rōdō gyōseishi* [History of Labour Administration], vol. 1 (1961), p. 286.
17. Ibid., p. 287.
18. Sumiya, *Nihon sekitan sangyō bunseki*, p. 386.
19. *Nihon kōgyō hattatsushi*, vol. 2, p. 262.
20. Sumiya, *Nihon sekitan sangyō bunseki*, p. 895.
21. See *Nihon kōgyō hattatsushi*, vol. 2, tables 148–149.
22. The authority on this is *Honpo kōgyō no susei* [Trends in Mining in Japan].
23. Information on the transition to self-sufficiency in mining machinery from *Honpō kōgyō hattatsushî*.
24. Ichihara Ryōhei and Tanaka Mitsuo, "Tankō naya seido no hōkai (2)" [The Collapse of the Naya System in the Mines, part 2], *Nihon rōdō kyōkai zasshi*, 64 (1964); 30–32.
25. Tanaka Naoki, "Chikuhō sekitan kōgyō hattatsu shi gaiyō" [An Outline of the History of Chikuho Sekitan Kōgyō], *Asō Hyakunen-shi* [A Hundred-year History of Asō] (1975), p. 87.
26. Nagasawa Kazuo, "Wagakuni sekitansan ni okeru rōdō kanri no sūsei ni tsuite" [Trends in Labour Management in Japanese Mines], *Nihon kōgyō kaishi*, 544 (1930):713.
27. The population of Korean miners in Fukuoka Prefecture by far outnumbered that in Hokkaido, which had the second-largest group; in Fukuoka, the proportion rose to 44.5 per cent in 1920, 49.5 per cent in 1925, and 62.1 per cent in

1930. From Park Kyung-sik, ed., *Zainichi Chōsenjin kankei shiryōshūsei* [A Collection of Documents on Korean Residents of Japan], vols. 1–2 (San'ichi Shobō, 1975).

28. Miwa Mitsuaki, Noda Nobuo, and Miura Chōhei, *Namazuta tankō kengaku hōkoku* (typed edition, 1926), pp. 41, 46.
29. *Miike Kōgyo enkakushi* [A History of the Development of Miike Kōgyōsho], vol. 7, section 1 on labour, Mitsui Bunko, p. 191.
30. Koga Ryōichi et al., eds., *Kita Kyūshū chihō shakai undō shi nenpyō* [A Chronology of Social Movements in Northern Kyushu] (Nishi Nihon Shuppansha, 1980).
31. Ibid.
32. *Miike Kōgyō enkakushi*, vol. 7, section 1 on labour, p. 191.
33. *Chikuhō sekitan kōgyō shi nenpyō* [A Chronology of Chikuho Sekitan Kogyo] (Nishi Nihon Bunka Kyokai, 1973).
34. Koga, *Kita Kyūshū chihō shakai undō shi nenpyō.*
35. *Chikuhō sekitan kōgyō shi nenpyō.*
36. Ibid.
37. At Miike mines, besides the subsidiary jobs promoted by mine operators, many laid-off workers chose to become vendors of vegetables, fruit, and fish, and they were numerous enough to threaten the business of shops in Ōmuta (Koga, *Kita Kyūshū chihō shakai undō shi nenpyō).*
38. Takahashi Kamekichi, *Nihon sangyō rōdō ron* [Discourse on Industrial Labour in Japan] (Chikuma Shobō, Tokyo, 1937), p. 132.
39. Sangyo Fukuri Kyokai, *Kōjō kōzan no fukuri shisetsu chōsa* (Survey on Welfare Facilities in Factories and Mines) no. 1, Educational and Training Facilities (1933), table 1; Hazama Hiroshi, *Nihon rōmu kanri shi kenkyū* [Studies on the History of Japanese Labour Management] Tokyo, 1 (Daiyamondosha, Tokyo, 1964), fig. 15.
40. Kuboyama Yūzō, *Sekitan kōgyō hattatsushi* [History of the Development of the Coal-mining Industry] (Kōronsha, Tokyo, 1942), p. 166.
41. Ministry of Labour, *Rōdō gyōsei shi* [History of Labour Administration], vol. 1, p. 654.
42. *Honpō kōgyō no sūsei.*
43. In September 1942, a small mine in the Joban mining region had 106 miners, of which 59 were male, 47 women (44 per cent of the workforce); 40 (38 per cent) worked as haulers (Yanase Tetsuya, *Waga kuni chōshō tankōgyō no jūzoku keitai* [The Subordinate State of Japan's Small- and Medium-sized Mines] (Itō Shoten, 1944), pp. 76–77).