

The Development of Labor Hygiene in Colonial Korea, 1910-1945: The Health Conditions of Korean National Railways (KNR) Employees*

Lim Chai Sung

This article analyzes the changing hygienic conditions of employees of the Korean National Railways (KNR) during the Japanese colonial period and the KNR authorities' response to those changes. Under the employment structure of the colonial period, Koreans worked as lower-level laborers in the field, receiving low wages that were half those of Japanese employees. In addition, because they worked mostly as engineers and factory workers, they were at a higher risk of sustaining diseases and injuries while on duty. Nevertheless, the death rates of Japanese employees, who were assigned to the mid- and upper positions in the labor system and received high wages, were actually higher. This is because the Japanese, who often worked indoors and lived communally when off duty, were vulnerable to epidemics of infectious diseases. In response to this paradoxical phenomenon, medical services were provided mostly for the Japanese and expanded to their families as well. In addition, although the benefits of modern medical services and its basis, the mutual relief system, were expanded to the Koreans as well, this was because the Japanese colonial authorities were aware of the usefulness of the Korean laborers as human resources. Premised on the colonial employment structure, modern labor hygiene was thus introduced and established in a distorted form.

Keywords: Colonial employment structure, Korean National Railways, diseases and injuries, labor hygiene, railway hospitals, Relief Association

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Introduction

In Korea, the introduction of modernity was mediated by colonial occupation, and this was also reflected on the level of hygienics, which is the principle system for promoting health. Regarding medical service during the Japanese colonial period (1910-45), Sin Dongwon (1997) has analyzed the public health policy of the Government-General of Korea (GGK), the Japanese colonial government, and concluded that because the main thrust of major policies was the supervision of the people, Koreans tended to avoid the compulsory health system, and that medical relief was only makeshift and “fictitious.” An example of this is provided by Jeong Geunsik (1997), who has reviewed the modern medical system established by the Japanese colonial authorities to treat Hansen’s disease (HD); Jeong points out that the total number of patients did not decrease despite a continued increase in the number of patients hospitalized, and concludes that this reveals the characteristics of colonial health policy.¹ Understanding the colonial ruling system as a process of strengthening modern disciplinary power, Jo Hyeonggeun (1997) has argued that the modern views of the body and medical discipline were formed at the center of the colonial medical system. Takenori Matsumoto’s (1999) analysis of the Japanese colonial authorities’ hygiene and medical projects directed at rural communities in colonial Korea lends further support to the findings of these studies. In the case of rural communities, even though they enjoyed fewer medical benefits than cities, they were by no means free from the GGK’s disciplinary power in terms of hygiene and medical service. Through an analysis of the formation and reorganization of the modern medical system, Bak Yunjae (2005) has argued that, in colonial Korea, administrative policies were implemented only in order to protect lives rather than to actively improve health, thus relegating ethnic Koreans not to the category of “subjects” who wanted to obtain better sanitary conditions but merely to the category of “objects” that were placed within the scope of control by the hygiene police.

An examination of such studies reveals that, during the colonial period, in addition to modernity, coloniality as a discriminatory structure was inherent in the public health policy of the Japanese authorities. However, existing studies have not analyzed the kind of labor hygiene system that was established on the ground and its relationship with the employment and lives of the workers. In

1. His views are based on data acquired from the Korean Leprosy Management Association, amongst others.

other words, because they regard the colonized Koreans only as patients or potential victims of the diseases, these studies have not examined the relationship between the labor hygiene system and the daily labor process. This article builds on the results of earlier studies but also looks at the ethnic discrimination apparent in the labor hygiene system. The colonial railroad system can provide an excellent case study to analyze this problematic.

The rise of railroads in the nineteenth century brought about and accelerated the process of industrialization. From the perspective of hygiene, however, one can also observe that the railroads swiftly spread diseases from one particular area to other areas. Moreover, because a large number of employees (for example, approximately 107,000 as of March 1945) worked for the railways in colonial Korea, a designated system was needed to manage workers' health. In addition, workers performed a variety of tasks; field workers such as train crews worked long hours, sometimes all night either on alternate days or on shifts. This system led to frequent accidents and occupational diseases, thus reducing the labor force. Consequently, the national railway authorities implemented measures to prevent diseases among the work force by instituting medical examinations and providing medical services at railway hospitals and clinics, and also by establishing a Relief Association (Kyōsai kumiai 共濟組合).

Takahashi Yasutaka (1995) and Go Seongbong (1999), analyzing the colonial railways in the context of comparative history, raised many points regarding the history of their management and Japan's colonial railway policies. So far, however, no one has analyzed the management of railworkers' health, not even Jeong Jaejeong in his comprehensive history of Korean railways to 1945 (Jeong 1999). In other words, these researchers have not shed light on the features of colonial rule and the process of modernization that are evident in the health policies of the colonial railway's work environment.

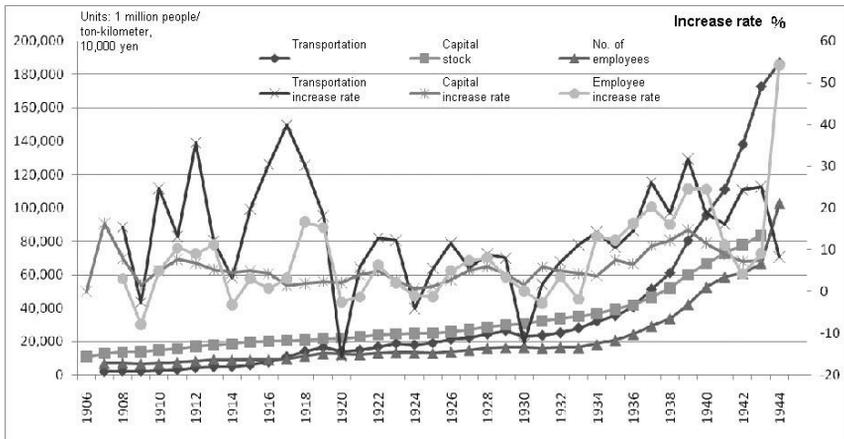
In this respect, this article takes a look at the Korean National Railways (KNR) during the Japanese colonial period, focusing on the changes of the employees' hygiene conditions as well as the KNR's health policies, in order to ascertain the ways in which health and hygiene were "modernized" in colonial Korea. This study consists of the following sections. Section 1 reviews the structure of the colonial employment system and the development of the railroad industry. Section 2 analyzes the diseases from which the workers suffered, thus elucidating the diseases that arose among different ethnic groups and how they differ from the diseases that were prominent among the entire Korean population of the time. Section 3 reviews the medical measures that the authorities took in response to such diseases.

The Development of the Railroad Industry and the Colonial Employment Structure

The development of the railroad industry was closely related to the colonization of Korea and the reorganization of the international order in East Asia. Constructed for military operations during the Russo-Japanese War (1904-5) and Japan's postwar foreign policy, the X-shaped main railroad network (Busan-Seoul-Sinuiju and Mokpo-Seoul-Hamheung) simultaneously served as the basis that made Japan's rule over Korea possible and as the strategic platform for extending Japan's influence over China and Russia. World War I offered a boost to the railroads so that, as shown in Figure 1, railroad transportation increased exponentially. However, stressing connections to Japanese politics on the Asian continent rather than the development of colonial Korea, management of KNR was consigned to the South Manchurian Railways Co. Ltd. from July 1917 to March 1925. Unfortunately, because a prolonged depression occurred during this period, railroad transportation did not increase and railroad investment was also suppressed.

Korea's opposition to this was considerable. In particular, when the Committee for the Investigation of Korean Industries was established in 1921, the Koreans demanded the construction and expansion of railroads as a precondition for

Figure 1. Transportation Volume, Capital Stock, and Employees of the KNR.

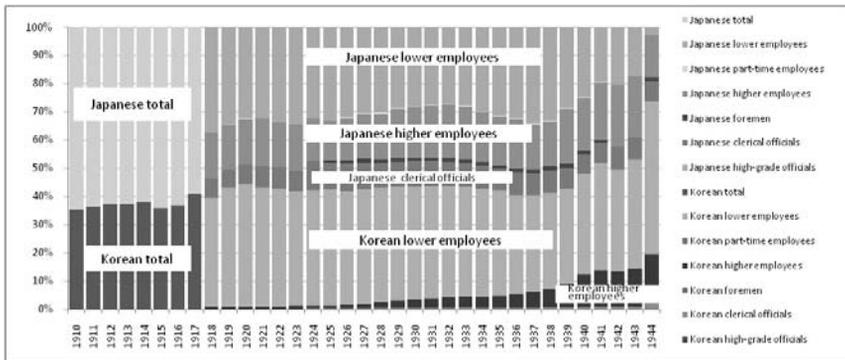


Sources: Tetsudōkyoku annual a and b; and Kyotongbu 1960.

Note: As for estimates on capital stock, see Im Chaeseong 2005, 51.

the development of industries in the colony. As a result, the consigned management of KNR was revoked, and the Twelve-year Korean Railway Plan was implemented. Naturally, during the latter half of the 1920s, there was more active investment in railroads. However, because railroad transportation decreased and the balance of current accounts deteriorated with the advent of the Great Depression, railroad investment fell once more. Amidst this situation, as the Manchurian Incident led to the Second Sino-Japanese War (1937-1945), the amount of military transportation that passed along the railways on the Korean Peninsula increased dramatically and, in addition, new demand arose as the result of the execution of the Production Capacity Expansion Plan and the Material Mobilization Plan. Consequently, transportation by KNR dramatically rose for both passengers and freight, as shown in Figure 1. It was only natural that, in order to meet the increased demand for transportation, the Japanese invested massively in the railroad system. However, because there was still a shortage in transportation capacity, KNR had no choice but to establish a system based on prioritizing the most urgent transportation needs. In addition, it sought to transport as much freight and as many passengers as possible by efficiently managing the facilities and rolling stock of existing railways. It became necessary to hire more laborers than before and to use a labor-intensive railway management method. When we examine the changes in the number of employees, the figure increased from 6,933 in 1907 to approximately 9,592 in 1917, when consigned management by South Manchurian Railways Co.

Figure 2. The Composition of the Status of KNR Employees (Unit: %).



Sources: Tetsudōkyoku annual a and b; Kōtsūkyoku (1944); Senkōkai (1986), p. 185; and Mizuno Naoki, ed. (1998), 247.

Note: Data on ethnic composition per position is available only from 1918 onward.

began, and to approximately 13,000 by the time the consigned management was terminated, continuing to rise afterwards. Although the increase rate slowed down somewhat during the Great Depression, the number of employees rose to approximately 30,000 during the war and after the recovery of the economy, and reached over 100,000 by March 1945.

Because it thus increased in size and was a part of the colonial state apparatus, KNR had an organizational structure that was very different from private businesses. In this system, while employees on the mid- and upper divisions were part of the public administrative system, those on lower levels were directly employed by KNR. In other words, there was a hierarchical structure where, under the command of high-grade officials (*kōtōkan* 高等官), who were the upper-level bureaucrats, clerical officials (*hanninkan* 判任官) formed the mid-level bureaucrats, below whom were hired employees (*koin* 雇員), or upper-level field workers (these two categories are designated “higher employees” in the article), and lower employees (*yōnin* 傭人), who were the lower-level field workers. When this employment structure is examined in the long term, as shown in Figure 2, lower employees consistently took up the largest share (although there was a tendency for them to decrease in the overall ratio), while the number of higher employees tended to increase. At the same time, there was great disparity between the two groups. As for clerical officials, their overall ratio did not increase considerably from the end of the 1920s to the wartime period. In addition, it is not possible to find a noticeable increase in the number of foremen (*tetsudōshu* 鐵道手) with clerical-official status, who had years of experience and held sway over the field. When seen by ethnicity, Koreans formed the largest group of lower-level employees. On the contrary, while they rose in number, ethnic Koreans took up only 20% of the higher level employees during the last years of the war. Of course, the ratio of clerical officials among the Koreans was still negligible even in March 1945, when they were appointed en masse. On the other hand, for the Japanese employees, the ratio of lower-level employees dramatically decreased and, in return, the ratio of higher employees increased during the wartime. However, even this latter figure drastically dropped in 1944. This was because the Japanese lower employees and higher employees were promoted to the status of clerical officials en masse. The Koreans were thus positioned as field workers, lower-level laborers in particular, in the colonial employment structure, with only a portion of them admitted to the ranks of the mid-level bureaucrats.

Looking at the deployment rate (i.e., the number in proportion to the total labor force, see Table 1), the greatest number of Koreans was assigned to railroad maintenance and constructions sections, where one had to engage in

Table 1. KNR Employees' Deployment Rate and Occupation Rate per Affiliation (Unit: %)

Year	Deployment rate														
	1915			1925			1935			1940			1944		
	Japanese	Koreans	Total	Japanese	Koreans	Total	Japanese	Koreans	Total	Japanese	Koreans	Total	Japanese	Koreans	Total
Ethnic group															
Headquarters and regional bureaus	3	1	17	17	10	13	3	5	17	17	24	4			
Stations and trains	33	15	31	31	17	29	29	28	29	29	22	27			
Locomotive sections and train inspection sections	18	13	21	21	15	23	15	24	28	23	36	36			
Railroad maintenance sections and building sections	28	44	19	19	32	16	35	22	10	10	17	17			
Factories	13	26	10	10	24	10	16	15	7	7	10	10			
Construction and improvement	4	1	3	3	2	6	4	3	5	6	2	2			
Others			3	2	100	100	100	100	100	100	100	100			
Total	100	100	100	100	100	100	100	100	100	100	100	100			

Year	Occupation rate														
	1915			1925			1935			1940			1944		
	Japanese	Ko	Total	Japanese	Ko	Total	Japanese	Ko	Total	Japanese	Ko	Total	Japanese	Ko	Total
Ethnic group															
Headquarters and regional bureaus	85	15	100	68	32	100	84	16	100	80	20	100	68	32	100
Stations and trains	77	23	100	71	29	100	62	38	100	53	47	100	23	77	100
Locomotive sections and train inspection sections	68	32	100	64	36	100	69	31	100	56	44	100	19	81	100
Railroad maintenance sections and building sections	49	51	100	43	57	100	38	62	100	33	67	100	17	83	100
Factories	45	55	100	35	65	100	46	54	100	32	68	100	20	80	100
Construction and improvement	89	11	100	67	33	100	78	22	100	70	30	100	53	47	100
Others							69	31	100	65	35	100	48	52	100

Sources: Tetsudokyoku annual a and b; and Senkōkai (1986), 185.

Notes: 1. "Headquarters and regional bureaus" refers to the headquarters, regional bureaus, and railway offices; "Construction and improvement" refers to Construction and Improvement Offices and construction sections; "Others" refers to electricity sections, electric repair shops, automobile sections, railway employee training schools, and others. "Deployment rate" refers to the ratio of a particular ethnic group in the entire work system; and "Occupation rate" refers to the ratio of a particular ethnic group in each specified occupation.

2. The statistics of 1915 have been created based on the Table of Relief Association Members. Consequently, the deployment rate to organs including the headquarters is extremely small.

physical labor; this is followed, in descending order of frequency, by labor in factories, stations and trains, and locomotive sections and train inspection sections. This is because, as the employment of ethnic Koreans rose, the proportion of employees in engineering decreased and that of employees in other divisions increased so that by approximately 1935 the deployment rate to the business affairs divisions of stations and train sections came to exceed the deployment rate to factories. Because the employment of Japanese became difficult during the wartime period, to supplement them, numerous Koreans were assigned to administrative and operation divisions rather than to engineering work. As for Japanese, the greatest number was assigned to administrative divisions, followed by operation divisions, before the war. Following the outbreak of the war, however, they were increasingly assigned to operation divisions and, later, to organs including the headquarters, regional bureaus, and railway offices. In other words, the KNR sought to maintain its ability to operate railways by intensively assigning the Japanese to positions as upper and mid-level bureaucrats and upper-level field workers, and to units such as railroad management/planning and high-level technical departments.

In such a colonial employment structure, how were the different ethnic groups treated? While the nominal wage per employee remained at a relatively stable level – apart from a dramatic increase from 27.8 yen in 1918 to 57.9 yen in 1919 – in terms of the real wage, which reflects price changes, it is evident that there were drastic shifts in the living standard.² Although the real wage was 55.9 yen in 1915, it swiftly fell amidst the World War I boom, dropping to 28.2 yen in 1918. It rebounded to 41.8 yen in 1919 because of wage adjustment, rising again in the middle of the depression and deflation in the 1920s. It reached the highest level of 85.0 yen in 1931, but dramatically decreased during the war to 37.3 yen in 1941. The wage differences among the positions and ethnic groups were clear. Not only was there a wage difference between ethnic groups in the same position, because Koreans worked mostly in low-wage positions, overall Korean employees' wages were approximately 50-60% of what the Japanese received.

Because this analysis is based on the basic salary, let us take the living standard into account including the fringe benefits (bonuses, allowances, etc.) with the example of Seoul Railway Factory in 1922 (Norisada Hayashibara

2. The employees' nominal wages and real wages are the average wage per employee. As for the deflator, Heo Suyeol's consumer price index for 1910-38 and Gim Naknyeon and Bak Giju's consumer price index for 1939-41 were used. However, with 1938 as the standard, the two indices were linked. In addition, wage differentials are the Koreans' wages/Japanese's wages multiplied by 100. Tetsudōkyoku annual a ; Heo 1981, Gim and Bak 2007.

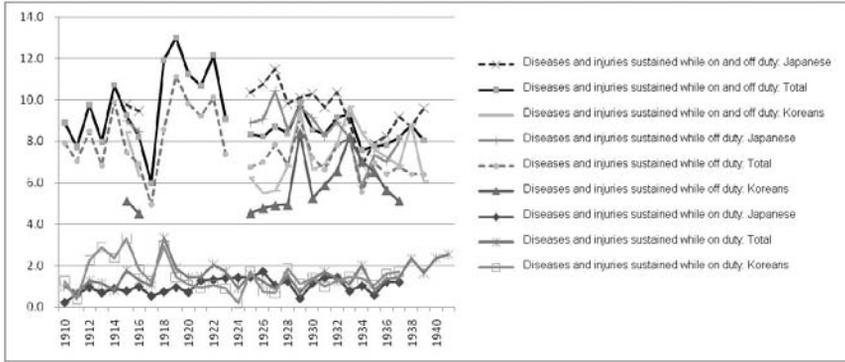
1923). The Japanese received a monthly income of 90 yen 68 sen. When we divide this by 3.8, the average number of family members per laborer's household, each person has access to 23 yen 86 sen, which is three times more than an average Korean, who had access to only 7 yen 92 sen (= 43 yen 56 sen/5.5 family members).³ The Koreans thus formed a group of laborers on the lower ranks of the railway organization.

Death Rates and Morbidity Rates per Ethnic Group and System: Problems and Paradoxes

Under the colonial employment structure, how can we describe the health conditions of KNR employees? To answer this question, let us examine the long-term death rate (Figure 3). Using data of the KNR Relief Association, we can estimate the death rates, morbidity rates, etc. Because most of the Japanese and Korean workers of KNR (except high-grade officials and a portion of clerical officials) were supposed to become members of the Relief Association, we can estimate the death and morbidity rates with almost 100% accuracy. Even though workers were forced to leave KNR once they were diagnosed with incurable diseases and injuries, they received relief payments. And because the discharge of employees in such cases implies with high probability that they died after leaving KNR, the death rates can be calculated from the labor loss rate. Unfortunately, detailed data can be attained only for the period between the second half of the 1920s and the middle of the 1930s.

Although the death rate drastically decreased during the mid-1910s, the death rate dramatically increased during 1917-18 and continued to be around 11-12‰ until 1923. It dropped again but rose slightly until 1929, was lower again during the first half of the 1930s, but rose slightly during the war. What, then, were the factors behind these large fluctuations in the death rate? When the time of death is classified into two categories – one from diseases and injuries sustained while on duty (mostly injuries) and one from diseases and injuries sustained while off duty (mostly diseases), the former only account for 2‰ or less of the total number of deaths, while the latter exhibited a movement similar to that of the total death rate. In other words, drastic changes in the death rate were the result of a variety of diseases. In addition to structural causes generated by railroad labor, such dramatic changes were affected

3. Among the workers of the Seoul Railway Factory, the average number of people per household was 3.8 for the Japanese and 5.5 for the Koreans.

Figure 3. Changes in KNR Employees' Death Rates (Unit: %)

Sources: Tetsudōkyoku Annual a and b; Kōtsūkyoku 1944; Sōmubu, annual edition; and Morio Hitoshi 1936.

- Notes: 1. The death rate per ethnic group was calculated from the Table of Relief Association Members in the Bureau of Railways, Government-General of Korea (Tetsudōkyoku Annual a). As for 1915-16, because of the Table of the Causes of Death of Relief Association Members per Disease, it is possible to calculate the death rates from diseases and injuries sustained while on duty and off duty per ethnic group. In addition, from the Department of General Affairs, Bureau of Railways, Government-General of Korea (Sōmubu, annual edition), it is possible to calculate the death rates from diseases and injuries sustained while on duty and off duty per ethnic group for nine years (1925-28, 1932-33, and 1935-37).
2. However, because there are no data on other years, estimates were made using the following method. From the Table of Casualties while on Duty, the death rate of all employees while on duty was calculated and compared with the death rate of members of the Relief Association from diseases and injuries sustained while on duty for the nine years above. Afterwards, because the death rate of Relief Association members was slightly higher, the average ratio 1.72861 of the two figures was used in the multiplication to estimate the death rates from diseases and injuries sustained while on duty and the death rates from diseases and injuries sustained while off duty. In addition, the number of deaths while on duty per ethnic group up to 1935, available in Morio (1936), was used to estimate the death rates from diseases and injuries sustained while on duty per ethnic group.

considerably by external causes, such as epidemics of specific diseases. For example, according to statistics on the causes of death in the Statistical Yearbook of the Government-General of Korea, the steep climb of the death rate in 1914, 1918-22, 1929, and 1932 was closely related to the spread of infectious diseases. In particular, during 1918-21, the number of deaths from

Spanish influenza is said to have reached several hundred thousands (Cheon and Yang 2007).

What, then, were the characteristics of the death rates for each ethnic group? According to the *Statistical Yearbook of the Government-General of Korea*, the average death rate per ethnic group (1925-39) is 15.1‰ for Japanese and 19.0‰ for Koreans, the latter surpassing the former. In KNR, however, the figures during the same period were 9.3‰ for Japanese and 7.2‰ for Koreans, the latter actually lower than the former.⁴ Because Japanese not only had an advantage over Koreans in the division of labor within the KNR but also greatly surpassed the latter in terms of living standards and were on the whole younger than the latter with an average age of 31.9 (compared to 33.7 for Koreans),⁵ it would be natural to assume that the death rate would be lower among Japanese employees. In reality, however, the death rate was higher for Japanese.

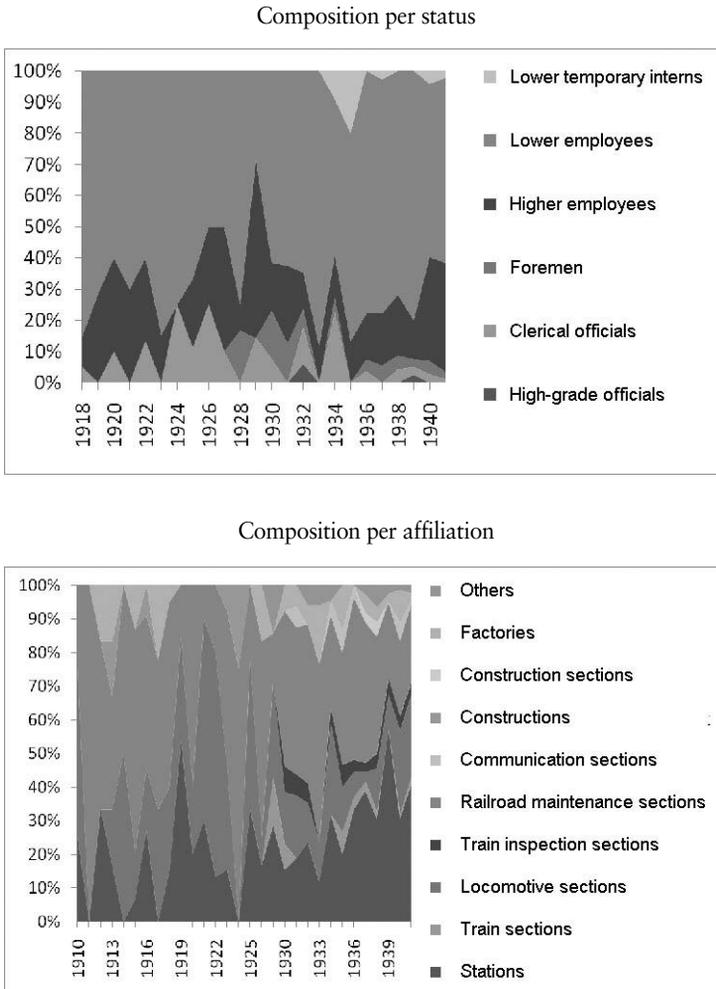
In order to analyze this paradoxical phenomenon, we now differentiate the deaths caused by diseases and injuries sustained while on duty from those sustained off duty. For the deaths from diseases and injuries sustained while on duty, Koreans overall exhibited a higher death rate, although Japanese exhibited a high death rate during the first half of the 1920s. By contrast, deaths from diseases and injuries sustained off duty were far higher among Japanese, by a margin of at least 4-5%. On the other hand, both groups' death rates tended to merge only when the death rate from diseases and injuries sustained while off duty reached its peak. Because a dramatic rise in the death rate is closely related to epidemics of infectious diseases, as mentioned above, there must have been a structural factor behind this high death rate among the Japanese caused by diseases and injuries sustained while off duty.

First, why was the death rate caused by diseases and injuries sustained while on duty higher for Koreans than for Japanese? To answer this question, we should try to grasp the actual working conditions for each group. Railroad maintenance workers were in charge of repairing various kinds of equipment and railroad tracks as well as small construction work. Since they mainly performed physical labor outdoors, they worked according to a regular daily work pattern (Yamakawa and Tashiro 1939). In comparison, construction

4. There are differences between the death rates of KNR employees and those of the entire population of colonial Korea because the deaths of railway employees did not include those of infants and the aged.

5. Based on Sōmubu (1933). Even in terms of their composition per age, the Japanese were slightly younger overall.

Figure 4. The Composition of Deaths from Diseases and Injuries Sustained while on Duty per Status and Affiliation (Unit: %)



Source: Tetsudōkyoku, annual a.

sections were in charge of large-scale projects such as laying railroads or building bridges. Though the type of work assigned to them was different, the work pattern was similar to that of railroad-maintenance sections, i.e. regular daytime work. Also, there were communication sections in charge of installing and maintaining facilities for communication, electricity, etc. Their work

pattern was not so different from that of the railroad maintenance sections, i.e. they performed basically the same work on a daily basis. While these workers could maintain regular patterns of living, they were at a high risk of accidents while on duty.

On the other hand, the workers of locomotive sections worked in a shift system, including night duty, and often had little rest time between shifts, because driving the locomotive is at the heart of railroad transport. Accordingly, they were disturbed by irregular patterns of living and harsh working conditions filled with noise and dust. The train inspection section had a working pattern similar to the locomotive sections and was in charge of the routine maintenance of locomotives and rolling stock. Even though the workers were obliged to perform a certain amount of night duties, they were in a relatively better working environment because they worked on the ground, rather than on the train.

The train sections formed part of the business division, which dealt with passengers and freight daily; the crews of train sections could not avoid shift work, night duty, and an inferior working environment plagued by noise and fatigue. On the other hand, workers in stations were engaged in on the ground duties at a fixed working place, although certain station employees had to process passengers and freight according to the train service, and were therefore unable to avoid night duty. Factories were not directly related to train service, but factory workers were in charge of the periodic repair of rolling stock and the manufacture of mechanical equipment. The working environment of railroad factories was very similar to that of other factories of the general machine industry. Exposed to noise and dust in a confined space, factory workers took charge of various jobs such as turnery, casting, welding, painting etc.

When the composition of those killed by diseases and injuries sustained while on duty (Figure 4) is examined, in terms of position, the number of fatal accidents was the greatest among lower employees, followed by higher employees. In terms of affiliation, while the composition of those killed changed considerably each year, railroad maintenance sections saw the greatest number of deaths, followed by locomotive sections and stations. Fatal accidents occurred the most in the lowest levels, railroad maintenance systems in particular. In other words, because many fatal accidents occurred in positions and departments where ethnic Koreans were mostly employed, it can be said that the Koreans were exposed to a great risk of accidents in the field.

In addition, non-fatal injuries sustained while on duty likewise were the greatest among lower employees. In 1934, the numbers of those injured while

on duty per position were: 1 high-grade official; 8 clerical officials; 12 foremen; 133 higher employees; 1,094 lower employees; and 123 lower interns, 1,371 in total. However, when looking at the non-fatal injuries by affiliation, the pattern is somewhat different from what we see among fatal injuries. The figures for the same year were: 157 at stations; 55 in train sections; 200 in locomotive sections; 42 in train inspection sections; 294 in railroad maintenance sections; 13 in communication sections; 6 in Construction and Improvement Offices; 7 in construction sections; 560 at factories; and 37 in others, 1,371 in total. Thus, the number of people injured was greater for factories and locomotive sections than for railroad maintenance sections.

As the number of those injured was considerably larger in factories, when the injury rate per affiliation (= number of people injured/number of employees) is calculated for factories and other places, the figures were 727‰ for factories and 30‰ for other places, amounting to a total of 150‰ in 1917. These figures rose dramatically in 1918, to 1427‰, 47‰, and 261‰ respectively, then fell to 580‰, 43‰, and 122‰ in 1924, and finally reached the lowest level in 1937, at 109‰, 39‰, and 47‰. During the war, the figures began to increase slightly and reached 170‰, 44‰, and 56‰ in 1941. In other words, the injury rate in factories was consistently high in comparison with that in other work units. This is because Seoul Railway Factory, which mostly saw a large work load in terms of repairs, “had assembly workplaces and other workplaces with many machines so as to repair locomotives” or, in other words, had a work organization different from other factories, which mostly repaired passenger and freight cars. Moreover, a “secondary cause lay in the fact that because physicians were always assigned to factories so that even those with minor injuries could be treated by physicians, all injuries were included in statistics” (Hayashibara 1923). Together with railroad maintenance sections, Seoul Railway Factory began to see a Korean occupation rate (i.e., the number of employees in proportion to each unit, see Table 1) of over 50% during the 1910s. Moreover, even when the injury rate per ethnic group in the Table of Investigations on Recuperation Payments per Disease in the *General State of the Projects of the Field Worker Relief Association in the Bureau of Railways in the Government-General of Korea* [Sōmubu annual ed.] is calculated, Koreans’ rate of injury was approximately twice as high. In other words, the Koreans were exposed to more danger while on field work than were the Japanese.

However, the death rate from diseases and injuries sustained while off duty was not only lower for Koreans but, according to Seoul Railway Factory’s diagnostic statistics from spring 1923, Koreans were also healthier: out of

Table 2. Table of the Causes of Death of Relief Association Members per Disease (Unit: %)

	1916			1925			1932			1937		
	Japanese	Koreans	Difference	Japanese	Koreans	Difference	Japanese	Koreans	Difference	Japanese	Koreans	Difference
Diseases and injuries sustained while on duty	Injuries	1.0	1.8	-0.8	1.5	1.7	-0.2	1.2	0.7	0.5	1.3	-0.5
	Diseases	0.0	0.0	0.0	0	0	0.0	0.3	0.6	-0.3	0.4	0.0
Diseases and injuries sustained while off duty	Total	1.0	1.8	-0.8	1.5	1.7	-0.2	1.4	1.3	0.1	1.7	-0.5
	Injuries	0.8	0.9	-0.1	0.7	0.8	0.0	0.1	1.0	-0.9	0.4	1.1
	Infectious diseases (Pulmonary tuberculosis)	2.4	0.6	1.8	4.0	1.7	2.3	4.4	1.1	3.3	2.8	1.5
	Neurological diseases	1.2	0.3	0.9		1.5		2.5	0.7	1.7	2.1	1.2
	Circulatory diseases	1.2	0.6	0.6	0.9	0.2	0.7	0.6	0.9	-0.2	0.3	0.4
	Respiratory diseases	1.0	0.3	0.7	0.5	0.2	0.4	0.3	0.3	0.0	0.4	0.2
	Digestive diseases	1.0	0.9	0.1	0.5	0.2	0.4	1.4	2.1	-0.7	1.7	0.9
	Urogenital diseases	1.0	0.9	0.1	0.7	0.8	0.0	1.8	0.7	1.1	0.5	1.2
	Tumors	0.0	0.0	0.0	0.5	0.6	0.0	0.3	0.1	0.1	0.5	0.1
	Others	0.0	0.0	0.0	0.5	0.0	0.5	0.0	0.1	-0.1	0.2	0.0
		1.2	0.3	0.9	0.4	0.2	0.2	0.0	0.1	-0.1	0.1	0.2
	Total (Death rates from diseases)	8.5	4.4	4.1	8.9	4.5	4.4	8.9	6.6	2.4	8.0	5.1
	Total	7.7	3.5	4.2	8.2	3.8	4.4	8.8	5.6	3.2	6.4	4.7
Total	9.4	6.1	3.3	10.4	6.2	4.1	10.4	7.8	2.5	9.2	6.8	

Sources: Tetsudōkyoku annual a; and Sōmubu, annual ed.

Note: Because pulmonary tuberculosis was classified as an infectious disease from the 1920s onward, tuberculosis included among respiratory diseases for 1916 was readjusted as infectious disease.

1,426 Korean employees, 91.6% were in class 1, 8.4% in class 2, and 0.1% in class 3; and, out of 430 Japanese employees, 87.9% were in class 1 and 12.1% in class 2. Here, the question arises why Koreans, despite their poor living and working conditions, were healthier than the Japanese? Was it indeed because, as the Japanese colonial authorities claimed, “they were comparatively strong in physique and could withstand physical labor” (Hayashibara 1923)?

Estimates based on a table of the causes of death of Relief Association members are shown in Table 2. When, from among deaths from diseases and injuries sustained while off duty, death rates from diseases excluding injuries are added up, the figure for Japanese is 6-8‰ while the figure for Koreans is lower at 3-5‰. This gap in death rates between Korean and Japanese employees gradually narrowed, however: it stood at 4.2‰ in 1916; 4.4‰ in 1925; 3.2‰ in 1932; and 1.8‰ in 1937. The greatest factor behind the disparity in the death rates was infectious disease, tuberculosis in particular.⁶ While the Koreans exhibited high death rates for other diseases, the number of deaths from acute infectious diseases and chronic infectious diseases (mainly tuberculosis) was certainly higher for Japanese. Let us compare this with the pulmonary TB death rates of all the Japanese who lived in Korea. While those of all Japanese were 1.52‰ in 1927, 2.61‰ in 1928, 2.42‰ in 1932, 2.33‰ in 1933 (Choe 1938), those of KNR Japanese workers were 3.0‰, 1.5‰, 2.9‰, 2.5‰, respectively. From this it can be deduced that the death rates of KNR Japanese workers were relatively higher than for other Japanese who lived in Korea.

This pattern differs significantly from the high death rates of ethnic Koreans within colonial Korea, who were easily exposed to infectious diseases. Of course, the overall death rates of Koreans could not but be great because they included the death rates of infants and the aged. Nevertheless, in comparison with the total death rates and death rates from diseases of employees of the Japanese National Railways (JNR), which amounted to 6-8‰ and 5-6‰, respectively, except for the period that saw a pandemic of the Spanish influenza, the death rates of employees of KNR are unexpectedly high.

This problem must be considered in terms of the division of labor within the railroad industry. The death rates for each disease within each work unit (1933) are as follows for Japanese and Koreans, respectively: 10.8‰ and 5.4‰

6. The same phenomena were observed in Japan and China as well as in Korea. Though TB had already decreased in Europe and USA, it was still higher in ‘the Japanese Empire’ (Fukuda 2001). As medicine developed, the TB problem gradually settled. When we look at infectious diseases, acute infectious diseases like typhoid fever are easily discerned. But those death rates remain relatively low.

in general affairs divisions; 9.4‰ and 8.5‰ in business divisions (Train sections and Stations); 5.2‰ and 7.9‰ in operation divisions (Train inspection and Locomotive sections); 7.1‰ and 5.9‰ in engineering works divisions (Construction, Communication and Railroad maintenance sections); and 11.8‰ and 5.7‰ in factory divisions. Of course, although the death rates for each unit varied somewhat year by year, the disparity between the two ethnic groups was small in the business affairs and operation divisions, while it was considerable in general affairs, engineering labor, and factories. Considering the deployment rate and the occupation rate (see Table 1, note 1), Koreans were assigned to engineering divisions as well as to factories as fieldworkers from early on, subsequently increasing in proportion to those who were assigned to the business affairs and operation divisions. As for Koreans, because they were in charge of outdoor and physical labor in the lower levels of the labor system, they were at a greater risk of accidents and injuries. At the same time, however, they engaged little in communal labor in crowded spaces and were comparatively more exposed to fresh air. In other words, they had less exposure to pathogens and they also had the physical strength to resist them (Yamakawa and Tashiro 1939). However, it must be noted that, as the Koreans' deployment rate and occupation rate in stations and locomotive sections increased, disparity in the death rate from diseases per ethnic group tended to decrease.

By contrast, Japanese workers occupied the mid- and upper levels of the headquarters, regional bureaus, railway offices, and field work units, all of which were key departments in management; even when assigned to field working stations, locomotive sections, and railroad maintenance sections, they acted in supervisory roles, while physical, low-skilled labor was assigned to Koreans as much as possible. Consequently, Japanese frequently worked indoors in stations, locomotives, trains, and factories, limited spaces where they were more exposed to pathogens.

Besides the exposure risk at work, differences in living environment should also be taken into consideration. Because they lived communally in company housings and bachelors' dormitories, Japanese were at a higher risk of infection with tuberculosis and other diseases. According to epidemiological studies conducted by JNR railway physicians, the main causes of tuberculosis epidemics were "infection between fellow lodgers," "infection between colleagues," and "infection between friends" rather than the absence of a clean environment (Muto 1931, 42). Most adolescent Japanese employees, who had left their homeland and found employment in colonial Korea, started their working lives in bachelors' dormitories, worked with fellow Japanese lodgers, and spent their leisure time with Japanese friends. In addition, after they married, they lived

Table 3. Table of Investigations on the Morbidity Rates of KNR Employees per Ethnic Group (Unit: %)

	1926				1933				1937			
	Japanese		Koreans		Japanese		Koreans		Japanese		Koreans	
	Total	Difference	Total	Difference	Total	Difference	Total	Difference	Total	Difference	Total	Difference
Injuries	1.0	1.1	1.1	-0.1	0.4	0.6	0.5	-0.2	0.5	1.4	0.9	-0.9
Infectious diseases	8.0	0.7	4.5	7.3	12.6	5.3	9.2	7.3	13.6	5.8	10.3	7.8
(Pulmonary tuberculosis)	1.4	0.4	0.9	1.0	1.9	1.2	1.6	0.8	1.1	0.7	1.0	0.4
Neurological diseases	2.9	2.0	2.5	0.9	2.1	3.2	2.6	-1.2	0.9	1.3	1.0	-0.4
Circulatory diseases	0.3	0.6	0.4	-0.2	3.1	1.2	2.2	1.9	2.6	0.7	1.8	1.9
Respiratory diseases	14.0	3.1	8.8	10.9	9.1	4.1	6.7	5.0	6.6	2.5	4.9	4.1
Digestive diseases	7.5	2.0	4.9	5.5	6.0	2.8	4.5	3.2	7.3	3.1	5.5	4.2
Urogenital diseases	3.1	1.5	2.3	1.6	3.4	2.1	2.8	1.3	1.9	0.5	1.3	1.3
Skin and musculoskeletal diseases	2.9	2.2	2.6	0.7	2.1	2.2	2.1	-0.1	2.6	1.7	2.2	0.8
Ocular, auditory, and olfactory diseases	1.5	0.4	1.0	1.2	2.3	0.6	1.5	1.7	2.6	0.7	1.8	1.8
Tumors	0.5	0.0	0.3	0.5	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.0
Parasites	0.5	0.4	0.4	0.1	0.3	0.4	0.3	-0.2	0.1	0.0	0.0	0.1
Others	10.3	2.6	6.6	7.7	3.2	1.8	2.5	1.5	1.7	0.7	1.3	1.0
Total	52.7	16.5	35.3	36.1	44.5	24.2	35.0	20.3	40.4	18.7	31.1	21.7

Source: Sōmubu annual ed.

Note: Morbidity rate = Number of recipients of illness payments per disease/number of Relief Association members * 1000

communally with other Japanese workers in railroad towns. On the other hand, Korean workers usually lived in areas where residential density was relatively low. In some cases, they even lived in rural areas. Before streptomycin became widely available, the only way to stop the spread of diseases was to avoid contact with patients suffering from open tuberculosis.

From what kind of diseases, then, did KNR laborers suffer? According to the Relief Association's Table of Investigations on the Morbidity Rates of KNR Employees per Ethnic Group (Table 3), the number of patients who suffered from infectious diseases and respiratory diseases was the largest, followed by digestive diseases, skin and musculoskeletal diseases, and neurological diseases. Among these, deaths from infectious diseases were the most numerous, followed by digestive diseases and respiratory diseases. Also, it can be noted that the morbidity rate for Japanese was approximately twice that of Koreans. If we look at the morbidity rates per disease among Japanese and Koreans for 1933, the year when, according to Table 3, the difference between the ethnic groups was the smallest, for pulmonary tuberculosis, pulmonary infiltration, pulmonary catarrh, dysentery, typhoid, anal fistula, pleurisy, appendicitis, prolapsed, nephritis, auditory diseases, ocular diseases and beriberi, the morbidity rate among Japanese was 5% higher than among Koreans.⁷ Most of

7. The morbidity rates per disease among the Japanese and the Koreans were, injuries (acnitis 0.3%, 0.1%, burn 0.0%, 0.0%, fracture 0.0%, 0.1%, bruise 0.0%, 0.3%, traffic accident injury 0.1%, 0.0%, subtotal 0.4%, 0.6%), Infectious diseases (pulmonary tuberculosis 1.9%, 1.2%, pulmonary infiltration 1.2%, 0.4%, pulmonary catarrh 2.5%, 1.2%, scarlet fever 0.0%, 0.0%, dysentery 1.0%, 0.0%, typhus 0.5%, 0.1%, paratyphoid 0.3%, 0.1%, typhoid 4.5%, 1.2%, influenza 0.0%, 0.0%, trachoma 0.1%, 0.0%, caries 0.0%, 0.4%, erysipelas 0.0%, 0.0%, syphilis 0.1%, 0.0%, subtotal 12.6%, 5.3%), Neurological diseases (psychastitis 0.0%, 0.0%, neurasthenia 0.6%, 1.0%, neuralgia 0.1%, 1.0%, cerebral apoplexy 0.3%, 0.0% articularrheumatism 0.6%, 1.0%, Richard Kretz's Diseases 0.1%, 0.0%, rhinogenousmeningitis 0.3%, 0.0%, subtotal 2.1%, 3.2%), Circulatory diseases (septicemia 0.0%, 0.0%, endocarditis 0.0%, 0.0%, hemorrhoid 0.0%, 0.0%, anal fistula 0.9%, 0.1%, subtotal 3.1%, 1.2%), Respiratory diseases (pneumonia 1.0%, 0.6%, bronchitis 1.3%, 0.9%, pleurisy 3.6%, 1.3%, bronchial catarrh 0.0%, 0.0%, lymphadenitis 0.0%, 0.0%, asthma 0.0%, 0.0%, necropneumonia 0.0%, 0.3%, empyema 0.1%, 0.1%, subtotal 9.1%, 4.1%), Digestive diseases (entrails catarrh 0.5%, 0.4%, stomach catarrh 0.6%, 0.4%, intestinal catarrh 0.1%, 0.4%, hyperacidity 0.0%, 0.0%, stomach ulcer 0.0%, 0.0%, appendicitis 2.0%, 0.3%, peritonitis 0.5%, 0.3%, 0.3%, cholelithiasis 0.3%, 0.0%, icterus 0.5%, 0.3%, enterosteosis 0.1%, 0.1%, prolapsed 0.5%, 0.0%, inguinal hernia 0.1%, 0.0%, subtotal 6.0%, 2.8%), Urogenital diseases (epididymitis 0.4%, 0.4%, cystitis 0.4%, 0.0%, nephritis 2.3%, 0.3%, prostatitis 0.0%, 0.1%, urethritis 0.3%, 1.0%, diabetes 0.0%, 0.1%, subtotal 3.4%, 2.1%), Skin and musculoskeletal diseases (arthritis 0.4%, 0.3%, myositis 0.6%, 0.6%, sinusitis 0.0%, 0.1%, periostitis 0.1%, 0.0%, abscess 0.5%, 0.6%, phlegmon 0.3%, 0.4%, dermatitis 0.0%, 0.1%, felon 0.1%, 0.0%, subtotal 2.1%, 2.2%), Ocular, auditory, and olfactory diseases (auditory diseases 0.6%, 0.1%, dental caries 0.1%, 0.1%, olfactory diseases 0.3%, 0.0%, ocular diseases 1.3%, 0.3%, subtotal 2.3%, 0.6%), Parasites (ancyllostomiasis 0.1%, 0.3%, pulmonary distomatosis 0.0%, 0.0%),

these diseases are often fatal once contracted. On the other hand, there are only two kinds of disease in which the morbidity rate for Koreans was 5% higher than Japanese, namely neuralgia and urethritis. Generally speaking, these two diseases are less likely to be the cause of death.

When we examine the morbidity rates for each work unit (1933) for Japanese and Koreans, the figures were: 82.4% and 43.0% in general affairs divisions; 48.3% and 28.0% in business divisions; 35.7% and 30.5% in operation divisions; 29.0% and 14.6% in engineering works divisions; and 65.0% and 32.6% in factory divisions, respectively. Except for the division of general affairs, which had few employees, the morbidity rate, in a descending order, was as follows: factories, business divisions, operation divisions, and the division of engineering. In other words, in factories, which were equipped with many machines, the workers suffered from mental tension and poor hygienic environments, therefore the morbidity rate, together with the injury rate mentioned above, was the highest. In addition, because of these environmental factors, five diseases which factory workers suffered from most were pleurisy (3.4%), typhoid (2.4%), pneumonia (2.4%), nephritis (2.4%), and beriberi (2.4%). Moreover, because the wage depended on the workload, factory workers were likely to overwork and accumulate considerable fatigue. The morbidity rates were the second highest in business divisions and operation divisions, where the employees had to work day and night according to railroad schedules (*Nihon tetsudō ikyōkai* 1930). In the business divisions, the top-five diseases in terms of morbidity rates were typhoid (3.0%), pulmonary tuberculosis (2.8%), pleurisy (2.8%), pulmonary catarrh (2.5%), appendicitis (1.9%), and in the operation divisions, those were typhoid (3.4%), pleurisy (3.4%), pulmonary catarrh (2.1%), neurasthenia (1.4%), and neuralgia (1.0%). Among them, the train crews and locomotive crews were at a higher risk of disease due to increased fatigue. On the contrary, because employees in the engineering division worked mainly outdoors during the day and felt less mental fatigue, they recorded the lowest morbidity rates (*Yamakawa and Tashiro* 1939). As a result, the diseases engineering workers' suffered most from were typhoid (3.1%), pulmonary tuberculosis (1.1%), articularrheumatism (1.1%), nephritis (1.1%), and bronchitis (0.9%). Though there are differences in numbers, such tendency can be found for both Koreans and Japanese.

Such health conditions began to deteriorate after the outbreak of the Second Sino-Japanese War in 1937. As railroad transportation increased during

subtotal 0.3%, 0.4%), others (cold 0.5%, 0.9%, beriberi 1.2%, 0.0%, puritus ani 1.0%, 0.9%, others 0.5%, 0.0%, subtotal 3.2%, 1.8%), the sum total 44.5%, 24.2%, respectively.

the war, the employees' physical and mental exhaustion became considerable due to the increase in the workload (Chōsen tetsudō kyōkai 1940, 41; and Fukutoku Owada 1942, 10). Inexperienced adolescents who were employed en masse during the war were particularly vulnerable (Chōsen tetsudō kyōkai 1938, 83). Although the morbidity rates during the war cannot be deduced from available data, according to statistics for respiratory diseases among field workers, which includes tuberculosis patients, the morbidity rate rose from 6.2% in 1936 to 9.8% in 1938 and to 13.5% in 1940 (Kōseikei 1942, p. 52). In absolute terms, the number of patients rose 3.3 times to 5,243. Moreover, the average term of office of those who died from respiratory diseases rose from 5 years and 7 months in 1938 to 7 years and 2 months in 1939, only to drop to 4 years 9 months in 1940, implying the weakening of physical strength of adolescents during the war.

Under the colonial employment structure, because Koreans engaged mainly in physical labor and kept a certain distance from one another, their morbidity and death rates were relatively low despite the fact that they were more exposed to danger in their work environment. On the contrary, because the Japanese worked in comparatively stable environments, working indoors and living communally after work, they were at a greater risk of exposure to infectious diseases including tuberculosis. After analyzing the colonial employment structure, this apparent paradox can thus be explained.

Labor Hygiene Measures: Railway Hospitals and a Relief Association for Whom?

From the early stages of KNR, labor hygiene measures were taken to ensure the health of KNR employees, and railway hospitals and the Relief Association constituted the core of this health system. While the railways in colonial Korea thus took responsibility for their employees' medical care, an internal medical system did not exist from the beginning. Consequently, there was no choice but to rely on external medical institutions for the treatment of the patients. The Gyeongin (Seoul-Incheon) Line entrusted Incheon Hospital with treatment, and the Universal Benevolence Association (Dōjinkai 同仁會) assigned some ten physicians to the Gyeongbu (Seoul-Busan) Line in 1904.⁸ As for the Gyeongui

8. A medical organization that was founded in June 1902 and existed until 1945, Dōjinkai supported Japan's administration of its colonies and management of its occupied territories. Hiroaki Osato (2006), 47-105.

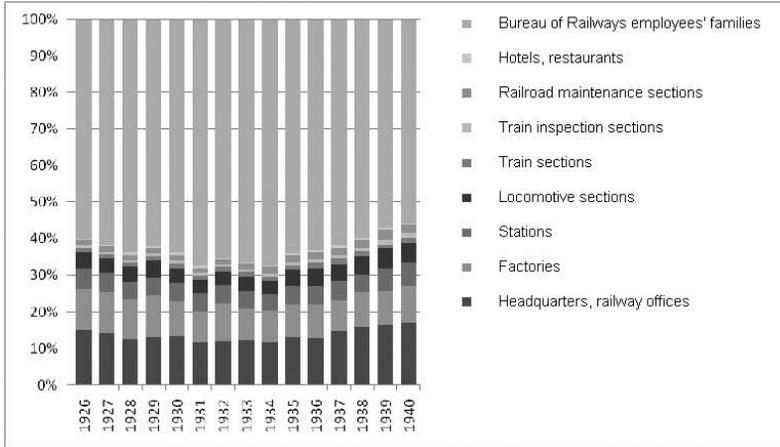
(Seoul-Sinuiju) Line, while some military physicians were assigned to take care of its workers, some part-time physicians were dispatched by Dōjinkai in 1905 due to a shortage of medical staff (Tetsudōkyoku 1937, 495, 546, and 585).

Consequently, even after the establishment of the Bureau of Railway Management in the Residency-General of Korea in 1906, a part-time physician system based on the contract with Dōjinkai (March 1907) was maintained (Senkōkai 1986, 233-234). Yongsan Dōjin Hospital was established in 1907, and with the termination of the contract with Dōjinkai in 1913, it was reorganized as Yongsan Railway Hospital but management was entrusted to Yomoshi Sasaki who came to Korea in 1906 after graduating from the University of Tokyo by recommendation of Dōjinkai and became the sanitary chief director of the Great Korean Hospital (Daehan uiwon 大韓醫院). Yongsan Railway Hospital (which later became Seoul Railway Hospital in 1938) came under the direct management of KNR in 1926 and continued to see the expansion of its medical facilities. Although in principle this hospital treated field workers for diseases and injuries sustained on duty, it also provided treatment to ordinary employees, their families, and passengers, as well as training for nurses and maternity nurses (Tomegoro Otani 1929, 120). In June 1940, eight departments – the Department of Internal Medicine, Department of Surgery, Department of Ophthalmology, Department of Otolaryngology, Department of Pediatrics, Department of Dentistry, Department of Gynecology, and Department of Dermatology – were created, which consisted of 134 employees including thirty-three physicians and assistants, eight pharmacists including the chief pharmacist, forty-seven staff member including the head officer, and forty-six nurses including the senior nursing officer. In July 1925, a number of maternity nurses were dispatched to regions with no medical institutions as part of a project implemented by the Friendship Association (Kyokuyukai 局友會) of the Bureau of Railways in the Government-General of Korea. Afterwards, the maternity nurses were called “part-time physicians’ assistants,” and one nurse with midwife license and nurse license was assigned to every major location along railroads (June 1940, 58).

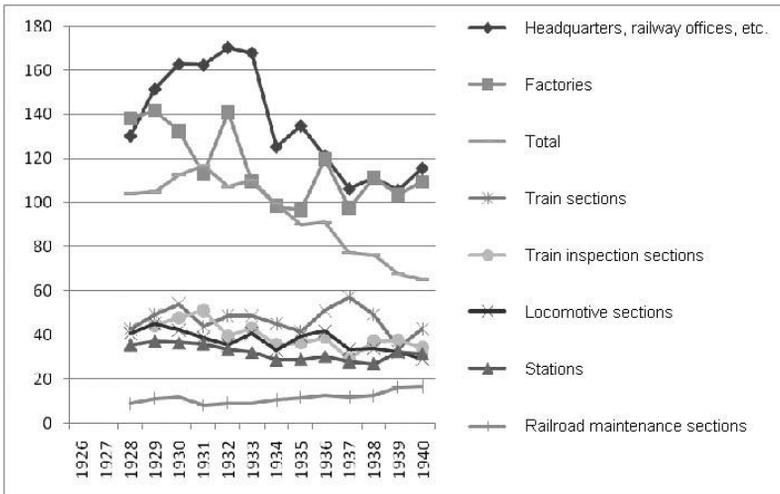
The number of patients treated at this hospital increased from 24,964 in 1926 to 31,978 in 1934, but shot up to 95,244 in 1941. Most of the patients were KNR employees and their family members, and only 10% of them were not related to KNR, a figure that decreased further to 5% or less during wartime. As for those who were related to or authorized by the railways, Japanese men were the most numerous, followed by Japanese women, Korean men, and Korean women. Because the proportion of Japanese patients exceeded 60% of the total number, it can be argued that the railway hospitals

Figure 5. The Composition and Medical Care Rate of Patients at Seoul Railway Hospital per Affiliation (Unit: %)

Composition of patients per affiliation (excluding others)



Medical care rate per affiliation



Source: Tetsudōkyoku annual a.

Notes: 1. "Headquarters and railway offices" include the headquarters and railway offices.

2. Medical care rate = Number of recipients of medical care/number of employees * 100.

functioned as Japanese-centered facilities.⁹

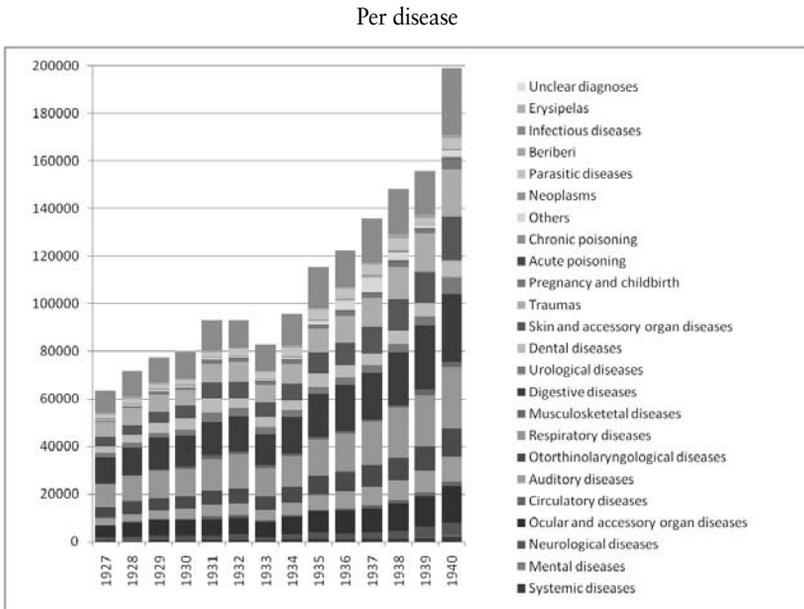
When we look at the affiliation of patients, 60% or more of the patients were family members of employees in the Bureau of Railways. Compared to JNR, the share of employees' family members in the total number of patients was far greater for KNR than for JNR. This is not only because the number of medical facilities available to employees' family members was comparatively less in colonial Korea, but it was also because the provision of medical services to family members was expanded during the period that management of KNR was consigned to South Manchurian Railways Co. The division that had the second highest number of patients was the headquarters and railway offices, followed by factories, stations, locomotive sections, railroad maintenance sections, train sections, and train inspection sections. As for factory workers, even though they employed less people than other divisions, the number of patients was considerable, as mentioned above. In contrast, there were few patients from the engineering division.

Moreover, Figure 5 shows the rate of provided medical care in terms of the number of employees in each division. The figures were the highest for the headquarters and railway offices, followed by factories. It may seem surprising that employees in headquarters and railway offices, who engaged in little field work, should constitute the biggest group. However, because the Japanese employees, who mostly worked in these departments, worked indoors and lived communally, they were comparatively more prone to diseases and had easy access to hospitals and clinics. For the divisions that related to fieldwork, factories had the highest rate, followed by train sections, train inspection sections, locomotive sections, stations, and railroad maintenance sections. This is influenced by such factors as working environment, the degree of exposure to machines, the payment system, the degree of mental tension, the ratio of indoor to outdoor work, and accessibility to medical facilities. Factories and railroad maintenance sections were very contrasting workplaces. Train laborers, including conductors, were less healthy than locomotive laborers, including the locomotive engineers. Nevertheless, the overall rate of provided medical care tended to drop from the early 1930s onward, indicating the improved health conditions of the total work force.

In addition to Seoul Railway Hospital, part-time physicians were stationed at major locations such as Busan, Daejeon, Pyongyang, Wonsan, along with other specific construction areas. The number of part-time physicians rose as

9. For example, though the proportion of Korean workers of KNR was 52% in 1942, Korean patients' proportion was only 26%.

Figure 6. The Number of Recipients of Medical Care by Hospitals, Clinics, and Part-time Physicians of the KNR (Unit: Person)



Source: Tetsudōkyoku annual a.

the railroad lines were extended, and they were dispatched to ninety-two locations by June 1940 (Senkōkai 1986, 233-235). Furthermore, as the number of employees greatly increased during wartime, medical organs under direct management were established in diverse areas. A railway clinic was established in Suncheon in September 1937, followed by one in the Cheongjin and Kanggye areas in 1941. Indeed, because the number of employees jumped to 60,000 after the breakout of the Pacific War, in addition to Seoul general railway hospitals were established in Pyongyang (1942), Hamheung (1943), and Busan (1944).

Figure 6 shows the number of employees who were diagnosed and treated by railway hospitals, clinics, and part-time physicians for each disease. While there were slight variations by year, in 1936 the number of patients was the highest for digestive diseases, followed by respiratory diseases, infectious diseases, trauma, skin diseases, ocular diseases, otorhinolaryngological diseases, auditory diseases, dental diseases, and parasitic diseases. Because these figures include many employees' family members, however, they somewhat differ from the morbidity rate shown above. Among the infectious diseases, which were the primary cause of death, in 1936, the highest number of patients is 4,702 for influenza, followed by 3,168 for venereal diseases, 1,961 for malaria, 1,332 for tuberculosis, 1,302 for trachoma, 929 for whooping cough, 625 for measles, 403 for dysentery, 172 for diphtheria, 116 for typhoid fever, 63 for scarlet fever, 26 for paratyphoid fever, 5 for eruptive typhus, 4 for the pest, and 3 for cholera. The number of those suffering from influenza and venereal diseases was especially large. In addition, there were many cases of malaria and trachoma.

As has been mentioned above, because the disparity in the death rate between the two ethnic groups can mainly be observed in infectious diseases, many precautions were taken against those diseases. As a countermeasure, a preventive medicine against diseases such as typhoid fever and dysentery was prepared and distributed to employees across the nation at affordable prices by Seoul Railway Hospital. In addition, when epidemics of infectious diseases were reported in diverse regions, Seoul Railway Hospital and part-time physicians often provided preventive inoculations free of charge to employees, especially field workers, and their family members (Senkōkai 1986, 235). In fact, the number of those for whom Seoul Railway Hospital provided diverse preventive inoculations in 1939 was over 12,500, and over 34,100 preventive treatments against typhus and dysentery were distributed nationwide. To prevent the outbreak of diseases among railway crews, Seoul Railway Hospital regularly conducted a variety of on-the-spot surveys each year as well. The following measures were taken: air pollution tests in the offices; inspections of

the wells at diverse stations, workplaces, and official residences; testing of food including milk sold by the Division of Consumption; testing of food sold at stations; and the testing of water at spas.

Tuberculosis, though not an acute infectious disease, was the greatest cause of death for KNR employees before the war, with the fourth greatest number of patients. However, the number of patients dramatically increased during wartime, reaching 6,195 in 1940, second only to influenza. It must be noted that these figures include family members and outsiders (for example, 952 in 1940). Nevertheless, it is easy to grasp the overall change. As noted above, although the overall health conditions of the work force seemed to have improved since the amount of medical care provided decreased, in terms of the actual situation, health conditions were deteriorating during wartime.

Consequently, in November 1941, KNR authorities opened Masan Railway Sanatorium, which could accommodate approximately 70 patients, for patients with tuberculosis (Senkōkai 1986, 235). Although the establishment of this sanatorium had been considered since the days of consigned management by South Manchurian Railways, it was not realized until 1938, when tuberculosis patients rose greatly in number. Statistically, 90% of tuberculosis patients can be completely cured if treated within one month and approximately 77% if treated within six months, but the number goes down to 40% if treated any later than six months (Kanji Eguchi 1936, 396). Because there was no reliable cure, patients had to rely on natural therapies: “First, maintenance of mental and physical rest; second, absorption of fresh air and sunlight; and third, intake of nutrition.” This was why sanatoria were needed. In addition, because there were many neuralgia patients among employees and their families in cold areas such as the Hyesan Line and the Baengmu Line, based on strong requests from Songjin Railway Office, Onsupyong Spa Resort was established in November 1940 as a treatment facility.

To provide such medical service to KNR employees including the colonized Koreans, the Relief Association system, which is a kind of insurance system, was implemented from early on.¹⁰ During the period when railways were managed by the Residency-General of Korea, a Mutual Aid Association (Kyōfukai 共扶會) was organized in 1908 at Yongsan Factory in Seoul, which had many injured employees, and monthly contributions (1% of the wage) were collected for mutual relief in times of death and disease. When the

10. The introduction of an extensive relief association system was due to the fact that KNR was established and managed by GKG. Such system did not apply to colonial blue-color workers in private companies.

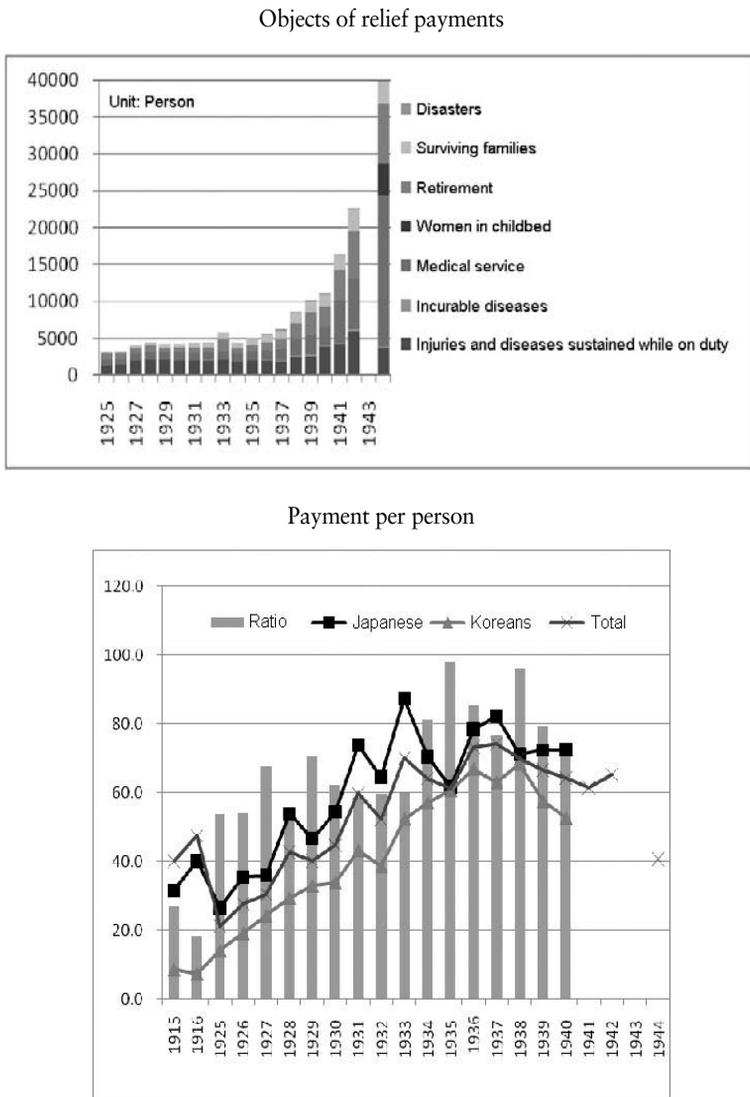
management of the railways temporarily fell under the jurisdiction of JNR in 1909, the Relief Association system of JNR was applied to those who were being transferred from JNR (Senkōkai 1986, 223-225). This Relief Association system was finally introduced to KNR in April 1910, thus leading to the establishment of the employee relief association. However, this was only for Japanese (mandatory subscription for higher and lower employees; optional for clerical officials) and was limited to life, endowment,¹¹ and accident insurance for the diseases and injuries sustained while on duty (Tetsudōkyoku 1915). As for the financial resources, regular contributions amounting to three percent of wages were collected from association members in the case of mandatory subscription, and the government, too, granted subsidies amounting to two percent of total wages. In the case of optional subscription, association members paid contributions of five percent of their wage. Subsequently, the collected amounts were increased on numerous occasions.

In April 1915, the civil registration system had been consolidated and the death and injury rates of Korean employees, the basis of calculations for the Relief Association thus far, had been established; it became possible for ethnic Koreans to join the Relief Association. However, in consideration of their living standard and other factors, the collection payments from Koreans were set at half the amount of those from Japanese. This implies that the wages of Koreans were half those of Japanese. However, the relief funds for 1916 show that the payout figures were 345.3 yen for Japanese and 96.8 yen for Koreans in case of injuries, 359.5 yen and 81.5 yen for deaths, and 8.3 yen and 5.0 yen for recuperation, respectively; apart from recuperation, Japanese thus received about three times more than Koreans. In other words, disbursements by the Relief Association indicate that conditions were actually worse for Korean workers than the wage disparity suggests.

The system changed considerably in 1917, when KNR came under the consigned management of South Manchurian Railways. In November of the same year, the Relief Association was abolished and the employee mutual relief regulations of South Manchurian Railways were applied instead. Employees became responsible for the costs of medical care for injuries and diseases sustained while on duty, which were previously covered by KNR. However, as compensation, the scope of mutual relief was expanded from diseases, injuries and disasters and deaths that employees sustained while off duty to diseases and deaths of their family members. Also, the types of payments were

11. The endowment insurance is a type of life insurance that is payable to the insured if a person is still living on the policy's maturity date, or to a beneficiary otherwise.

Figure 7. Relief Payments of the KNR and Relief Payment per Person (Units: Person, yen, %)



Sources: Tetsudōkyoku annual a and b; and Kōtsūkyoku 1944).

Note: Because the statistics for 1942 and 1944 cannot be obtained from the Bureau of Railways, Government-General of Korea (Tetsudōkyoku annual a), those for April-July of these years in the Bureau of Railways, Government-General of Korea (Tetsudōkyoku annual b) and the Bureau of Transportation, Government-General of Korea (Kōtsūkyoku 1944) were multiplied by 3 to yield estimations.

expanded to eight types: medical treatment and hospitalization expenses, sickbed relief funds, gift money, disaster relief funds, condolence money, seniority allowances, family medical treatment and hospitalization expenses, and funeral expenses for the family.

As the GGK retook the management right over KNR in April 1925, the Field Worker Relief Association in the Bureau of Railways (which later became Relief Association in the Bureau of Railways in 1941 and Relief Association in the Bureau of Transportation in 1944) was established, implementing a compensation system for diseases and injuries sustained while on duty, as well as for incurable diseases, recuperation, diseases, childbirth, retirement, and compensation for surviving family members.¹² Subscription was mandatory for field workers and optional for other employees, and the system was further expanded during wartime; in 1941, subscription became mandatory for all clerical officials and others in lower positions as well as for those with annual wages lower than 1820 yen, and it also became mandatory for chief officials in 1943. The number of those who received payments in the new system increased as the number of employees dramatically increased, as shown in Figure 7, rising from 5,494 in 1936 to 16,264 in 1941, finally to 39,762 (estimates) in 1944. As for the details, in 1941, the figures were: 4,193 for diseases and injuries sustained while on duty; 212 for incurable diseases; 5,799 for medical service; 1 for childbirth; 4,043 for retirement; 1,991 for surviving family members; and 25 for disasters. The four cases – diseases and injuries sustained while on duty, medical service, retirement, and surviving family members – were the main cases, and in terms of the amount of payments, these categories rose dramatically during wartime.

Figure 7 shows changes in the amount of payments for one person for each ethnic group from 1915 to 1940. Although the payments show an overall increase, they decrease during wartime to 40.6 yen in 1944, which was a level equivalent to that of the end of the 1920s. Nevertheless, it is also true that, in comparison with the 1910s, the disparity between the two ethnic groups tended to lessen in the long term. In other words, while average payments to Korean amounted to 30% of average payments to Japanese during the 1910s, starting in the latter half of the 1920s, when KNR was managed by South Manchurian Railways, the figure exceeded 50% and increased from approximately 60% to over 80% during the 1930s, reaching 96% in 1938. Of course, although the figure subsequently decreased, it can be noted that the

12. In approximately 1941, “recuperation” and “diseases” were combined under “medical service.”

disparity between the two ethnic groups dropped considerably over the 25-year period. This exceeded the wage differentials, which were 50-60%, and the Koreans received comparatively higher amounts, considering the decrease in physical strength due to injuries and diseases, thus somewhat lowering the level of inequality between the two ethnic groups.

For the disparity per payment (1940), the figures were 93.7% for diseases and injuries sustained while on duty, 64.4% for incurable diseases, 75.4% for medical service, 61.8% for retirement, 59.2% for the surviving family members, and 71.8% for disaster relief. The figures were the highest for diseases and injuries sustained while on duty, followed by medical service and disasters, and Koreans were also paid more in the case of accidents and diseases. On the contrary, payments for incurable diseases, retirement, and relief for surviving family members only amounted to approximately 60-64%, exhibiting levels that were actually similar to the wage gap (57.1% in 1940). Such differences show that the amounts paid were high when the premise was the recovery of their physical strength and ability to return to work after treatment or recuperation, while they were lower when the patient's prospects for recovery were low. In other words, the Japanese colonial government implemented efficiency-driven policies in the management of the Relief Association as well.

Conclusion

The colonial employment structure was built into the management system of KNR. Within the division of labor system, ethnic Koreans were assigned mainly manual labor as engineers and factory workers. Restricted to low-skilled labor, only a small number advanced to clerical offices as middle-class bureaucrats. This colonial employment structure was reflected in the wage system, Koreans receiving 50-60% of the wages received by the Japanese. As for the standard of living, Koreans experienced more disparity than the wage differences show, because they had fewer fringe benefits but had more family members on average.

Nevertheless, the death rate of Koreans was lower than that of Japanese. Because the Koreans were concentrated in positions such as engineering work and factories, where they were mainly prone to accidents, their death rates from diseases and injuries sustained while on duty were high. However, Koreans' death rates from diseases and injuries sustained off duty were lower than those of Japanese, which is reflected in the overall death rates. This was

because many of the deaths among Japanese were caused by infectious diseases including tuberculosis. As for Japanese employees, because they occupied higher management positions within the labor system as well as in fieldwork, they often worked indoors and lived communally, which increased their exposure to infectious diseases. Such a tendency can also be observed in the morbidity rates. The division that had the highest morbidity rate was the factory, followed by business divisions, operation divisions, and engineering works divisions at the lowest (with the exception of the division of general affairs which had few employees). The factors that decisively affected employees' health conditions include the quality of the working environment, wage payment methods, and the frequency of work outdoors. The decrease in physical strength and the increase in the number of patients of respiratory disease during the war indicate the deterioration of the workers' health conditions, especially among Japanese adolescents.

Regarding these ongoing issues, some countermeasures were implemented from early on; KNR authorities entrusted medical service to Dōjinkai and directly managed the railway hospitals and expanded the number of part-time physicians starting from 1926. During wartime, the number of medical organs under direct management expanded. Their use was overwhelmingly Japanese-centered; approximately 60% of the total number of recipients of medical care were family members of employees. Also the use of medicine was the highest in areas near the headquarters and railway offices, where the majority of work was done indoors. The areas surrounding the factories and stations were the next highest. The frequency with which medical facilities were used by each division was highest for the factories, followed by trains, train inspection, locomotive, stations, and railroad maintenance, in a descending order. In addition, there were many deaths among Japanese. Because these deaths were mostly caused by infectious diseases, many precautionary measures were taken, including the distribution of preventive medicine and the provision of preventive injections without any charge on the part of the patients. In particular, in response to tuberculosis, Masan Railway Sanatorium was established.

The Relief Association system was implemented to support the provision of such medical service. In addition, under the consigned management of KNR by South Manchurian Railways Co., fringe benefits for employees' families were expanded. This system was further refined following the restoration of direct management to KNR. The disparity of payments between the ethnic groups tended to decrease more strikingly in the long term than wage disparity between the two. In other words, the relief payments were carried out in order to maintain the workforce.

As has been examined above, this paradoxical phenomenon – the fact that Koreans’ health condition was comparatively better than that of Japanese, despite the fact that they had lower standards of living as low-skilled workers – stemmed from the division of labor under the colonial employment structure. In response to these circumstances, Japanese-centered medical service was provided to Japanese employees and even expanded to their family members. Although the benefits of modern medical services and the mutual relief system were also expanded to include ethnic Koreans, it was only in the interest of the Japanese colonial authorities who were well aware of the usefulness the Koreans as human resources. Modern labor hygiene was introduced and established in this distorted manner, with the colonial employment structure as its premise.

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Note: characters have been inserted only for Japanese names and colonial organizations mentioned in the main text

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