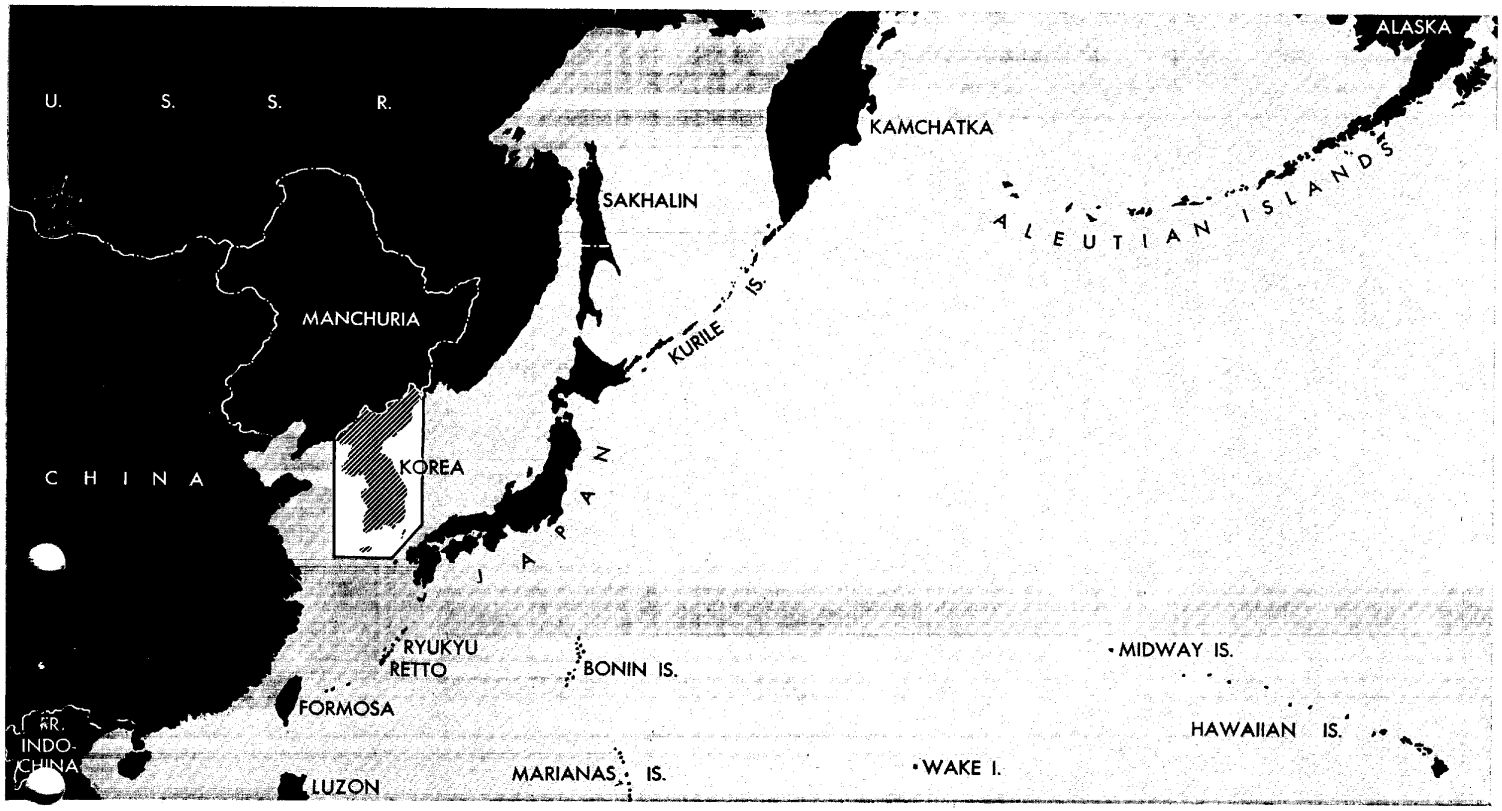
JANIS 75
CHAPTER VII

~~Confidential~~

Non-registered

25X1



JOINT ARMY-NAVY INTELLIGENCE STUDY

OF

KOREA

(INCLUDING TSUSHIMA AND QUELPART)

TRANSPORTATION AND TELECOMMUNICATIONS

APRIL 1945

List of Effective Pages, Chapter VII

Subject Matter	Change in Effect	Page Numbers
Cover Page	Original	unnumbered
List of Effective Pages and Table of Contents, Chapter VII (inside front cover)	Original	unnumbered
Text and Figures	Original	pp. VII-1 to VII-48
Figures (inserts, reverse sides blank)	Original	Figures VII-53 to VII-55
Imprint (inside back cover, reverse blank)	Original	unnumbered

Table of Contents

Note: This chapter is based on information available in Washington, D. C., on 1 March 1945.

TRANSPORTATION AND TELECOMMUNICATIONS

70. General

The position of the Korean peninsula has made it of considerable importance as a land bridge between Japan and Asia proper. Both transportation and telecommunication facilities have been developed since the early 1900's as an integral part of Japan's expansion to the mainland. Since Korea became a part of the Japanese Empire, military considerations, as well as industrial development and exploitation of mineral resources, have influenced the formulation of plans for expansion, improvement, and control of the transportation and telecommunications systems.

A. Transportation.

Korea's railway and road-building programs have been directed toward the development of strong north – south routes with branches to tap the principal industrial, agricultural, and mining areas (FIGURE VII - 54). This system is linked with Japan by steamers which cross Korea Strait (Chōsen-kaikyō and Tsushima-kaikyō). Most of the trade between Japan, Manchuria, and north China formerly moved by sea. Wartime conditions greatly increased the volume of goods moving between these countries; much of this is now being directed as far as practicable over land routes owing to the shortage of shipping and the vulnerability of sea lanes. During recent years, an east – west route between Manchuria and Japan, through northeastern Korea, has received considerable attention. Railways, roads, and ports in this area have consequently been improved.

Both railways and roads are more numerous in the populous western part of the country than in the mountainous eastern and northern areas. The principal highway and the main double-track standard-gauge railway line extend the length of the peninsula between Sinuiju (Shingishū) and Pusan (Fusan), and branches cross the central part to form a connection with the northeastern area. This northeastern sector has become so much a part of the route between Manchuria and Japan that the North Korea railway lines and the ports of Ch'ongjin (Seishin) and Najin (Rashin) are now under the control of the South Manchuria Railway.

During the war there has been a marked increase of traffic on both railways and roads. A large amount of the traffic is military supplies. Roads have largely been feeders to the railways, and, formerly, short hauls were common. It is thought that the meager trucking facilities may now be taxed by the necessity of making longer hauls. Whereas the main rail line, Sinuiju – Pusan, formerly carried goods principally destined for or originating in Korea, it now has a considerable transit traffic as well. Special wartime restrictions have cut the number of passengers to a minimum.

The total mileage of railroads in 1941 was 4,213. The standard gauge of the government lines is 4′8½″. The mileage of narrow-gauge track is chiefly on private lines and is probably not much more than 500 miles. The principal rail line, between Sinuiju and Pusan, is believed to be almost completely double-track. It is, however, the only considerable section of double-tracking. Numerous bridges and tunnels are found on practically all lines. To safeguard against disruption of traffic, duplicate bridges and tunnels have been constructed, together with diversion lines, frequently at some distance from the original. Kyongsong (Keijō) is the hub of the railway network, principal lines to northeast, northwest, southeast, and southwest radiating from it (FIGURE VII - 54).

There are only a few stretches of hard-surfaced road, mainly between important cities and their ports. Other principal roads are all-weather, stone-based or stone-topped, and vary considerably in width. The most important through roads follow the same general routes as major railways. Most of the principal roads serve mainly as feeders to the railways. Improvement of the roads during the last 10 years has been mainly for military reasons.

Shipping has been important in both the peacetime and wartime economies. The steamship service between southern Korea and Japan is, in effect, an extension of the land transportation systems of the 2 countries. This service has been operated chiefly by the Japanese Government Railways. Wartime shipping shortages and the vulnerability of sea routes have somewhat curtailed the use of water transportation between China, Manchuria, and Japan, and land routes have been forced to bear some of the traffic. Local coastal trade, carried chiefly by junks and small motor vessels, is still significant. Facilities of the principal ports have been considerably improved during recent years, primarily to serve Japanese shipping. The chief ports of the northeast, Unggi (Yūki), Najin (Rashin), and Ch'ongjin (Seishin), have received a considerable impetus during the war because of their relation to Japanese-Manchurian traffic. Pusan has continued to be the most important port in the south, although several alternative ports have developed because of the increased shipping load across the straits (FIGURE VII - 54). River navigation has not been important, as there are few navigable rivers. Only one river on the east coast, the Tuman-gang (Tōman-kō), and one along the south coast, the Naktong-gang (Rakutō-kō), are navigable for any appreciable distance inland. Because of the nature of the terrain, rivers emptying along the west coast are longer and are more suitable for navigation. The most important of these rivers is the Yalu (Amnok-kang) (Oryoku-kō).

B. Telecommunications.

Korea's telecommunications facilities are used primarily to further Japan's political and economic control of the country. Radio, especially aviation and point-to-point radiotelegraph, is used extensively. Telegraph and telephone networks reach all parts of Korea, but public use has been subordinated to official and military needs. Landings of submarine telegraph and telephone cables, connecting Korea and Japan proper, are concentrated in the vicinity of Pusan.

Radiobroadcasting consists of censored news and propaganda in both Japanese and Korean. Most programs originate in either Kyongsong or in Japan, and are rebroadcast by other stations

in Korea. Shortwave reception is prohibited, and home sets capable of receiving domestic long wave broadcasts are licensed. Radiotelegraph is used not only between stations in Korea, but also to supplement overland or submarine telegraph circuits with Manchuria, North China, and Japan. It is also important in aviation and navigation. Radiotelephone has been developed primarily in connection with commercial and military aviation.

Telegraph lines extend throughout Korea, and most telegraph offices are located at post offices. Through-telegraph service links Korea to Manchuria and China and via cable or radio to Japan. A serious shortage of equipment has caused drastic curtailment of all but urgent wartime messages.

Korea's telephone network extends to all parts of the country, and virtually every town and village has at least 1 telephone. Public use of telephones, however, is very limited; there is only 1 telephone to every 400 people. The network is used primarily for police and border patrol stations. Through-telephone circuits connect Korea with Japan, Manchuria, and north China. Some of the trunk lines have been placed underground. A serious shortage of telephone equipment has existed for years, and priority for service is based on the applicants importance to the war effort.

Korea and Japan are connected by at least 10 submarine telegraph or telephone cables. Landings are in the vicinity of Pusan, Korea, and near Shimonoseki and Fukuoka in Japan. Several of the cables were laid via Tsushima and Iki. Radiotelephone and radiotelegraph supplement or substitute for these cables.

71. *Railroads*

A. General.

The geographic position of the Korean Peninsula gives it vital importance as a bridge for rail transport between Japan and the Asiatic mainland. The pattern of the railroads, which were originally built for strategic purposes, is, consequently, predominantly north – south, reflecting the country's transit function. In recent years, as Korean resources have been developed, branch lines have been built from the main north – south arteries to industrial and agricultural regions. The total route mileage in 1941 was 4,213.

Owing to the shipping shortage and increased transportation requirements since the outbreak of war, the Japanese have had to make much more extensive use of the main railway lines of Korea. They have instituted plans for extensive double-tracking of these lines, which involve increased budget appropriations, the allocation of men and materials, and the movement to Korea of equipment of the South Manchuria Railway Company. Restrictions have been imposed on passenger traffic and light freight.

The heaviest volume of railway traffic in Korea moves over the Mukden – An-tung – Pusan (Fusan) line; any disruption of this route would seriously hinder the movement of goods between Japan and the continent.

B. Pattern.

(1) Route pattern.

The 2 main routes follow the east and west coasts (FIGURES VII - 53 and VII - 54). The key double-track line runs the length of the peninsula along the west coast, connecting the southern port of Pusan and the commercial and industrial centers of Kyongsong (Keijō) and P'yongyang (Heijō) with An-tung and Mukden in Manchuria. The east coast line extends north from the port of Wonsan (Genzan) and links the industrial area of Hamhung (Kankō) and Hungnam (Kōnan), and the northern ports of Ch'ongjin (Seishin) and Najin (Rashin) with the eastern Manchurian railroads. An extension of the east coast line south of Wonsan has been under construction for some years.

Only 2 railroad lines have been built across the peninsula over the mountain backbone, the first from Kyongsong, northeast to Wonsan and the other east from P'yongyang to Kowon (Kogen), north of Wonsan.

Alternate lines have been built for portions of the double-track main line. The Chongju – Sup'ung-dong (Teishū – Suihōdō) line and the Sunch'on – Manp'ojin (Junsen – Mampochin) line are alternates for the P'yongyang – Sinuiju (Heijō – Shingishū) section into Manchuria. In 1941 opening ceremonies were held for the Kyongsong – Andong – Pusan line, the alternate for the Kyongsong – Pusan main line, and the line was reported open to regular traffic in 1942.

The Kyongsong – P'yongyang section, which is without an alternate, is highly vulnerable because of its vital bridges and numerous tunnels. Northbound traffic could be routed over the Kyongsong – Wonsan line to Ch'ang-ch'un (Hsin-ch'ing), Manchuria, but would increase the strain already placed on the North Korean lines by traffic through Ch'ongjin (Seishin) and Najin (Rashin). Southbound traffic could be routed across the peninsula on the P'yongyang – Wonsan line and out of the North Korean ports. The capacity of these single-track alternates, however, is limited by mountainous terrain, steep grades, and sharp curves, and is only a fraction of that of the main line.

(2) Significance of routes.

Formerly, transit traffic between Japan and Manchuria passed mainly through North Korean ports; goods destined for and originating in Korea were generally routed via Pusan. The Pusan – Manchuria – North China line carried mainly intra-Korea and Korea – Manchuria freight; more recently it has absorbed a portion of the tonnage formerly shipped by water and, in so doing, has supplemented local traffic by transit traffic. Coal and iron ore from North China and the Tungpien-tao region of Manchuria, southeast of Mukden, travel toward Japan along this and auxiliary lines in western Korea. The rice of western Korea also moves to ports on this line. Into and through Korea, the Pusan – An-tung line carries principally processed goods from Japan. The function of this line and its west coast branches is, therefore, mainly commercial.

The North Korean lines have maintained their original transit function, although they have assumed more intra-Korean traffic with the connection from east to west provided by the recently finished P'yongwon line (Wonsan to P'yongyang). Their primary use is still, however, the transportation of agricultural and lumber products from North Manchuria to Japan and the handling of processed goods in transit from the western Japanese ports to Manchuria. This traffic moves mainly through Ch'ongjin along the Ch'onghoe line to T'umen. Supplementing the commercial transit traffic, the Najin – T'u-men section has been developed as an important carrier

of military supplies. During the years 1940-1944 Najin was being expanded as a military port amid great secrecy. Military goods, including railroad equipment, were destined not only for China through Manchuria, but for the highly important military concentrations in eastern and northeastern Manchuria. After the initial supply, the movement of army supplies to these latter areas would fluctuate, but the main emphasis still appears to be on strategic traffic to China. The capacity of Najin port has been shown to be only slightly under that of Pusan. The Najin – T'u-men area has been the subject of keen military attention, and the railroad has probably been constantly improved.

(3) Lines and mileages.

TABLES VII - 1 and VII - 2 show the government and private lines in Korea, with their mileage and gauge as they existed in 1941. In addition, the tables show lines constructed since 1941, or under construction at last report. The status of some of these new lines is uncertain, much of the information being derived from the reports of returned residents and travellers. In the absence of confirmatory evidence construction has been assumed to be incomplete.

TABLE VII - 1

KOREA, GOVERNMENT RAILWAY LINES, 1941

(Standard gauge – 4'8½", except those marked ‡ which are 2'6")

TERMINI	LINE NAME	MILEAGE	REFERENCE TO SUBTOPIC FOR DESCRIPTION
Principal Trunk Lines			
KYONGSONG – SINUIJU (Keijō – Shingishū)	KYONGUI (Keigi)	310.3	K (1)
PUSAN – KYONGSONG, via Taejon (Fusan – Keijō, via Taiden)	KYONGBU (Keifu)	279.9	K (2)
KYONGSONG – KYONGJU (Keijō – Keishū)	KYONGKYONG (Keikei)	228.6	K (3)
*KYONGSONG – WONSAN (Keijō – Genzan)	KYONGWON (Keigen)	139.0	K (6)
WONSAN – SUSONG (Genzan – Yujō)	HAMKYONG (Kenkei)	331.1	K (7)
SOP'O – KOWON (P'YONGYANG – WONSAN) (Seiho – Kōgen [Heijō – Genzan])	P'YONGWON (Heigen)	131.8	K (8)
TU'MEN – NAJIN (T'u-men – Rashin) (North Korea Lines)	TUMAN (Tomon)	101.0	K (10)
NAMYANG – CH'ONGJIN (Nonyō – Seishin) (North Korea Lines)	CH'ONGHOE (Seikai)	105.6	K (10)
Secondary and Connecting Lines			
Northwest Korea			
‡SINANJU – KAECH'ON (Shin-anshū – Kaisen)	KAECH'ON (Kaisen)	18.2	K (1)
P'YONGYANG – CHINNAMP'O (Heijō – Chinnampo)	PYONGNAM (Heinan)	34.3	K (1)
TAEDONG-GANG (Stn.) – SUNGHO-RI (Daidō-kō – Shōko-ri)	PYONGYANG (Heijō)	14.5	K (1)
HWANGJU – KYOMIP'O (Kōshū – Kenjiho)	KYOMIP'O (Kenjiho)	8.1	K (1)
SUNCH'ON – MANP'OJIN (Junsen – Mampochin)	MANP'O (Mampo)	185.9	K (9)
Central Korea			
YONGDUNGP'O – INCH'ON (Eitōhō – Jinsen)	KYONGIN (Keijin)	19.2	K (2)
*KYONGSONG – CH'UNCH'ON (Keijō – Shunsen)	KYONGCH'UN	40.4	K (2)
ANBYON – PUSAN (Ampen – Fusan)	TONGHAI (Tokai)	(340.0) 174.0 open	K (6)
KUMCH'ON – ANDONG (Kinsen – Antō)	KYONGPUK	73.6	K (2)

TABLE VII - 1 *Continued*

TERMINI	LINE NAME	MILEAGE	REFERENCE TO SUBTOPIC FOR DESCRIPTION
Southeast Korea			
TAEGU – YONGCH'ON (Taikyū – Eisen)	TAEGU (Taikyū)	23.9	K (2)
SAMNANGJIN – CHINJU (Sanrōshin – Shinshū)	KYONGCH'ON SOUTH (Keizen South)	68.4	K (2)
CH'ANGWON – CHINHAE (Shōgen – Chinkai)	CHINHAE (Chinkai)	12.7	K (4)
Southwest Korea			
TAEJON – MOKP'O (Taiden – Moppo)	HONAM (Kōnan)	162.1	K (4)
I-RI – YOSU (Ri-ri – Reisui)	CHOLLA (Zenra)	123.9	K (5)
I-RI – KUNSAN (Ri-ri – Gunzan)	KUNSAN (Gunzan)	15.3	K (4)
SUNCH'ON – SONGJONG-NI (Junten – Shōtei-ri)	KYONGCH'ON WEST (Keizen West)	83.6	K (4)
HWANJU – TAMYANG (Kōshū – Tanyō)	KWANJU (Kōshū)	13.5	K (5)
Northeast Korea			
‡HOERYONG – SHINKEIRIN (Kainei – Shinkeirin)	HOERYONG (Kainei)	7.2	K (10)
KILCHU – HYESANJIN (Kisshū – Keizanchin)	HYESAN (Keizan)	87.9	K (7)
‡PAEGAM – YONSA (Hakugan – Ensha)	PAEMU (Hakumo)	84.8	K (7)
Minor Branch Lines Not Listed		202.2	
TOTAL GOVERNMENT LINES 1941		3,081.0	
Lines completed since 1941			
SAKCHU – PYOKTONG (Sakushū – Hekidō)		45.0	K (1)
Lines under construction, possibly completed. Mileage estimated			
CHINJU – SUNCH'ON (Shinshū – Junten)	KYONGCH'ON	40.0	K (4)
YANGYANG – P'OHANG-DONG (Jōyō – Hokō-dō)	TONGHAI	166.0	K (6)
YONSA – MUSAN (Ensha – Mosan)	PAEMU	30.0	K (7)
CH'ONGJIN – NAJIN (Seishin – Rashin)		50.0	K (10)
SINDAE-RI – LIN-CHIANG (MANCHURIA) (Shindae-ri – Lin-chiang)		110.0	K (10)
TOTAL		3,522.0	

* Electrified. (see text)

‡ Narrow-gauge (2'6"). All of these lines have subsequently been changed to standard gauge.

TABLE VII - 2

KOREA, PRIVATE RAILWAY LINES

TERMINI	GAUGE STANDARD 4'8¼", NARROW 2'6"	MILEAGE	REFERENCE TO SUBTOPIC FOR DESCRIPTION.
Northwest Korea			
†SINUIJU – TAEDASA-DO (Shingishū – Daitasa-tō)	Standard	24.5	K (1)
†YANGSI – NAMSI-DONG (Yōshi – Nanshi-dō)	Standard	10.9	K (1)
CHONGJU – SUP'UNG-DONG (Hei-Hoku Tetsudo) (Teishū - Suihō-do)	Standard	78.9	K (1)
†TOKCH'ON – SUNGHO-RI (Tokusen – Shōko-ri)	Standard	75.0	K (1)
†CHINNAMP'O – YONGGANG (Chinnampo – Ryūkō)	Standard	21.6	K (1)

TABLE VII - 2 *Continued*

TERMINI	GAUGE STANDARD 4'8½" NARROW 2'6"	MILEAGE	REFERENCE TO SUBTOPIC FOR DESCRIPTION
Central Korea			
†HWANGHAI LINES T'osong-ni – Ongjin; Haeju – Sariwon; Sanghai-ri – Changyon. (Dojō-ri – Ōshin; Kaishū – Shariin; Jokai-ri – Chōen)	Narrow	177.7	K (1)
INCH'ON – YOJU (Jinsen – Reishū)	Narrow	77.9	K (2)
CH'ONAN – CHANG-HOWON-NI (Tenan – Chōkoin-ri)	Standard	43.4	K (2)
CH'ONAN – CHANG-HANG-NI (Tenan – Chōkō-ri)	Standard	89.6	K (2)
CHOCH'IWON – CH'UNGJU (Chōchiin – Chūshū)	Standard	58.4	K (2)
†*CH'ORWON – KACH'ON-NI /NAE KUMKANG (Tetsugen – Kasen-ri /Uchi-kongō)	Standard	72.5	K (6)
Northeast Korea			
*YOHAEJIN – SINBOKCHANG (Jokaishin – Shinfukujō)	Narrow	48.0	K (7)
TANCH'ON – P'UNGSAN (Tansen – Hōzan)	Narrow	51.1	K (7)
SINHUNG LINES (SHINKŌ) †Hamhung – Sindae-ri (Kankō – Shindae-ri) Oro-ri – Pujonhoban (Goro-ri – Fusenkohan)	Narrow	121.1	K (7)
†MUSAN – KŌMUSAN (Mosan – Komosan)	Standard	38.7	K (10)
TOTAL PRIVATE LINES 1941 (including minor lines not listed)		1,132	
Lines constructed since 1941 Mileage estimated			
Branching from P'YONGNAM Line			
P'UNGSAN – KIYANG – OI-RI (Hōzan – Kiyō – Uji-ri)	Narrow	12.0	K (1)
MINING LINES	Narrow	12.0	K (1)
Branching from HYESAN Line			
HYESANJIN – SOBAEK-SAN (Keizanchin – Shōhaku-san)	Narrow	45.0	K (7)
Branching from MANP'O Line			
MYOHYANG – PUKCHIN (Myōkō – Hokuchin)	Narrow	30.0	K (9)
†KANGGYE – HUCH'ANG (Kōkai – Kōshō)	Standard	30.0	K (9)
Branching from Manchurian Border			
HUJUGOUP – (Lumber camp) (Kōshūkoyū)	Narrow	25.0	
Projected 1941, possibly completed			
CH'UNGJU – YONGWOL (Chūshū – Neietsu)	Standard	45.0	K (2)
CHANGHOWON-NI – WONJU (Chōkoin-ri – Genshū)	Standard	25.0	K (2)
TOTAL		1,356.0	

* Electrified.

† Purchased by Government Railways by 1943 or planned to be purchased in 1943. Most of the narrow-gauge lines in this category have been converted to standard-gauge since 1941.

C. Administration.

(1) Ownership and control.

The first Korean railroad (Kyongsong to Inch'on) was built in 1899 by a private company, but subsequent railroad construction has been a government enterprise. The majority of the lines have been built directly by the Government-General, and private companies which have built railroad lines have done so subject to government approval, subsidy, and control. The Japanese War Department built the first through line, the Pusan-Sinuiju line, during the Russo-Japanese War in 1905-06. After annexation and the establishment of the Chōsen Government-General in 1910, the Governors-General were appointed from high military and naval ranks, keeping the government of Korea essentially military. The Chief of the Railroad Bureau is appointed by the Governor-General, and the operations of the railroads are patently dictated by the military.

In 1941, 26% of the line mileage was privately owned. Since that time, however, all reports have indicated that the government has been carrying on an extensive program of purchasing private lines. Many former branch lines have been extended to become connecting links in an increasingly unified state-owned network. Including even the new construction undertaken by private companies since 1941, it is probable that less than 20% of the total mileage is now privately owned, and that which is under private management is also under the close control of the Railway Bureau.

There is a certain amount of supervision of the Railway Bureau of Korea by the Department of Railways of Japan. This applies mainly to operation and management. Policy decisions relating to new construction, however, stem directly from the Governor-General and the Japanese War Department.

The North Korean lines were leased in 1933 to the South Manchuria Railway Company under a 20-year contract, whereby the lines were to remain under the ownership of the Chōsen Government-General. These lines included the Ch'onghoe line from Ch'ongjin to Namyang-dong (Nanyō-dō), and the Tuman line from Najin to T'u-men. Management of the ports of Ch'ongjin and Najin was later added.

(2) Organization.

On 19 October 1943 a reorganization of the Government-General went into effect. Under the new structure the Railway Bureau was combined with Maritime and Customs Affairs to form a Communications Bureau. The meaning of the reorganization is not wholly clear. It is reported that the local bureaus of railway, maritime and customs have also been joined, but the details of local structure are not known. For purposes of clarity, this discussion will deal with the structure of the Railway Bureau before October 1943. It is possible that offices and appointments have remained substantially the same.

The Railway Bureau with its offices at Kyongsong was divided territorially into 3 regions, each regional director being responsible to the chief of the Railway Bureau with regional offices at Kyongsong, Pusan, and Hamhung. The Railway Bureau was also divided functionally into 9 departments, this division carrying down to the regional offices. The departments were as follows:

General affairs
Supervisory
Operation
Traffic
Maintenance of ways and works
Construction
Engineering, mechanical and electrical
Locomotives and rolling stock
Accounts

There is a railway training school which is in a separate category under the Central Railway Bureau, and is presumably located at Kyongsong.

The 3 regional bureaus maintain railway offices in the following cities within their regions:

Kyongsong Regional Railway Bureau
- Kyongsong
- P'yongyang
- Kanggye (Kōkai)

Pusan Regional Railway Bureau
- Pusan
- Taejon (Taiden)
- Sunch'on (Junsen)

Hamhung Regional Railway Bureau
- Wonsan
- Songjin (Jōshin)
- Ch'ongjin

A railway hospital is maintained at Kyongsong, under the direction of the Kyongsong Regional Bureau.

• The Korean Railway Bureau operates no shipping lines. All steamers between Japan and Korea are under the management of the Japanese Department of Railways. As an adjunct to the railroad business, however, the Railway Bureau operates an extensive hotel system. The hotels are usually in the upper stories of the main station buildings.

(3) Personnel.

The personnel in 1934 was 16,400, and in 1940 was 20,900, divided approximately as follows:

	1934	1940
High officials	85	100
Chief officials	1,615	2,000
Clerical	3,700	4,500
Technicians and laborers	11,000	14,000
Total	16,400	20,900

The chief officials include foremen in shops and section gangs, station masters, and office managers. The Japanese hold all high offices and responsible positions in all departments, Koreans being employed for minor clerical work and as technicians and hand laborers. Training in the Government Railways schools, established in 1919, was thorough, although the number of students was small.

D. Track and right-of-way.

(1) Track.

The complete mileage of double-track in Korea is not actually known. On the line from Pusan to Sinuiju (590.2 miles) the Kyongbu section (279.9 miles) is completely double-tracked, and on the Kyongui section double-tracking may be almost completed. From latest reports, some portions just south of Sinuiju are still single-track, although a few bridges have been duplicated. Other duplicate bridges had piers and approaches built by March 1943. The branch line from Kyongsong to Inch'on has been stated to be double-track, but aerial photographs indicate that it is probably only single-track, with roadbed laid for double-track. Some sections of the Ch'onghoe and Tuman lines notably between Sangsambong and Hoeryong, are double-track. In view of the military importance of the Tuman line, it is possible that its double-tracking has been completed. As far as is known, the only multiple track is in the section between Kyongsong and Yongdungp'o. All other lines in Korea are single-track.

FIGURE VII - 1. *Kyongsong Station.*
Hotel in upper story. 1930.

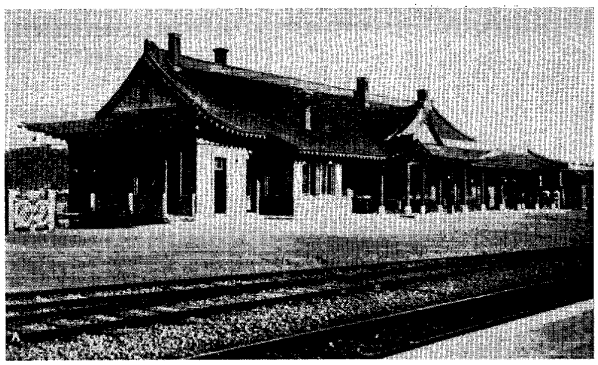


FIGURE VII - 2. *P'yongyang (Heijō) Station.*
Example of Korean station architecture. 1935.

On the single-track portions of the main line, passing sidings are generally spaced at distances of about 3 miles. On other single-track lines there are passing sidings at each station, or, where stations are infrequent, generally not more than 7 or 8 miles apart. Sidings at stations are reported to accommodate 20 to 25 cars, which is ample for the reported train lengths of 10 to 20 cars on single-track lines.

Passenger stations in larger cities are modern buildings of which the upper stories are generally hotels (FIGURE VII - 1). In smaller cities, they are of Korean architecture and limited layout (FIGURE VII - 2). Platforms are usually slightly above rail level.

Warehouses and freight terminal facilities are located at all large stations. Those with the most extensive warehousing facilities are Pusan station, Taejon, Kyongsong (Yongsan station), P'yongyang station, Sinuiju (along the docks), Wonsan station, and in the freight yard areas of Ch'ongjin and Najin.

(2) Gauge.

The standard gauge of the government lines is 4′ 8½″. There is a small mileage of 2′ 6″ gauge, mostly privately owned. The following tabulation shows the gauges and total mileages of government and private lines in 1941; data for individual lines are given in TABLES VII - 1 and VII - 2.

	MILES		TOTAL
	4′8½″	2′6″	
Government lines	2,913	168	3,081
Private lines	600	532	1,132
Total	3,513	700	4,213

Most of the narrow-gauge private lines purchased by the government have been changed to standard-gauge. It is probable that at present, therefore, there are not more than 400 to 500 miles of 2′ 6″ gauge. City and suburban tramways, of which there were 56.4 miles in 1941, are of 3′6″ gauge.

(3) Gradient and curvature.

On the trunk lines, Kyongbu and Kyongui, maximum gradient is reported to be 1%, and on branch lines 1.6%. In the mountainous areas, however, it is highly probable that steeper grades are the rule. On the Manp'o line, through Kuhyon-lyong (Kōken-rei) pass, the ruling grade is 3.3%, with similar conditions reported on the newly constructed Kyongkyong line. There are probably even steeper gradients at some points.

Curves on the Pusan-Sinuiju line are reported to be not under 1,500-foot radius. On the rest of the Government standard-gauge lines the minimum curvature is stated to be 1,000-foot radius except at Musan pass, where the horseshoe curve is of 858-foot radius. Minimum radius of curves on the 2′ 6″ gauge lines is reported to be 131 feet. The lines in northern Korea are said to have many and sharp curves.

(4) Roadbed and ballast.

On the main trunk lines the roadbed is well-built and maintained to a high standard (FIGURE VII - 3). Inspection is frequent and thorough. Although mechanical equipment is scarce, section gangs of Korean laborers under Japanese foremen are numerous and apparently well-trained. Washouts occur on the newer lines, but of recent years the Japanese have been working to alleviate this condition by flood control. Cuts are well sodded and drained, and are frequently faced with stone blocks beyond ordinary operational necessity. Subgrade embankments through level terrain are generally 3 to 4 feet high.

Ballast on the main lines is crushed rock of one size, but on the more recently constructed lines river and creek gravel is used, some of which has been screened.

(5) Ties.

The standard dimensions of ties are 8 feet by 6 inches by 8 inches. Spacing varies between 2 and 3 feet, 2,000 to 2,700 per mile. Switch ties are generally 7 inches by 9 inches with length and spacing depending on axle load conditions.

Ties are made of an assortment of locally-procured hardwoods, Japanese hardwoods and Japanese red oak. On the main double-track line they are creosoted, but ties on the remainder of the Korean lines are probably not treated.

(6) Rails.

The flat-bottomed rail is standard. On the main government lines the standard rail was formerly 33 feet long, weighing 75 pounds per yard, but many of these have been replaced with 100-pound rails of 40-foot length. On the standard-gauge branch lines, weights vary from 45 to 60 pounds. The normal weight of rail on the narrow-gauge lines (2′ 6″) is 33 pounds, although the range is from 22 to 45 pounds. Electric tramways are reported to be using the 60-pound rail.

Rails are attached directly to ties by either screw or dog spikes. Joints are secured by 6-hole fish-plates on the main lines and by 4-hole fish-plates on others.

(7) Signals.

Train operation follows the Japanese tablet block system. Sectional route locking is used where movements are particularly frequent. Semi-automatic signals, some of which are color lights, are used on the trunk lines (FIGURE VII - 4), and hand-operated signals at stations on branch lines.

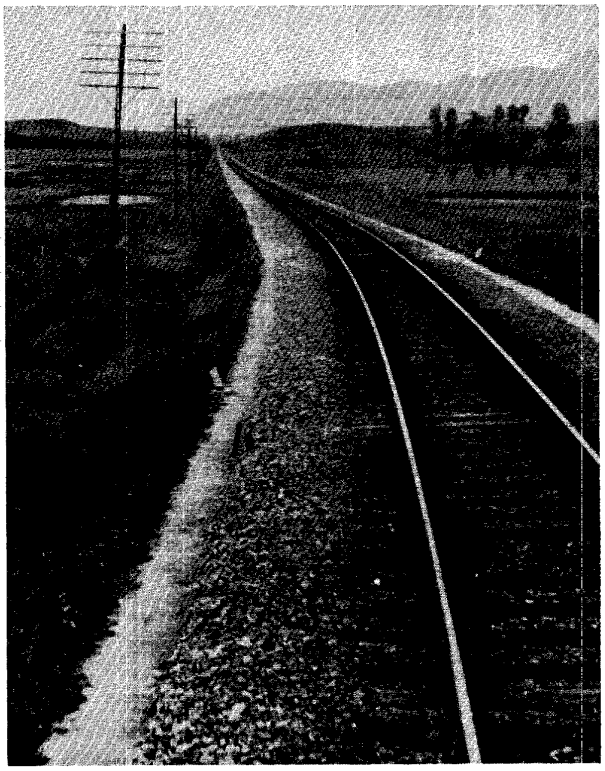


FIGURE VII - 3. *Korea Government Railway between Kyongsong (Keijō) and Pusan (Fusan).*
Roadbed of main Kyongbu line. 1937.

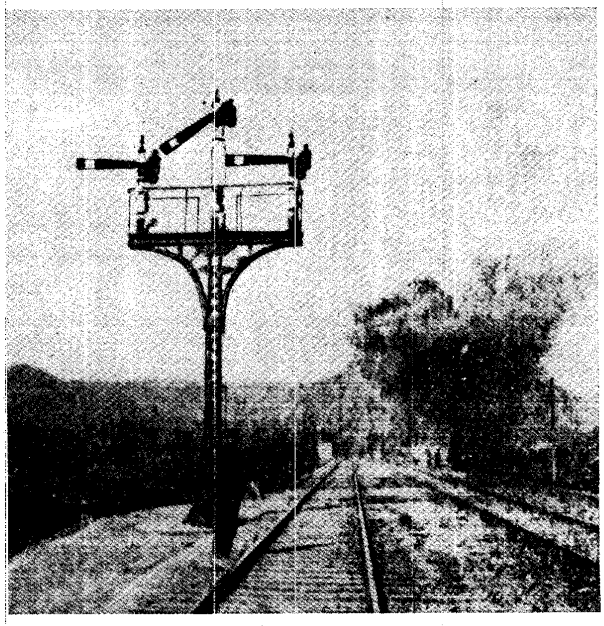


FIGURE VII - 4. *Kyongsong (Keijō).*
Signal standard and semaphores at Kyongsong Station yards, main Kyongui line. 1924.

FIGURE VII - 5. *Yalu River between Sinuiju, Korea and An-tung, Manchuria.*
Steel truss swing bridge. Now paralleled by double-track railroad bridge.

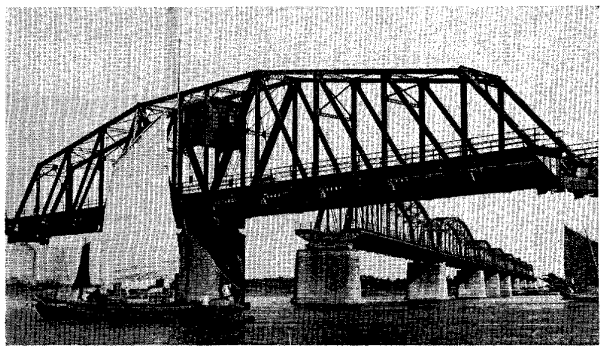


FIGURE VII - 6. *Yalu River bridge between Sinuiju (Shingishū), Korea and An-tung, Manchuria.*
Detail of swing span, 306′ long.

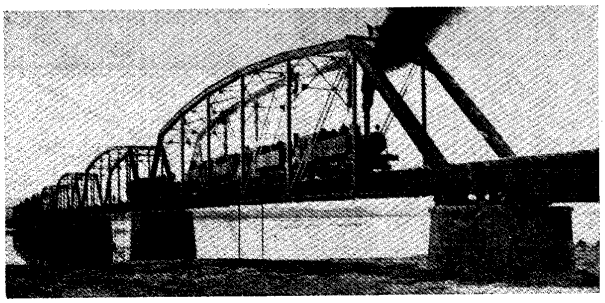


FIGURE VII - 7. *Ch'ongch'on-gang between Sinanju and Maengjung-dong.*
Single-track railroad bridge on Kyongui line. Piers and approaches built by 1943 for parallel bridge.

(8) Electrification.

Excluding the tramways, about 210 miles of railway lines are electrified. The first electric railways, the Diamond Mountain Railway Company (Ch'orwon to Naekumgang and Kach'on-ni and the line from Yohaejin to Sinbokchang (Jokaishin to Shinfukujo), were both built by private companies. About 1940 the Railway Bureau began electrification on the Kyongwon line, presumably in the mountainous area between Sep'o-ri and Sin'gosan. The Kyongch'un line is claimed by one source to be electrified, but this report has not been verified.

The city tramways in Pusan, Kyongsong and P'yongyang are electrified, and use the trolley system (FIGURE VII - 18). They are principally for city and suburban passenger commuters. There are some 15 to 20 miles of lines classed as tramways in the Pusan vicinity, which carry freight and use steam power.

E. Bridges.

Railway bridges are of permanent construction, well-built and generally of steel (truss or plate girder type) on masonry or reinforced concrete piers and abutments. Because of inadequate flood control, bridges in rugged terrain may be washed out by flash floods during the rainy season of July and August. In most cases where rail lines cross large rivers, a second bridge has been built, even when the line is single-track. In the latter case the track divides about ½ mile from either end of the bridges. The earlier duplicate bridges were built as "twins," close to the original structure, as at Kyongsong. More recently, the duplicate bridges have been built at a distance of about 100 yards or more; by thus making 2 separate targets, their vulnerability is reduced.

Most of the larger railroad bridges are composed of multiple steel spans of either 200 feet, 60 feet, or a combination of both lengths. Apparently the design for the 200-foot spans is a standardized 7-panel through Parker truss, and the 60-foot spans are deck plate girders (FIGURES VII - 5 through VII - 11).

The more important bridges are guarded both by patrol boats on the river below and by guardhouses built on the bridge approaches.

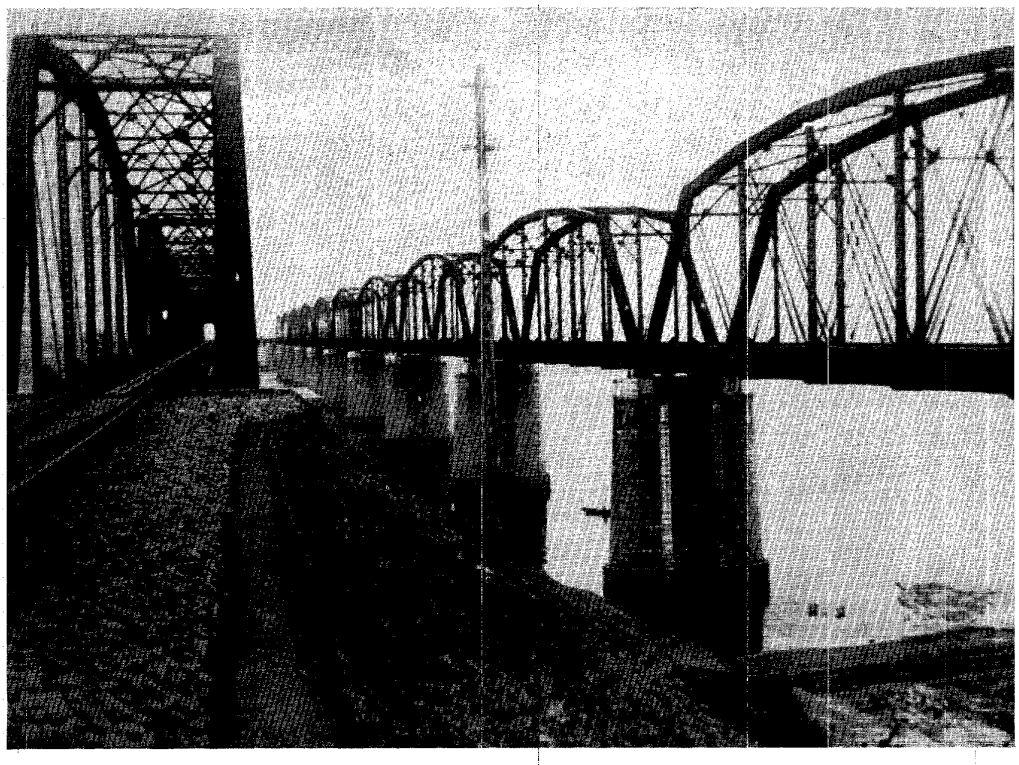


FIGURE VII - 8. *Han-gang at Kyongsong (Keijō).*
Duplicate single-track railroad bridges on main Kyongbu line. Now paralleled by double-track bridge.

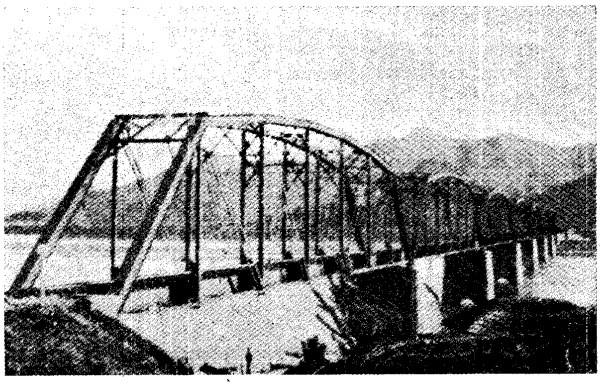


FIGURE VII - 9. *Naktong-gang at Waegwan.*
Single-track railroad bridge, now paralleled by second single-track bridge.

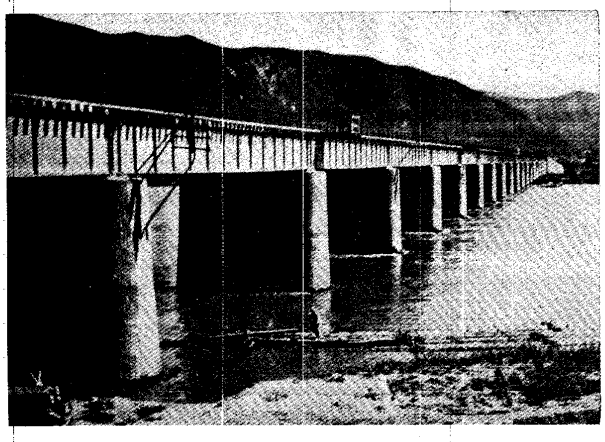


FIGURE VII - 10. *Tuman-gang between Namyang, Korea and T'u-men, Manchuria.*
Plate deck girder bridge.

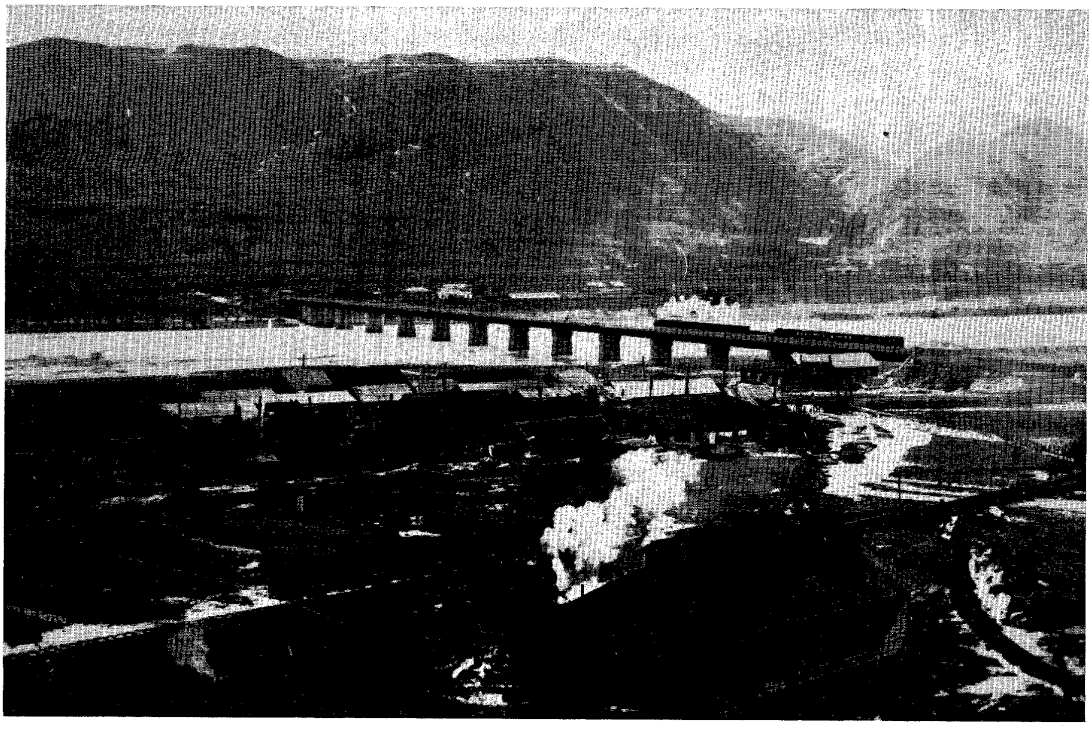


FIGURE VII - 11. *Tuman-gang Bridge.*
Half railroad and half road bridge, believed to be at Sangsambong (Kamisanbo). 1935.

TABLE VII - 3
SELECTED BRIDGES IN KOREA

LINE	ROUTE	RIVER	LOCATION	LENGTH (IN FEET)	NO. AND LENGTH OF SPANS (FEET)	STRUCTURAL FEATURES	REMARKS
Kyongui	A	Yalu	Between An-tung, Manchuria and Sinuiju, Korea.	3097	6x200 6x300	Steel truss on masonry piers. Swing span in center, 306′.	Two parallel bridges. Second bridge recently completed, reportedly doubletracked. Old bridge is 36′ wide, with path 10′ wide for pedestrians. Floodlighted at night, with antiaircraft searchlights. Guards on bridge patrol boats on river below. (FIGURES VII - 5, VII - 6, and II - 76).
Kyongui	A	Samgyo-ch'on	Just S of Paengma	1236	19x60	Plate	
Kyongui	A	Taeryong-gang	Immediately NW of Maengjung-dong.	1643	7x200 3x60	Truss. Plate. Granite masonry piers.	Single track. Piers and approach to second bridge about 500′ down stream constructed by early 1943.
Kyongui	A	Ch'ongch'on gang	Between Sinanju and Maengjung-dong.	2582	9x200 11x60	Truss. Plate. Granite masonry piers.	Single track. About 250′ upstream, piers and approach for second bridge constructed by early 1943. Old bridge recently reinforced. (FIGURE VII - 7).
Kyongui	A	Taedong-gang	P'yongyang	North bridge 1436 South bridge 1502	6x200 3x60 6x200 4x60	Truss. Plate. Truss. Plate.	Railroad crosses river by use of island, making two consecutive bridges, single-track. Paralleled by duplicate bridges. Steep river bank, swift current. Guard houses, patrol boats on river.
Kyongui	A	Yesong-gang	About 20 mi. N of Kaesong.	—	5-span		Single-track. Reported duplicate bridge paralleling.
Kyongui	A	Imjin-gang	Between Kaesong and Kyongsong (Keijō) (Seoul)	1786	8x200 2x60	Truss. Plate.	Single-track.

TABLE VII - 3 *Continued*

LINE	ROUTE	RIVER	LOCATION	LENGTH (IN FEET)	NO. AND LENGTH OF SPANS (FEET)	STRUCTURAL FEATURES	REMARKS
Kyongbu	A-1	Han-gang	Kyongsong (Keijō) (Seoul)	2067	10x203	Truss. Masonry piers.	Two parallel bridges, single-track, about 50 feet apart. Steep banks to river, swift current. Third bridge, parallel, about 100 feet downstream (west). Double-track. Same construction (FIGURE VII - 8).
Kyongbu	A-1	Naktong-gang	At Waegwan about 20 mi. N of Taegu.	1544	7x200 2x40	Truss. Plate.	Two parallel single-track bridges (FIGURE VII - 9).
Kyongbu	A-1	Kumho-gang	About 3 mi. N of Taegu.	1167	11x60 10x40	Plate deck. Plate deck.	
Kyongbu	A-1	Miryang-gang	Miryang, N of Samnangjin.	1928	24x60 8x40	Plate deck. Plate deck.	
Kyongch'on	F	Naktong-gang	Just S of Samnangjin, about 25 mi. NW of Pusan.	1838	7x200 6x60	Truss. Plate	
Honam	E	Man'gyong-gang	Immediately S of I-ri.	About 500		Deck plate girder.	Single-track. Levee banks at either end of bridge some 20 feet high. River channel not over 50 feet across, so bridge mainly spans cultivated land.
Hamkyong	C	Yonghung-gang	Yonghung (Eikō)	1011	3x200 6x60	Truss. Plate.	
Ch'onghoe	C-1	Tuman-gang	At Sangsambong	About 980	14x70	Deck plate girder. Reinforced concrete piers, 25′ wide, 5′ 10″ thick. Pier foundations on rock, some 15′ below water level.	Half railway and half road. Single-track on upstream side. Nine-foot footwalk on downstream side. Piers reach 25 feet above mean water level. There is some question whether this may be the bridge at Hunyung S of Namyang across the Tuman (FIGURES VII - 11 and II - 28).
Tuman	C-2	Tuman-gang	Between Namyang, Korea and T'u-men, Manchuria.	About 1500	20 spans	Deck plate girder.	Half road and half railway, single-track. As nearly as can be determined from photographs the remarks on Bridge 15 apply to Bridge 16. There has been some confusion about distinction between these two bridges, but from the use of photographs which show legends in Japanese characters on the approaches, it is felt that this present distinction is satisfactorily established (FIGURE VII - 10).

Information on the exact number of bridges is unknown, but as Korea abounds in rivers and streams, bridges are numerous on all lines. TABLE VII - 3 includes only important bridges about which some information is available. Among bridges omitted are those over the Yalu River on the Manp'o line, and over the Tongsongch'on-gang at Hamhung (Kankō) on the Hamkyong line. Photographs show that the Hamhung bridge has about 26 spans, is of truss construction, and is probably about 1,500 to 2,000 feet long. There is no alternative route for this section of line.

F. Tunnels.

Tunnels are numerous on all lines passing through mountainous terrain. On the Manp'o line between Mup'yong-ni (Buhyō-ri) and Manp'ojin one observer counted 22 tunnels in 19 minutes of travel time. There are sections on other lines with frequent tunnels: on the Kyongwon line between Sep'o-ri and Sin'gosan; and on the main Pusan-Sinuiju line, 9 tunnels between Sariwon and Kaesong (70 miles), 8 between Ch'onan and Kumch'on (98 miles), and 8 between Kyongsan and Samnangjin (37 miles).

Tunnels are usually built of glazed or very hard brick impervious to water, or of masonry blocks. Some are of concrete. Approaches to tunnels, generally through long cuts, are well-drained, and faced either with turf or with masonry blocks.

Information on location and lengths of tunnels is incomplete. TABLE VII - 4 probably does not include all the longer tunnels.

TABLE VII - 4

RAILWAY TUNNELS

LINE	ROUTE	TUNNEL NAME	LOCATION	LENGTH (IN FEET)
Kyongbu	A-1	Sonjong (Shōken)	6 mi. S of Kyongsan (Keizan).	3,988
Kyongui	A	Paengma (Hakubō)	Between Sinuiju and Paengma.	1,781
Kyongui	A	Opa-ri (Gyoha)	Between Sukch'on and Sunan, about 28 mi. N of P'yongyang.	1,738
Tuman	C-2	—	Between Najin and Unggi.	Reported to be 12,408 (2.35 mi.)
Pyongwon	D	—	Just east of Sinup (Shinyū).	Reported about 18,500 (3.5 mi.)
Hei Hoku Tetsudo	H	—	3 mi. S of Sup'ung-dong (Suihō-dō).	Reported about 19,500 (3.7 mi.)

G. Locomotives and rolling stock equipment.

The first railways of Korea were built by American engineers, and rolling stock and track materials were for the most part of American manufacture. The principal suppliers were the Baldwin Locomotive Works and the American Car and Foundry Company. For some years, additions to track and equipment were purchased from the United States, but in the last 10 years they have come from Japanese, Korean, and Manchurian shops. These shops have continued the manufacture of Baldwin-type locomotives, and passenger and freight cars patterned on American styles.

All rolling stock is equipped with buck-eye couplings and continuous air brakes of Westinghouse type.

By 1941 all types of rolling stock were apparently in poor condition and in need of modernization and replacement. Since that year an increasing strain has been placed on the already deteriorated equipment by the diversion of freight from sea to land transportation, the increased production of goods for transport both in Korea and in Manchuria, and the fact that additions to rolling stock have probably not kept pace with new construction of track. The locomotive and car mileage has increased. The average age of locomotives and rolling stock is higher than in 1941; much of the equipment has been in use for 20 to 40 years, and repair, rather than retirement and replacement, is the rule.

No statistics on locomotives and rolling stock in use on the railroads in Korea have been published by the Railway Bureau after 1932. In that year the Annual Report of the Department of Railways, Government of Japan, gave facts shown in the following tabulation:

		4' 8½" GAUGE	2' 6" GAUGE	TOTAL
Locomotives		315	31	346
Tank	114			
Tender	201			
Passenger cars		754	75	829
Freight cars		3,444	319	3,763

In the preceding year, 1931, the rolling stock consisted of 333 locomotives, 808 passenger cars, and 3,632 freight cars.

An apparently reliable source estimated the private railways' rolling stock in 1934 as 93 locomotives, 161 passenger cars, 49 gasoline-driven cars, and 834 freight cars.

It has been estimated that 650 locomotives, 2,430 passenger cars, and 7,580 freight cars were required to handle the traffic which is assumed to have been carried on Korean railways in 1943. Korea had at one time depended to some extent on Manchurian production, but during the period 1937-1942 much of the new production of the Manchurian railway shops, as well as existing Manchurian equipment, was sent to North China. It seems probable, therefore, that the stock of locomotives has been increased mainly out of Korean and Japanese production. Although no precise information is available there are indications that Manchurian locomotives and rolling stock run over the Korean railways and vice versa.

(1) Locomotives.

About 30% of the stock in use in Korea on the government railways are tank locomotives, and 70% are tender types. Tank locomotives, which are used for local service and shunting, are reported to be of 2-6-0, 2-6-2, and 4-6-4 classifications. Of the tender-locomotives, the 4-8-2 and 4-6-2 classes are used on fast passenger trains, and 4-6-0, 4-4-0, 2-8-0, and 2-8-2 classes on second-class passenger, freight, and mixed trains. The South Manchuria Railway shops at Dairen supplied the Korean Railways with 4-6-0 locomotives, weighing, with tender, 240,000 pounds, of which 120,000 pounds are on the drivers. These shops also constructed locomotives of the Mikado (2-8-2) and

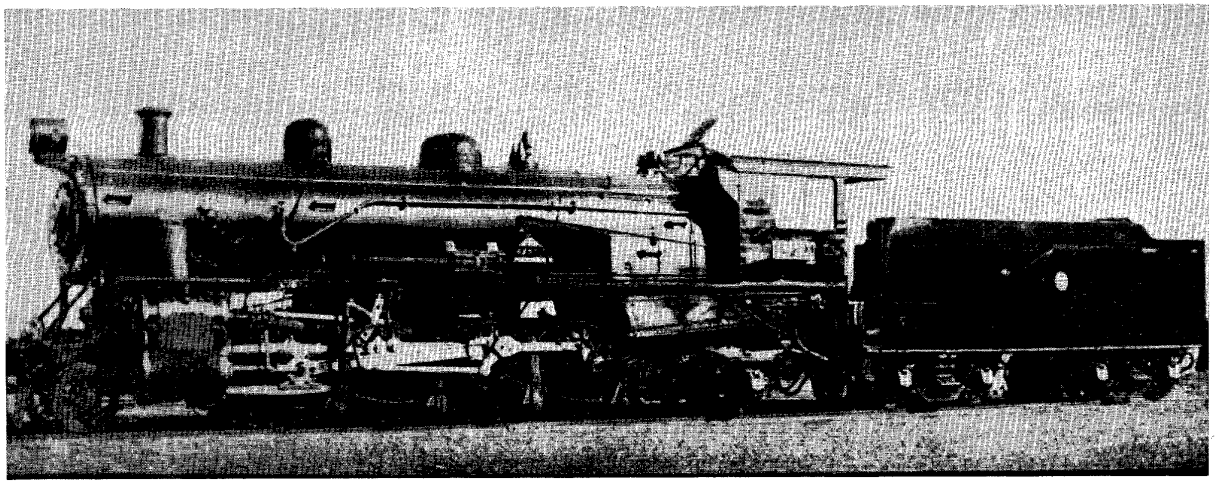


FIGURE VII - 12. *Korea Government Railways.*
Mikado (2-8-2) locomotive, 4'8½" gauge, built by Yongsan (Ryuzan) workshops at Kyongsong.

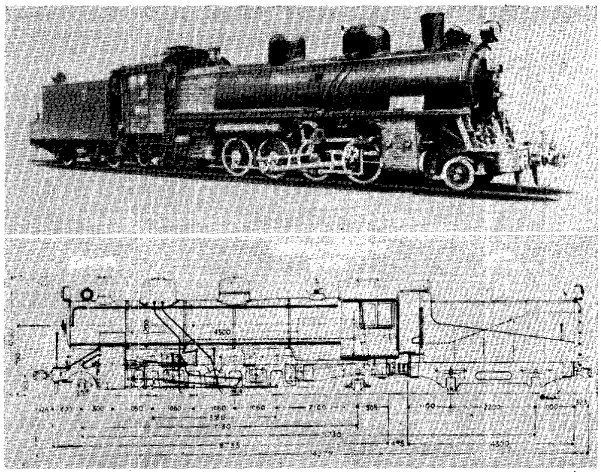


FIGURE VII - 13. *Hwanghae lines.*
Mikado (2-8-2) locomotive, 2'6" gauge, built in Japan. 1938.

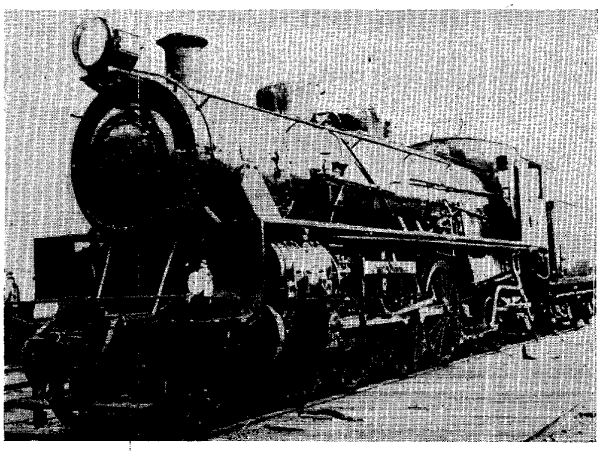


FIGURE VII - 14. *Korea Government Railways.*
Pacific (4-6-2) locomotive, 4'8½" gauge. 1930.

Pacific (4-6-2) types, some of which were probably for Korea. The 2-8-2 class were also built in Korea at the Kyongsong shops. Little information is available on the locomotives in use on the 2' 6" gauge lines but the 2-8-2 type is known to have been employed (FIGURES VII - 12 through VII - 14). Specifications for the Mikado-type locomotive, built for Mitsui and Company, Korea, by the American Locomotive Company, are as follows:

Gauge	4' 8½"
Cylinders	21" x 28"
Steam pressure	200 lbs.
Diameter of drivers	54"
Tractive force	38,800 lbs.
Driving wheel base	15' 0"
Total wheel base	31' 10"
Evaporating heating surface	1,861 sq. ft.
Superheating surface	437 sq. ft.
Grate area	47.5 sq. ft.
Weight on drivers	146,500 lbs.
Weight of engine	202,000 lbs.
Weight of tender	125,800 lbs.
Fuel	Soft coal

FIGURE VII - 15. *Korea Government Railways.*
Second-class passenger car. 1928.

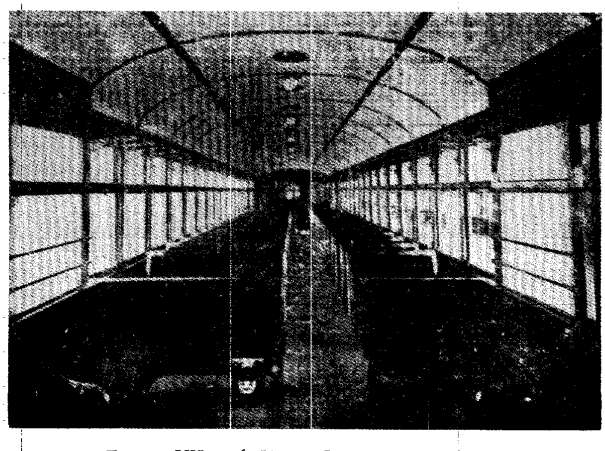


FIGURE VII - 16. *Korea Government Railways.*
Second-class passenger car. 1933.

Two inquiries for new equipment in 1940 give some indication of the types of electric locomotives in use. Locomotives for the Musan Iron Mines were to be 100-ton and 1,500-volt, D.C. An inquiry from the Korean Railway Bureau specified 125-ton electric locomotives, and mentioned catenary suspension electric cables carrying current at 3,000 volts, D.C. Rectifiers were to have 2,000 kilowatts capacity at 3,000 volts.

(2) Passenger cars.

All carriages are of center aisle type, without compartments, and are electrically lighted (FIGURES VII - 15 and VII - 16). They are equipped with 4-wheel trucks. First- and second-class sleeping cars are of American style, but the third-class sleepers, which in 1941 were of English type, have the aisle down one side and 3 tiers of bunks. At last report, there were still first-class sleeping cars on the trunk line, Pusan to Sinuiju, carried on through trains to Manchuria and North China. On all other lines, however, both coach and sleeping car trains are third-class only, with an occasional second-class sleeper for long-distance runs. Luggage and mail vans are separate units.

Third-class coaches are equipped with straight-backed wooden seats and center aisles. They are estimated to have a capacity of 80 to 100 when used as troop cars.

A regulation of the North China Transport Company and the South Manchuria Railway Company, which presumably extends to the Korean railways as well, stated that as of January 1944 the main North China – Mukden – Pusan passenger service would be limited to 2 passenger cars per express train

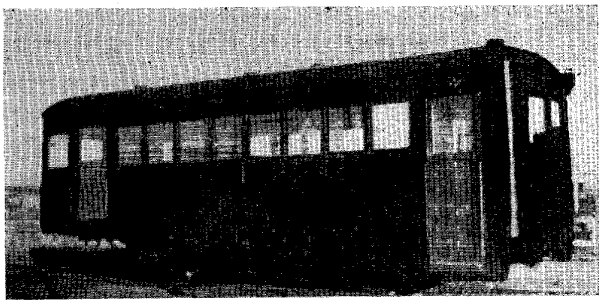


FIGURE VII - 17. *Changhung – Ch'onan – Changhowon-ni private line.* Gasoline-driven car built by Ryuzan Manufacturing Co. for 4'8½" gauge. Motor 68 H.P. Buda, weight 15 tons, seating capacity 53 persons. 1930.

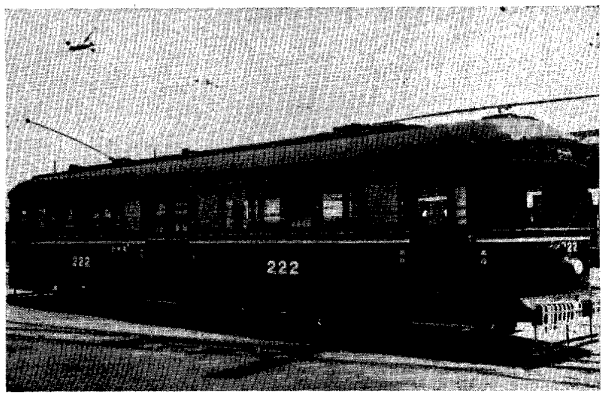


FIGURE VII - 18. *Kyongsong (Keijō) electric railway.* Electric tram car used on 3'6" gauge track. 1937-1938.

in order to facilitate transport of freight to all parts of Korea. All surplus passenger cars were to be converted to freight cars.

Gasoline-driven cars powered by 68 H.P. engines are used on the Keinan Railway, Changhang-ni – Ch'onan – Changhowon-ni (Chōkō-ri – Tenan – Chōkoin-ri), for passenger service and seat about 50 persons (FIGURE VII - 17).

Electric-motor cars in urban and interurban service are of the center aisle type, 50.9 feet long and 8.2 feet wide. Each car has 4 motors coupled 2 in series, each with a maximum voltage of 750 and rated at 70 HP at that voltage. The current at 1,500 volts D.C. is conveyed by trolley (FIGURE VII - 18).

(3) Freight cars.

Capacities of freight cars normally range from 15 to 40 tons but a few 50-ton cars are in use. Most of the cars on the government lines have rated capacities of 20, 26, and 30 tons. Those under 30-ton capacity are of 2-axle types. Those of over 30-ton capacity are generally stock equipped with 4-wheel trucks (FIGURE VII - 19), although some may be 2-axle cars. The 50-ton cars are reported as having 6-wheel trucks.

The earlier cars were built of wood, but by 1940 almost all box cars were of steel. It was announced in 1940 that in view of the steel shortage freight cars would again be built of wood "as replacements."

Box and open-type cars were about evenly divided in number. There were a few special wagons, such as refrigerator cars for the transport of fish to the interior, and a small number of cattle cars.

Ore and coal cars of the all-steel drop-side type were put into

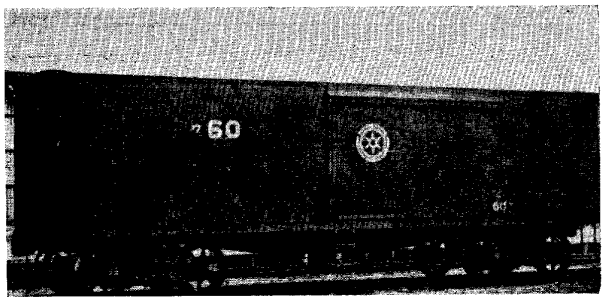


FIGURE VII - 19 *Korea railways.* 4'8½" gauge box car. 1931.

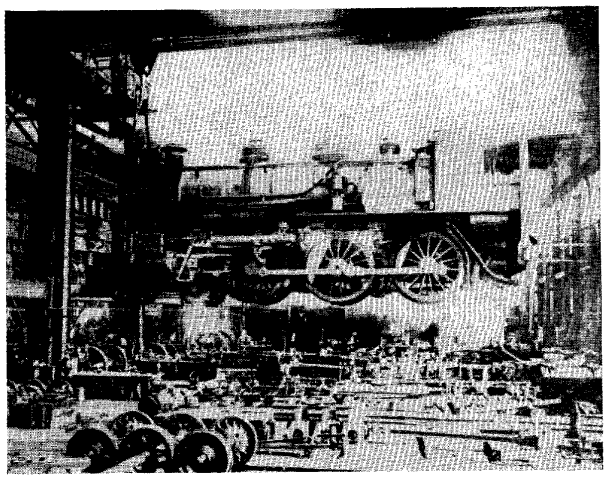


FIGURE VII - 20. *Yongsan (Ryuzan) workshops at Kyongsong (Keijō).* Erecting shop. 1924.

operation shortly before 1941. Coal cars on the P'yongyang – Chinnamp'o run were reported as open-top, without hoppers, about 33 feet long and 6½ feet wide, with sides varying in height between 1 foot 6 inches, 3 feet, and 5 feet 5 inches.

Box cars with shelves installed are often used as troop cars. For short distance travel these would have a capacity of about 60 men. When used for long distance sleeping accommodation, the shelves usually have only 3-foot headway, and capacity is cut to about 25 to 30 men.

H. Workshops and yards.

The efficiency shown by the Japanese in their home workshops has been generally extended to railway shops on the mainland. In the 15 to 20 years prior to 1941, great energy was expended in the examination, study, and adaptation of American methods in both shops and yards. Consequently operation of these facilities resembles the pattern set by American practices, with some variations to suit local conditions.

(1) Workshops and repair shops.

Until the Japanese Government began to stress the strategic value of the Korean railway system, little importance was attached to the shops in Korea. They were adequate for peacetime purposes, but the shop machinery and equipment did not compare with that in either Japan or Manchuria. The average machine in Korea was older, and there were comparably fewer machines, capacity depending largely on the amount and train-

FIGURE VII - 21. *Kyongsong (Keijō).*
Yongsan (Ryuzan) Government Railway workshops, before expansion.

FIGURE VII - 22. *Pusan (Fusan).*
Pusan Government Railway workshops, before expansion.

ing of labor. Recent reports indicate that new shops have been built and old ones expanded.

The principal workshops are located at the northern suburb of Pusan (FIGURE VII - 22), at Yongsan, southern suburb of Kyongsong (FIGURES VII - 20 and VII - 21), at P'yongyang, at Ch'ongjin, and at Wonsan. These shops handle major repairs and construct new equipment. Yongsan and, reportedly, Wonsan produce locomotives and cars, and the other 3 shops cars only. It has been reported that P'yongyang and Pusan shops are now building a limited number of locomotives. Producing new equipment may mean either building all parts for a new car or locomotive, or importing some parts and only assembling the unit as new. There is a disagreement as to which is done in Korea, but it is likely that by now units of rolling stock, including locomotives, are built in entirety by Korean shops, particularly the Yongsan, Pusan, and Wonsan shops. All 5 shops manufacture other kinds of railway equipment, such as girders and other steelwork for bridges, switches, crossings, and other track materials. The Yongsan shops were the most important, both as to capacity and location, Kyongsong being the center of the entire railway network. In 1932 these shops combined employed 1,632 men, and it is estimated that employees would now number about 3,000 to 3,500 men. It is reported, however, that Wonsan now has the largest shops.

Of the shops dealing only with repairs, the largest are at Sinuiju, Chongju (Teishū), Taejon, Taegu, Wonsan, and Songjin (Jōshin). Other smaller shops are reported at Sariwon, Choch'iwon, Ch'orwon, Pokkye-ri (Fukkei-ri), Sunch'on, and Huich'on (Kisen).

(2) Enginehouses and minor repair shops.

Enginehouses are located every 40 to 100 miles. It has been stated that the daily running distance of a locomotive is about 100 miles, no distinction having been made between passenger and freight trains. Operational practices probably follow those of Japan, where passenger trains are run over 2 sections and freight engines over only one.

Known roundhouses and engine sheds are located on FIGURE VII - 54, and the list of engine houses given below is probably incomplete:

Pusan – Sinuiju line:	Kumch'on, Ch'onan, Kaesong, Sinmak, Hwangju, Sop'o, Sinanju.
Wonsan – Susong line:	Kowon, Hamhung, Sinbukch'ong, Tanch'on, Kilchu.
North Korea lines:	Hoeryong, Namyang, Unggi, Najin.
Sunch'on – Manp'o line:	Kanggye.
Pusan – P'ohang line:	Ulsan, Kyongju (Kōshū).
Taejon – Mokp'o line:	Kanggyong, I-ri, Kunsan, Songjong-ni, Mokp'o.
Southern coast:	Sunch'on, Yosu, Masan.

Water towers and coaling stations are adequate to handle the heavy wartime requirements.

(3) Yards.

(a) Marshalling (classification) yards. Marshalling or classification yards are located in the P'yongyang area and the Kyongsong area. The original yards at P'yongyang station and at Yongsan station proved to be inadequate, and new yards have been built at both cities. A large classification yard was under construction in 1940 at Sop'o 4 or 5 miles north of P'yongyang on the main line. When completed, it was to cover an area ¾ mile wide and 2 to 3 miles long. It would serve the Kyongui and Manp'o lines from Manchuria, the cross-peninsular P'yongwon line, and the port of Chinnamp'o. At Kyongsong, 3 new yards are being developed. At Susaeng-ni (Suishoku-ri), about 4 miles northwest of Kyongsong station, a classification yard of the hump gravity type is under construction to handle the main line traffic. A second large yard is east of Kyongsong at Ch'ongyang-ni (Seiryō-ri), formerly

Higashi-Keijō, the junction of the Kyongwon, Kyongch'un, and Kyongkyong lines. Both these new yards are undoubtedly in operation. At Sobinggo (Seihyoko), the second station east of Yongsan, a third yard is planned as an extension of the Yongsan yards. As yet only a few tracks have been laid in the open area south of the station.

Although nothing is known of the yards at Taejon, they are reported to be of considerable size, and Taejon is said to be an important marshalling center for freight travelling the southwest network of railway lines. A large yard is also stated to have been constructed at Sinmak (Shinbaku) between Kyongsong and P'yongyang, possibly to relieve the yards in the areas of these two places.

It may be assumed that there are sizable yards at all important cities and junctions as well.

(*b*) *Terminal yards.* Extensive terminal facilities are located at Pusan, Mokp'o, Inch'on, Chinnamp'o, Dasado, Najin, Ch'ongjin, and Wonsan. New terminal yards have probably been built at Yosu and Masan where port facilities are said to have been developed.

I. Traffic.

(1) General.

Traffic on the Korean railways has been steadily increasing. During the years 1942 and 1943, the shortage of shipping space required a larger portion of North China and Manchuria freight to be sent by rail through the Korean ports. Considerable emphasis has been placed on the revision of schedules to facilitate rail movement of goods. Whereas all bulk goods between Japan and Manchuria and China formerly went by ship, and the Korean lines offered direct through service to light freight only, extensive adjustments of the land transport systems were undertaken in 1943 to transfer the movement of coal and later other items to the railroads.

(2) Volume.

Since 1930, statistics on railway traffic published by the Chōsen Government-General have obviously been intentionally misleading. Figures on freight tonnage on the State Railways given in American and other publications and official reports varied each year by 20 to 25%. Any estimate for 1945 must therefore be purely arbitrary, but, on the basis of the rising trend of traffic in recent years, it is considered that about 25,000,000 tons will probably be carried by the State Railways and about 6,000,000 to 7,000,000 tons by the private railway companies. Tramways will carry around 400,000 tons.

Available information on freight ton-miles also cannot be relied upon. 1933 figures give the average haul as 140 miles. but allow for no difference in areas. It may generally be said that most of the short hauls will be in the peripheries of Kyongsong, P'yongyang, and the ports out of which are shipped produce from the immediate hinterland. As shown in Subtopic A, (3), the Korean railroads are carrying a greater volume of through traffic. The average haul has therefore been lengthened.

Passenger figures also show some variance. In 1937 a little under 36,000,000 passengers were carried on the State Railways and 2,000,000 on the private lines. This figure had increased to over 100,000,000 in 1941, but in view of the drastic curtailment of passenger travel in subsequent years current figures are likely to be considerably lower. Tramways carried 97,000,000 passengers in 1937.

(3) Commodities.

Before the war, the principal commodities handled on the railways were mining and industrial products, grains, and railway materials. Fisheries, livestock and lumber constituted a very minor part. This traffic, however, did not include military supplies which even then were of some importance. The principal commodities carried at present are probably coal, iron ore, military supplies, grains, industrial products, railway materials, and lumber. Coal moves chiefly on the lines servicing the north and south Korean ports and the industrial area of P'yongyang. Iron ore travels from Manchuria along the main line to Dasado and Kyomip'o, and from Northeast Korea to Ch'ongjin and cross-peninsula to Kyomip'o. Grain moves mainly in 2 areas: southwest Korea and along the western plain, and on the North Korea lines. Military supplies will travel on the North Korea lines, and to some extent on the main line. Railway material will be carried mainly by the Kyongbu and Kyongui lines, but also by all other lines. Lumber will travel on the North Korea lines and the northwestern lines, especially the Kyongui and Manp'o lines.

(4) Seasonal variation.

The heaviest traffic movement is during the winter months, from October to March, grain traffic mainly accounting for the difference.

(5) Capacity.

It has been stated that by 1941 the capacity of the railroads was already strained to meet the demand for freight transport. Observers who returned from Korea as early as 1940 stated that passenger trains were sometimes 3 to 5 hours late. Critical conditions have been indicated by the repeated plans and reorganizations to increase freight capacity. Apparently, however, these had been effective, and as tonnages increased, the railroads had managed to increase their carrying capacity up to 1944. This had been accomplished by 1, drastic restrictions of passenger traffic; 2, conversion of passenger cars to carry freight; 3, improvement and expansion of repair facilities; 4, construction of new yards in bottleneck areas; 5, improvement of roadbed and track; 6, quicker turn-round of rolling stock, and 7, addition of new motive power and rolling stock. As affecting the addition of rolling stock, the change in character of commodities is worthy of note. Heavy commodities, such as coal and ore are being carried rather than light freight, and increased tonnage figures would therefore not necessarily indicate a comparable demand for increase of freight cars, but rather a greater need for motive power. In spite of the measures outlined above having been exploited to their fullest, the position had become acute by the end of 1944 and is now steadily worsening. In addition to the lack of locomotives and rolling stock there is now a shortage of coal for fuel, and it is unlikely that those deficiencies can be made good in 1945.

In estimating the present capacity of individual lines it has been necessary to take into account the condition of track, length and frequency of passing sidings, gradients and curves, and type and availability of locomotives and rolling stock. Train loads are dependent in some instances on the double-heading of trains over mountainous sections.

The double-tracked main line is estimated to have a capacity of 30 to 35 trains each way per day, with a net tonnage of about 650 short tons per train. The single-track lines are discussed separately in the individual line descriptions (Subtopic K), but generally it is considered that they can handle from 5 to 10 trains each way per day with net train loads ranging from 350 to 650 short tons, the lines in northeastern and southwestern Korea usually having higher capacities than those in the north. These train loads will be dependent upon assistance by a second locomotive over heavily graded sections. Simultaneous operation of a number of lines would have the effect of reducing their separate capacities owing to the limitations of rolling stock.

J. Vulnerability.

The pattern of the Korean railways has been developed with a view to strategic requirements, and special precautions were taken to safeguard the lines against attack. Cuts and fills are built more strongly than the traffic normally requires. Where second bridges and second tunnels have been built, they have been spaced farther apart than normal construction practice would demand.

As locomotives and rolling stock are considered to be in already short supply in Korea, any considerable diminution would seriously affect operation of the railroad system. The loss of locomotives would be felt more than rolling stock as they are more difficult to replace. It must be borne in mind, however, that unless the stock of Korean locomotives is greatly reduced, military traffic could still be maintained by introducing locomotives withdrawn from Manchuria and China, and by eliminating the movement of all but essential traffic. Concentrations of locomotives and rolling stock are likely to be found at the major workshops and at the important junction yards. Pusan, Yongsan, Kyongsong, P'yongyang, Ch'ongjin, Wonsan, and Taejon are therefore all vital points.

Bridges represent one of the major vulnerable features. Any assessment of the possibilities of railroad operation being interrupted must, however, take two factors into consideration; the fact that the duplicates often represent separate bombing targets, and the existence of alternative routes, even although they may be of a lower capacity. In such cases, only simultaneous interdiction could be entirely successful.

The following bridges are especially critical:

1, The Yalu River bridge between Antung and Sinuiju (Kyongui Line). This is the longest (3,097 feet) in Korea, and its destruction would cut the main line which carries the largest volume of transit goods between Korea and Manchuria (FIGURE VII - 5).

2, The Taedong-gang (river) bridge on the main line just south of P'yongyang (Kyongui Line). Although traffic could be routed by the Sungho-ri – Shinseisen – Sop'o alternate, this is an inadequate substitute for the main line.

3, The bridge over the Imjin-gang (river) between Kyongsong and Kaesong (Kyongui Line). A tunnel on the south side of the river is adjacent to the bridge. No alternative route is available for this section of the line.

4, The Han-gang (river) bridges at Kyongsong (Kyongbu Line). These carry the main line traffic, and traffic between Kyongsong and its port, Inch'on (FIGURE VII - 8). Kyongsong, as the hub of the railway system, is a major bottleneck. Important freight yards and the largest railway workshops in Korea are located on the Kyongsong side of the bridges. Other large freight yards, through which all north – south traffic must pass, are on both the eastern and western outskirts of the city. It is likely that a concentration of locomotives and cars will usually be found at these yards.

5, At Waegwan, between Taejon and Taegu (Kyongbu Line). A railroad bridge crosses the Naktong-gang (river), and the tracks enter a tunnel on the south bank (FIGURE VII - 9).

6, Sup'ung-dong dam. The Chongju – Sup'ung line to Mukden, Manchuria (an alternate to the main line) crosses the Yalu River on this dam, one of the most important sources of hydroelectric power in Korea (Hei Hoku Tetsudo Line).

7, The third railroad bridge over the Yalu is on the Manp'o line. Destruction of this bridge would cut the most direct route from central Korea to central Manchuria.

8, A 26-span bridge at Hamhung on the Hamkyong Line. Destruction of this bridge would cut traffic on the northeast coast line where there is no alternate, disrupting the important flow of mineral products to the western industrial centers.

9, The Ch'ongjin-gang bridge, about which no details are known, between Ch'ongjin and Susong. This bridge carries heavy traffic in and out of Ch'ongjin.

10, The North Korea lines cross the Tuman-gang (river) at Sangsambong and at Namyang (FIGURES VII - 10 and VII - 11). The destruction of either bridge would seriously impede the use of this important gateway to Manchuria.

Although bridges are the most strategic points, there are a few other vulnerable features. On the Kyongbu main line, midway between Taejon and Yongdong, is a horseshoe curve on a heavy grade, followed by a tunnel. The tunnel areas of the Manp'o line to Manchuria and the Kyongwon across the peninsula, as shown in FIGURE VII - 54 are another example. These sections are also reported to be subject to frequent landslides.

K. Individual lines.

As little information on the lines of Korea has been published, much of the route description has been collected from returned residents of Korea, and some of it is necessarily of a general nature.

In the subsequent description of individual lines, capital letters following the line names are the symbol by which that line is designated on the accompanying maps (FIGURES VII - 53 and VII - 54).

(1) Kyongui line (Line A).

This is the northern half of the main double-track line to Manchuria. The entire route, between Sinuiju and Pusan, is the best maintained and most heavily built line in Korea. The Kyongui line can handle about 25 trains each of about 650 net short tons per day in each direction. Trains are generally 30 to 40 cars in length.

(*a*) *Termini.* Kyongsong and Sinuiju.

(*b*) *Length.* 310 miles.

(*c*) *Gauge and track.* 4'8½"; at least a large portion is double-tracked, but double-tracking was reportedly abandoned in Spring 1944 because of the shortage of steel. Aerial photographs of December 1944 showing a 5-mile stretch from Maengjung-dong north revealed that section as still single-track. Radio reports of the Japanese Diet have stated several times that double-tracking of the Korean railroads was completed in December 1944. If true, this would presumably refer to the Kyongui line.

(*d*) *Grade and curves.* Maximum gradient is 1% and minimum radius of curves about 1,500 feet.

(*e*) *Motive power.* Steam.

(*f*) *Yards.* An-tung, Manchuria, across the Yalu River

from Sinuiju; Sop'o, P'yongyang; Susaeng-ni, large new hump gravity yard west of Kyongsong; Yongsan (Ryuzan) at Kyongsong.

(*g*) *Workshops.* Yongsan and P'yongyang. The Yongsan shops are the largest in Korea. Both shops build and repair locomotives and cars. Repair shops are at Sinuiju, Chongju, Sinanju, Sop'o, Hwangju, Sariwon, Sinmak, and Kaesong (71-H).

(*h*) *Tunnels and bridges.* There are 20 tunnels on this stretch of the main line, 9 of which are between Sariwon and Kaesong. Bridges are numerous and several are 1,500 feet and more.

(*i*) *Vulnerable points.* The most vulnerable features of this line are the bridges at Sinuiju, Sinanju, P'yongyang, and Munsan, as shown in TABLE VII - 3. At P'yongyang the bridges, large freight yards, and workshops are within ½ mile of one another. Just north of Kyongsong, between Kyongsong station and the yards at Susaeng-ni, are 2 consecutive double tunnels (4 in all) on the double-track line.

(*j*) *Branch lines.*

1, From Sinuiju a standard-gauge (4'8½") single-track line is reported as under construction along the Yalu River to Sup'ung-dong (Suihō-do).

2, From Sinuiju a standard-gauge private railway runs 25 miles to the port of Dasa-do (Tashitō), and to Namsi-dong on the Kyongui line, making an alternate loop. This line has been reported purchased by the government; and, as the corresponding section of the main line has 3 tunnels, this alternate route (Sinuiju – Yangsi – Namsi-dong) may have been double-tracked, and now be the main route.

3, At Chongju, a line (Line H) from Kuantien, Manchuria via Sup'ung joins the Kyongui line. It is 4'8½" gauge, single-track, privately owned, and 79 miles in length. Its ruling grade is not known, but the gradient is reported heavy and curves are frequent. Only 2 trains a day in each direction were reported in operation in 1940, but the line is estimated to have a capacity of 5 trains of 350 net short tons a day each way. A 45-mile branch has been constructed from Sakchu, south of Sup'ung to Pyoktong.

4, From Sinanju a single-track line, 18 miles long, branches east to join the Manp'o line at Kaech'on. It was formerly a privately owned, narrow-gauge, mining line, but has been purchased by the government, and is believed to have been converted to standard gauge.

5, The P'yongwon line (Subtopic (8) below) branches east at Sop'o to Kowon on the east coast. It is 132 miles long and 4'8½" gauge. Through Sop'o also runs traffic of the Manp'o line which branches from the P'yongwon line at Sunch'on.

6, From P'yongyang the P'yongnam line (4'8½" gauge) runs 34 miles to the port of Chinnamp'o. In 1941 there were 8 trains a day, carrying coal and iron ore. This line has several short branch lines: a standard-gauge line from Chinnamp'o to Yonggang (Ryukō) hot springs; a narrow-gauge line from Kiyang (Kiyā) northwest to mines, and southeast to the Taedong-gang (river); a narrow-gauge line northwest to mines from a point just west of the main line junction; and at Chojon-ni a standard-gauge branch to the freight yards at Sop'o allowing North Korean freight to by-pass the yards and station at P'yongyang.

7, From Taedong-gang station (Daidō-ko), south of P'yongyang, the single-track, standard-gauge P'yongyang line runs east and north to the P'yongwon line and on north to Tokch'on (Tokusen). The section from Taedong-gang station (Daidō-kō) to the P'yongwon line is now government-owned. This 90-mile line is principally for freight, carrying coal from the 3 important mining areas at Sungho-ri (Shōko-ri), Pyolch'ang-ni (Bessō-ri), and Tokch'on.

8, The Kyomip'o line runs from the Kyongui line near Hwangju 8 miles to the mines and smelters around Kyomip'o. It is standard-gauge and single-track.

9, From Sariwon the Hwanghae narrow-gauge lines branch south in a network tapping rice country and coal deposits. They join the Kyongui line again at T'osong-ni (Dojō-ri). In 1941 there were 177 miles in operation and about 30 to 40 miles under construction. They were to be purchased by the government in 1943 and may have been changed to standard-gauge; the Kaesong – Haeju – Sariwon portion would then provide an alternate to this section of the main line.

(2) Kyongbu line (Line A-1).

This is the southern half of the main double-track line to Manchuria. Its capacity is about 30 to 35 trains a day each way, and trains are from 30 to 40 cars in length with a net load of about 650 short tons. Pusan is the terminus for the steamship service from Shimonoseki, Japan (FIGURE VII - 23).

FIGURE VII - 23. *Pusan (Fusan).* Port railroad terminus. 1942.

(*a*) *Termini.* Kyongsong and Pusan.

(*b*) *Length.* 280 miles.

(*c*) *Gauge and track.* 4'8½"; completely double-tracked.

(*d*) *Grade and curves.* Maximum grade is 1% and minimum radius of curves about 1,500 feet.

(*e*) *Motive power.* Steam.

(*f*) *Yards.* Yongsan (at Kyongsong), Yongdungp'o, Taejon, and Pusan, with small yards at junctions of branch lines.

(*g*) *Workshops.* Yongsan and Pusan. Both shops build and repair locomotives and cars. Repair shops are at Ch'onan, Choch'iwon, Taejon, Kumch'on, and Taegu.

(*h*) *Tunnels and bridges.* There are at least 18 tunnels on this line, with 8 in the 67-mile section between Kyongsan and Pusan. Bridges are frequent and several are long.

(*i*) *Vulnerable points.* The most vulnerable features are the bridges at Kyongsong, Waegwan, and Taegu. At Kyongsong, the bridges over the Han-gang (river) and the Yongsan yards and workshops are within ½ mile radius.

(*j*) *Branch lines.*

1, From Yongsan station the Kyongwon single-track line goes 140 miles east and north to Wonsan on the east coast. From this line, just east of Kyongsong, branch 2 standard-gauge single-track lines; the Kyongch'un, electrified, runs to Ch'unch'on, and the Kyongkyong, to Pusan by an inland route. (Subtopics (3) and (6) below).

2, At Yongdungp'o the Kyongin line, 19 miles long, branches west to Inch'on, port of Kyongsong. It has been reported as double-tracked, but aerial photographs of December 1944 show a single-track bridge and single-track culverts, and there is no converging of lines on either end of the bridge. The track is not shown clearly but appears to be single, with roadbed prepared for double-tracks. If it is single-track, it probably carries 10 to 15 trains a

day in each direction, and trains may be about 30 cars long with a maximum net load of about 650 short tons. The line crosses level country, and curves are easy.

3, At Suwon the main line is crossed by a narrow-gauge private line from Inch'on on the west to Yoju (Reishū) on the east. It is 78 miles in length. In 1934 small sidings were being built at Suwon station, and facilities are probably available for the transfer of freight to the main line.

4, The standard-gauge private line from Changhang-ni (Chōkō-ri) to Changhowon-ni (Chōkoin-ri) crosses the main line at Ch'onan. The length of line from Ch'onan to Changhang-ni is 90 miles, and from Ch'onan to Changhowon-ni it is 43 miles. A 25-mile extension from Changhowon-ni to Wonju has been under construction and may now be completed. The line to Changhang-ni serves munitions plants and refineries. No characteristics of the line are known, although the terrain crossed indicates that the gradient would not be heavy. Gasoline-driven cars are used for passenger traffic (FIGURE VII - 17), but freight trains are probably powered by steam.

5, From Choch'iwon a standard-gauge private line runs 60 miles east to Ch'ungju via Ch'ongju. At Choch'iwon there are 6 or 7 sidings. In 1938 about 10 trains a day, made up of 4 to 5 cars per train, ran between Choch'iwon and Ch'ungju. The roadbed was at ground level from Choch'iwon at least to Ch'ongju, and possibly the full length of the line. There were limited repair facilities both at Choch'iwon on the main line and at Ch'ongju on the branch line. This branch line was reported under construction in 1941 as far as Chech'on on the alternate Kyongsong – Pusan line, and across it to the mining area at Yongwol. An unsubstantiated report claims a further extension to Samch'ok (Sanchoku) on the east coast. If completed, this route in conjunction with the Tonghai line would be another alternate for the Kyongwon line, principally for northbound traffic.

6, Taejon is the main line junction for the southwest network of railroads; it taps the agricultural, mining and textile-plant areas, and the ports of Kunsan, Mokp'o, and Yosu. (Subtopics (4) and (5) below).

7, At Kumch'on the standard-gauge Kyōngpuk line (Line G-1) branches northeast 73 miles to connect with the alternate Kyongkyong line at Andong.

8, A second connecting line to the Kyongkyong line runs from Taegu to Yongch'on, 25 miles. Two different names have been applied to this line, but there are not likely to be 2 separate lines with the same mileage and the same termini. Taegu is possibly the correct name (Line G-2).

9, At Samnangjin (Sanrōshin) the Kyongch'on South line (Line F) branches west along the southern coast. (Subtopic (4), (j), 2 below).

10, From Pusan the southern portion of the Tonghai line extends northeast to P'ohang-dong; construction as far as Samch'ok may possibly have been completed to link up with the line from Wonsān.

(3) Kyongkyong line (Line A-2).

Opening ceremonies were held on this alternate Pusan – Kyongsong line in 1941, but the line was apparently not open to full schedule until September 1943. It is reported to carry only military transport and supplies, but no passengers. Little specific information is available concerning this line, but, as it passes through rugged country and was built under pressure, it is probable that no more than 7 or 8 trains each of about 350 net short tons could be run in each direction per day.

(*a*) *Termini.* Kyongsong and Kyongju (Keishū).

(*b*) *Length.* 228 miles.

(*c*) *Gauge and track.* Standard-gauge; single-track.

(*d*) *Grade and curves.* No exact information exists, but this entire line passes through mountainous terrain, and it has been reported that there are many curves. Grade is about 1.6%, except in some switchback areas where the gradients are possibly about 3.3%.

(*e*) *Motive power.* Steam.

(*f*) *Yards.* This line leaves from Ch'ongyang-ni (Seiryori) station east of Kyongsong, where a large new yard has been reported under construction since about 1940. There is no information on other yards on this line.

(*g*) *Workshops.* A repair shop is reported at Kyongju. There are probably small shops at Wonju, Chech'on, Andong, and Yongch'on.

(*h*) *Tunnels and bridges.* Tunnels have been reported as numerous and long. Rivers and streams are frequent and bridges should be plentiful.

(*i*) *Vulnerable points.* Too little is known about this line to list vulnerable points. Possible landslides may be a vulnerability.

(*j*) *Branch lines.*

1, From Andong the 73-mile Kyōngpuk line (Line G-1) branches west to the Kyongbu line.

2, From Yongch'on a second connecting line, the Taegu (Line G-2), 24 miles long, branches west to the Kyongbu line.

(4) Honam line (Line E).

The southwest lines are principally alternates to the line to Pusan. Although there have been reports of the expansion of Yosu and Mokp'o as ports, the connecting rail lines should not be overrated. It has been estimated that this line can handle 10 trains a day in each direction, each train having a maximum loading of about 650 net short tons with double-heading over mountain sections. In 1941 only about 6 trains were run, with about 10 cars per train.

(*a*) *Termini.* Taejon and Mokp'o.

(*b*) *Length.* 162 miles.

(*c*) *Gauge and track.* 4'8½" gauge; single-track.

(*d*) *Grades and curves.* North of Songjong-ni the grade on the north side is described as "heavy." This section is mountainous and curves are frequent.

(*e*) *Motive power.* Steam.

(*f*) *Yards.* Terminal yards at Mokp'o. Presumably yards of fair size are at I-ri. There are good-sized yards and warehouses at Taejon.

(*g*) *Workshops.* The repair shop at Taejon is reported as capable of making major repairs. There are roundhouses at I-ri, Kunsan, Songjong-ni, and Mokp'o.

(*h*) *Tunnels and bridges.* There are 3 tunnels just north of Mokp'o, one south of Naju, and two just north of Saga-ri. The few bridges are not over 700 to 800 feet long.

(*i*) *Vulnerable points.* Between Naju and Mokp'o a tunnel is very near a bridge spanning a small river. Just south of Taejon the railroad crosses a flood plain. Here the tracks are carried by a series of trestles.

(*j*) *Branch lines.*

1, I-ri is the junction for 2 lines, the Kunsan (Line E-2), going 15 miles west to the port of Kunsan, and the Cholla, 124 miles southeast to the port of Yosu (Subtopic (5) below). Both are standard-gauge, single-track, and steam-powered.

2, At Songjong-ni a standard-gauge, single-track line branches east. This is the western half of the Kyongch'on line (Line F), which is planned to run along the southern coast. The section between Sunch'on and Chinju has been under construction for several years and is probably now completed. If so, it will con-

nect Pusan with all the southwest Korea lines, making a complete loop in that area. There are reports of lines which leave this line to connect with the main Kyongbu line inland (FIGURE VII - 54). There is reasonable doubt about the existence of these lines, as the area is mountainous, and the ports seemingly not developed enough to warrant this further network. The reports of steel shortage would also limit such building in favor of the more important connections which undoubtedly would be finished first. It is possible, however, that a spur line has been built west of Posong (Hōjō) to the mine area around Haenam (Kainan). This spur was claimed by Domei as open to traffic in 1942.

(5) Cholla line (Line E-1).

Emphasis has been placed on the growing importance of this line as a result of the development of Yosu port. The line, however, passes through mountainous country as far as Chonju (Zenshū), and is reported to have had only 4 or 5 trains running each way daily in 1940; moreover, 10-car trains frequently had difficulty in making the sharp grades. It is estimated, however, that the line probably now has a capacity of 10 trains a day in each direction, and that by double-heading trains might be loaded up to 450 net short tons.

(*a*) *Termini.* I-ri and Yosu.

(*b*) *Length.* 124 miles.

(*c*) *Gauge and track.* Standard-gauge; single-track.

(*d*) *Grade and curves.* Just north of Sunch'on and between Namwon (Nangen) and Chonju heavy grades are reported. In the mountains beyond Chonju the grade is stated to be "unusually steep." It is said that at times the engine and train went out of control on this grade, and that, as a result, a siding was built into the mountain into which the train could be switched.

(*e*) *Motive power.* Steam.

(*f*) *Yards.* Terminal facilities are at Yosu, and probably yards at I-ri.

(*g*) *Workshops.* Roundhouses are at Yosu, Sunch'on, and I-ri.

(*h*) *Tunnels and bridges.* Just north of Yosu are 2 or 3 short tunnels, one of which can be seen from the sea. Between Sunch'on and I-ri are 2 more known tunnels. No tunnel on this line is long. There are about 8 bridges.

(*i*) *Vulnerable points.* The most vulnerable features of this line are washouts and landslides. In the mountains between Yosu and Sunch'on, and about 20 miles north of Sunch'on and 12 miles north of Namwon, landslides are said to be frequent and can be started with little effort.

(*j*) *Branch lines.*

1, Just south of Namwon is the junction of the Kwanju line under construction from Tamyang. If completed, this 35-mile line would be an alternate for the Sunch'on – Namwon section of the Cholla line.

2, Sunch'on is the junction of the Cholla and Kyongch'on lines, the latter probably completed to Chinju, and connecting with Pusan.

(6) Kyongwon line (Line B).

This line is one of 2 trans-peninsular lines, and is an important connection between the industrial areas of Kyongsong and the resources of northern Korea. In 1941 it was reported that the roadbed was well-maintained, with gravel ballast, and that the rolling stock was in good repair. It was also reported by a returned observer that sidings were at stations only. Passenger service was third class only, mostly coaches. This line may handle about 10 trains a day in each direction with train loadings of about 650 net short tons with double-heading over heavy grades.

(*a*) *Termini.* Kyongsong (Yongsan station) and Wonsan.

(*b*) *Length.* 139 miles.

(*c*) *Gauge and track.* Single-track; standard-gauge.

(*d*) *Grade and curves.* In the mountainous area between Sep'o-ri and Sin'gosan the maximum gradient is probably around 2.5% and a second locomotive is said to be necessary. Curves are frequent and the minimum radius is possibly about 700 feet.

(*e*) *Motive power.* Steam and electric. The electrified section is reported to be in the mountain area, probably between Sep'o-ri or Sambang-ni and Sin'gosan. It is likely that more of this line is now electrified, possibly at least as far south as Ch'orwon, junction for the electrified branch line.

(*f*) *Yards.* Yongsan, Ch'ongyang-ni, and Wonsan are the principal yards; the first two are classification yards. At Sobinggo (Seihyōko) yards are under construction. At Ch'orwon there are about 7 sidings, and at Anbyon probably more than the usual 2 to 3 sidings per station.

(*g*) *Workshops.* At Yongsan and Wonsan there are major repair shops. Smaller shops are at Ch'orwon station and at Pokkye-ri.

(*h*) *Tunnels and bridges.* Bridges are numerous; the bridge across the Hant'an-ch'on north of Tongduch'on-ni is described as large. Just south of Sep'o-ri are 2 tunnels, and between Sep'o-ri and Sin'gosan are 15 tunnels, all within a distance of about 25 miles.

(*i*) *Vulnerable points.* The tunnel area between Sep'o-ri and Sin'gosan (Subtopic (h)) may be regarded as very vulnerable.

(*j*) *Branch lines.*

1, At Ch'ongyang-ni the Kyongkyong line branches south to Pusan, and the Kyongch'un line goes 40 miles northeast to Ch'unch'on (Shunsen). The Kyongkyong line is discussed above in Subtopic (3). The standard-gauge Kyongch'un line is reported to be electrified, but this has not been confirmed.

2, From Ch'orwon a standard-gauge, single-track private line goes to Naekumgang (Uchi-Kongō), and has a branch from Ch'angdo-ri to Kach'or-ni. There were 78 miles in operation in 1941. The lines were built chiefly for tourist traffic. This line has been reported extended from Naekumgang to Kosong on the east coast, but this would appear unlikely in view of the mountainous country intervening and the absence of a real need.

Electric power is used; the system is D.C., 1,500 volts, single-catenary. The source of power is the hydro-electric plant at Hwach'on in Kangwon Province. The maximum gradient is 2.5%, and the minimum radius of curves 460 feet. Switchbacks are used, but their location is not known.

3, Just south of Anbyon station the Tonghai line (Line A-3) branches east to run south along the east coast. It is standard-gauge and single-track, and is reported to be in operation to Samch'ok. The roadbed has been prepared for connection with the southern portion at P'ohang-dong, and tunnels and bridges have been built, but track has not been laid. Building was apparently abandoned in the spring of 1944, but may since have been resumed. There are no large bridges, most stream crossings being of the culvert size and type.

(7) Hamkyong line (Line C).

This northeast coast line is an important artery for mining products and other raw materials coming from Manchuria

and north Korea to the cities of P'yongyang and Kyongsong. Industrial centers have grown up along this line at Hamhung, Hungnam, Tanch'on, and Songjin. Only the Hamkyong line links these centers and north Korea with the western and central areas. As the tracks skirt the coast, there are few grades. Roadbed is well-built and well-maintained. It has been estimated that this line can handle 10 trains a day each direction. Except for the section between Kilchu and Myongch'on, where some grade is encountered, it should be possible to run trains of up to 400 net short tons.

(*a*) *Termini.* Wonsan and Susong.

(*b*) *Length.* 331 miles.

(*c*) *Gauge and track.* Standard-gauge; single-track.

(*d*) *Grade and curves.* No exact information on this line has been available. Judging from the nature of the terrain crossed, it seems safe to assume that there are no extreme curves and that the only area of steep grades would be between Kilchu and Myongch'on.

(*e*) *Motive power.* Steam.

(*f*) *Yards.* At Wonsan there are terminal facilities on the waterfront and yards, possibly classification yards, at the station on the south side of the city. Small yards, which have no more than a few spur tracks, are at Hamhung and Nanam. It is probable that yards have been developed at both cities, as well as smaller yards at other towns, but information is lacking.

(*g*) *Workshops.* At the Wonsan station and yard area there are workshops capable of making major repairs and reportedly new construction. Songjin has also been reported as a major repair depot. Hamhung has smaller repair shops, and there are roundhouses at Kowon, Sinbukch'ong, Tanch'on and Kilchu.

(*h*) *Tunnels and bridges.* As far as is known, there are at least 6 tunnels on this 331-mile line. Nothing is known of their sizes. Bridge information on the line as a whole is also lacking, but the bridge just west of Hamhung has 26 spans, and the bridge over the Yonghung-gang at Yonghung is probably of major size. There are very likely many bridges on the Hamkyong line over the numerous streams running to the Sea of Japan.

(*i*) *Vulnerable points.* The bridges mentioned in Subtopic (h) are probably the most vulnerable features of this line.

(*j*) *Branch lines.*

1, Wonsan is the terminus of the 140-mile Kyongwon Line to Kyongsong (Subtopic (6) above).

2, From Kowon the P'yongwon line branches west 130 miles to Sop'o and P'yongyang (Subtopic (8) below).

3, Hamhung is the junction point for the private, narrow-gauge Sinhung lines, 121 miles in length, which run north from the newly developed industrial plants at Hungnam, through Hamhung to the hydroelectric plants at Changjin (Chōshin Reservoir) and Pujon (Fusen Reservoir) lakes. Maps of Hamhung show the line crossing the main line on the west side of the city by means of under- or overpass, with spur lines running to the main line station and sidings in Hamhung. The line divides just north of Oro-ri, one line going to each of the 2 lakes. From Oro-ri to Handae-ri on Pujon lake (Fusen Reservoir) are sections of extreme grade, over which cable cars are used (FIGURE VII - 24). The western branch to Changjin lake (Chōshin Reservoir) is steam-powered, probably with heavy grades, but not so extreme as to require cable arrangements.

A new line from the western branch of the Sinhung lines to the Manchurian border has been reported. If it exists, the line from Changjin (Chōshin) through Oro-ri to Hamhung has undoubtedly been changed to standard-gauge, and a direct connection made with the station at Hamhung. Aerial photographs of December 1944 are not clear enough to confirm this assumption, but do not rule out the possibility. The existence of this line would offer another alternate to the double-track Kyongui line, and a more direct connection with the Korean east coast from the Mukden area than the longer route via T'u-men and the North Korean lines.

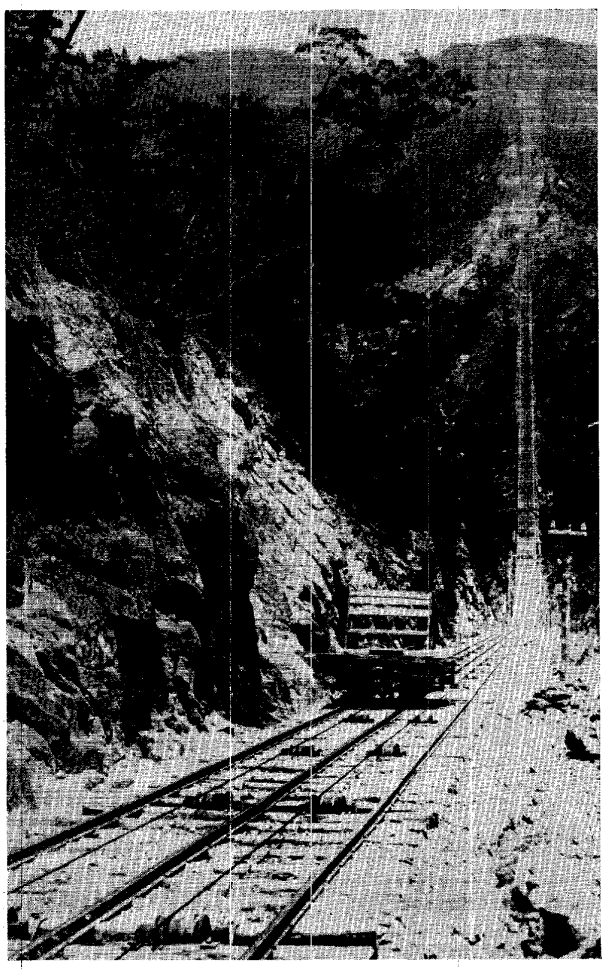


FIGURE VII - 24. *Sinhung Railway, Oro-ri to Pujonhoban.* North view. Cable railway of the Hungnam (Konan) plant, serving Pujonhoban reservoir. Car of 5-ton capacity. Before 1935.

4, The Pukch'ong and Ch'aho lines are mining spurs; their port is at Ch'aho.

5, From Tanch'on a 51-mile narrow-gauge, private railway runs northwest to P'ungsan, serving hydroelectric plants and tapping copper deposits at P'ungsan.

6, From Yohaejin (Jokaishin) a narrow-gauge, private, electrified line, goes north 50 miles to the magnesite mines at Sinbokchang. In 1939 about 80,000 to 90,000 tons of ore were shipped over this line to Songjin. With the opening of the railroad and addition of new mining equipment, it was planned to ship 450,000 tons of ore a year by 1941 by this route. Power is supplied by the hydroelectric plant at Hwangsuwon-ni (Kosūiin-ri), about 55 miles southwest of Sinbokchang. There is a heavy grade on this line; ore is moved downhill, and empty cars are hauled back.

7, Kilchu is the junction for the Hyesan line (Line K) which runs 88 miles to Hyesanjin (Keizanchin). This single-track line

is standard gauge and has a maximum gradient of 3.3%. About midway between Paegam and Hyesanjin there is a pass over which switchbacks are used. The line taps extensive timber stands and coal, gold, and mica mines. From Paegam the Paema (Line K-1) has been built northeast to Yonsa, and since about 1940 it has been under construction to Musan. There are indications that this section has been completed, providing 2 routes to the main line for the large iron ore deposits at Musan.

8, From Nanam a privately owned electrified railroad is said to run to Ch'ongjin, by-passing Susong.

9, At Susong the Hamkyong line joins the Ch'onghoe line, with connections to the port of Ch'ongjin on the east and to Manchuria on the north (Subtopic (10) below).

(8) P'yongwon line (Line D).

This cross-peninsular line was completed in 1941. Virtually the entire route is over mountainous terrain. The roadbed is blasted out of the mountainsides or filled in without an earth sub-layer. An observer traveling the line in 1941 stated that trains were made up of 15 to 20 cars, and that there were no passenger trains; instead, 1 or 2 passenger cars were attached to a freight train. Two or three such mixed trains were run per day and 5 to 7 all-freight trains. The present capacity is probably about 10 trains of 350 net short tons per day in each direction.

(*a*) *Termini.* Sop'o and Kowon.

(*b*) *Length.* 132 miles.

(*c*) *Gauge and track.* Standard-gauge; single-track.

(*d*) *Grades and curves.* From Kich'ang to Kowon the line runs through rugged terrain and it has been stated that many sharp curves and grades slowed traffic.

(*e*) *Motive power.* Steam.

(*f*) *Yards.* Classification yards at Sop'o, and station sidings at Sunch'on.

(*g*) *Workshops.* Minor repair shops are at Sunch'on, and roundhouses at Sop'o and Kowon. There may be larger repair facilities at Sop'o as a relief to the P'yongyang shops.

(*h*) *Tunnels and bridges.* There are numerous tunnels between Kich'ang and Kowon, location unknown. East of Sinup is a tunnel, reportedly 3 to 4 miles long. Tunnels are all constructed for single-track. Many re-inforced concrete bridges span the mountain streams, with one long bridge east of Sunch'on.

(*i*) *Vulnerable points.* The bridges and tunnels are vulnerable factors, as well as the possibility of landslides.

(*j*) *Branch lines.*

1, From Sunch'on the Manp'o line branches north to Manchuria (Subtopic (9) below).

2, Shinseisen Station is the junction for a standard-gauge single-track line to Tokch'on on the north, about 40 miles, and to Sungho-ri and P'yongyang 50 miles to the south.

(9) Manp'o line (Line J).

Much attention has apparently been paid to the improvement of this line, which is the principal alternate to Manchuria for the main Kyongui line. In 1939 and 1940 only 4 or 5 trains were run daily in each direction, with about 10 cars per train. Mixed trains were run until 1940, when regular passenger trains were put into schedule. The present capacity is estimated to be 5 trains, each of about 350 net short tons, per day in each direction. From Huich'on north the tracks are subject to washouts and landslides during July and August. Rails are 75 pounds and 60 pounds.

(*a*) *Termini.* Sunch'on and Manp'ojin.

(*b*) *Length.* 186 miles.

(*c*) *Gauge and track.* Standard-gauge; single-track.

(*d*) *Grade and curves.* Maximum gradient is 1.25% except over the pass midway between Huich'on (Kisen) and Mup'yong-ni (Buhyō-ri), where the grade is 3.3% and switchbacks are used. Curves are frequent and stated as often sharp.

(*e*) *Motive power.* Steam.

(*f*) *Yards.* Sunch'on. Sidings are reportedly at all stations, and usually 3 to 4 shunting tracks.

(*g*) *Workshops.* Repair shops are located at Sunch'on and a roundhouse at Kanggye (Kōkai).

(*h*) *Tunnels and bridges.* Little is known on exact locations of tunnels, but they are described as numerous. On one stretch of the northern section of the line, presumably north of Mup'yong-ni, an observer counted 22 tunnels in 19 minutes of travel time. There are many bridges, generally of steel truss type, including that across the Yalu River between Manp'ojin (Mampochin) and Chi-an (T'ung-kou).

(*i*) *Vulnerable points.* Again, the landslide and tunnel areas north of Mup'yong-ni are probably the most vulnerable factors of this line, as well as the bridge over the Yalu River.

(*j*) *Branch lines.*

1, From Kaech'on a standard-gauge, single-track line runs through the coal area to Sinanju on the Kyongui line.

2, At Kujang-dong a standard-gauge line runs east about 5 miles, and is under construction to Tok'chon, which is on the private line connecting with the P'yongwon line.

3, From Myohyang (Myōkō) between Kujang-dong and Huich'on, a narrow-gauge, private railroad runs 30 miles northwest to the mines at Pukchin.

4, From Kanggye a standard-gauge line goes northeast to Huch'ang (Kōshō), a distance of about 30 miles. Mention has been made of a line from Kanggye to Hamhung, which may be the north – south line under construction from Changjin lake (Chōshin Reservoir) north of Hamhung.

(10) North Korean lines (Lines C-1 & C-2).

The North Korean lines are composed of 2 lines, Chonghoe and Tuman. They are leased to the South Manchuria Railway Company, which manages both the railways and the ports of Ch'ongjin and Najin. This northeastern corner of Korea is vital as a gateway to Manchuria and the outpost of defenses for Korea. The distance from Tōkyō to Harbin, Manchuria, via Niigata and Najin is 1,208 miles, as against 1,930 miles via Shimonoseki and Pusan. The Tuman line carries mainly Manchurian agricultural and lumber products for Najin, which has been developed as a strategic port. The Ch'onghoe line transports mineral products for Ch'ongjin. A recent well-informed source has stressed the importance of both the area and the Tuman line from a strategic standpoint, stating that it was highly probable that many improvements on the line have been made. The entire length of the line along the Tumangang (river) is guarded by patrols and in 1940 armed trains were run twice daily.

From Munung-dong (Buryō-dō) north and Hunyung (Kunjū) west the lines pass through mountainous country, and abound in cuts, high fills, bridges, and tunnels. Snow plows are used during the winter months. Tracks are laid with 75-pound rails. The present capacity is estimated at 10 trains of 550 net short tons per day in each direction.

(*a*) *Termini.* Ch'onghoe line: Ch'ongjin and Namyang-dong.

Tuman line: T'u-men and Najin.

The junction of the two lines is at Namyang-dong.

(*b*) *Length.* Ch'onghoe line: 105 miles.

Tuman line: 101 miles.

(*c*) *Gauge and track.* 4'8½" (standard) gauge; partially double-track. The section between Hoeryong and Sangsambong has been reported as double-track, and several sources have stated that the Najin – T'u-men section is either completely double-track or in process of being double-tracked. Between Najin and Unggi a second track, following a different route, was being laid in 1937, and the tunnel on the second route was built for double-track. A later source indicates that the entire line, although single-track, was built with roadbed for double-track.

(*d*) *Grade and curves.* Maximum gradient is reportedly 1.25%. Between Munung-dong and Hoeryong the railroad passes through a particularly mountainous section, over which a second locomotive was required on all trains. On other sections, probably north of Hoeryong a second locomotive was needed at times.

(*e*) *Motive power.* Steam.

(*f*) *Yards.* There are terminal facilities at Ch'ongjin and Najin. Although no specific information is available, there are presumably fair-sized yards at Susong to handle traffic to and from the port of Ch'ongjin. At Munung-dong are several sidings serving the Musan – Komusan line. A freight yard of 9 or 10 sidings at Unggi in 1937 has probably been extended during the development of the port. Namyang-dong would not have yards, as any switching of freight would be done in the T'u-men yards across the Tuman-gang.

(*g*) *Workshops.* Ch'ongjin has one of the 4 shops in Korea which build new cars. It also makes all major repairs. There are roundhouses at Hoeryong, Namyang-dong, Unggi, and Najin.

(*h*) *Tunnels and bridges.* There are 2 bridges over the Tuman-gang, one at Sangsambong and the other between Namyang-dong and T'u-men. Reports have indicated the possibility of a third bridge over the Tuman-gang at Hoeryong (Kainei) and another alternate line built on the Manchurian side. There are many short bridges in the mountainous sections of these lines. Tunnels are said to be frequent, especially between Munung-dong and Sangsambong, although locations have not been established. One of the two tunnels between Najin and Unggi is stated as 2.3 miles in length.

(*i*) *Vulnerable points.* The 2 bridges over the Tuman-gang, if destroyed, would cut transit traffic between Manchuria and North Korea, which is the main function of these lines. The Tuman-gang at these bridges is reported as becoming a torrent during the rainy months of July and August, and during spring thaws. There has been no mention of landslides; the mountains through which the Ch'onghoe line passes are granite and barren.

(*j*) *Branch lines.*

1. From Komusan, on the Ch'onghoe line, a 38-mile mining railway branches northwest to Musan. It was purchased and converted to standard-gauge about 1940. It may since have been electrified, as there is record of an electric locomotive, 100 tons, operating at 1,500 volts D.C., ordered for the Musan mining company. This may on the other hand mean simply electrification in the mine area, between the mines and the sintering plant.

2. From Hoeryong a 7-mile line serves the coal mines on the west at Shinkeirin.

3. From Sangsambong and from Namyang-dong are two alternate lines which cross the Taman-gang into Manchuria, and converging west of Yen-chi, continue west to Harbin and Ch'angch'un. There is also a branch leaving the main line west of Namyang-dong and running north into northeastern Manchuria.

4. The former private narrow-gauge line from Hunyung (Kunjū) across the Tuman-gang, has been changed to standard gauge and extended to Han-ch'un and beyond possibly as far as the Manchurian – U.S.S.R. border. This line is regarded as highly important militarily both from an offensive and defensive position.

5. Lines are reported branching north from Unggi to army concentrations just west of the Tuman line. There may also be spur lines from these camps east to the section of the Tuman line paralleling the Tuman-gang.

6. Along the coast between Najin and Ch'ongjin a railroad has been under construction since before 1937. In all likelihood it has now been completed, and will form a useful land connection between these two ports.

72. *Roads*

(FIGURES VII - 53 and VII - 54)

A. General.

(1) Development of the road system.

When Japan annexed Korea, transport was mainly by ox-cart or porters, along cart tracks and trails. Roads were built and improved by the Japanese for economic and strategic reasons. At first, emphasis was on roads to supplement the railways in the economic development of the country. In the south and southwest roads were developed for the movement of rice and cotton to the ports for export to Japan. Subsequently emphasis was laid on the northern border, the northeast mining and industrial area, the south coast, and on roads connecting the principal cities and their ports. Since there has been increased Japanese interest in Manchuria, effort appears to have been concentrated on through roads between Manchuria and Japan.

(2) Road pattern.

The most important through roads center at the capital, Kyongsong (Keijō), forming a large X that extends across country from Sinuiju (Shingishū) to Pusan (Fusan) and from Omsong (Onjō) to Mokp'o (Moppo). Another primary road which roughly parallels the Korea-Manchuria frontier, was developed partly to provide a good route for border patrols. Military considerations have apparently also played a part in the improvement of the road along the south coast; this route has become more and more important with the increasing use of south Korean ports and the development of defenses in that area. These major roads link the largest cities of Korea, several of which are located some distance inland from their port outlets. The roads which connect these cities with their ports are among the best highways in Korea.

Other motorable roads are numerous in the lowland area of western Korea and less numerous in the mountainous areas

where they serve the mining communities and provide cross-peninsular routes.

(3) Road classification.

Before 1938 roads were classified according to width rather than surface or maintenance. The standards corresponded rather closely to those for Japanese roads. The classes were:

First-class roads	24 feet or wider
Second-class roads	18 feet to 24 feet
Third-class roads	12 feet to 18 feet
Unclassified roads	less than 12 feet

In early 1938, official mileages were:

First-class	1880 miles
Second-class	5460 miles
Third-class	7240 miles

In 1938 roads were reclassified according to administration and importance. The new classes are:

State roads: a. Roads leading from Kyongsong (Keijō) to capitals of provinces, headquarters of military units, fortresses, naval ports, and open ports.
b. Roads connecting seats of provincial governments, open ports, places of importance, airfields, and railway stations.
c. Roads of military importance.
d. Roads of economic importance.

Local (Provincial) roads: a. Roads leading from the seats of provincial governments to places where prefectural or district offices are located.
b. Roads leading from airfields, places of importance, ports, or railway stations within a province.
c. Roads important for local development.

Prefectural roads: Roads in prefectures, not otherwise defined.

Township and village roads: Roads in townships and villages, not otherwise defined.

State roads correspond closely to what were formerly first-class and second-class roads. Local roads are mainly the former third-class, but probably include a few of the wider roads and some which were previously unclassified.

No maps are available which classify roads on either of the above bases.

FIGURES VII - 53 and VII - 54 are compiled from a number of sources. The principal source was the Army Map Service, Series L551, First Edition 1944, on the scale of 1:250,000, checked against interview reports on the condition of particular roads, plus a 1940 transportation map in Japanese, showing roads used by buses. On this basis, the main through routes were classified as primary roads, and other selected roads were shown because they are believed to be next in importance. Roads of equal importance may be found to have been omitted, either because no information was available or because they have no importance apparent on the map.

Absence of information makes it impossible to arrive at a reliable classification based on road width and quality. The classification given is generally true but may be found to be incorrect for short stretches of road. The indication that a road is 2 or more lanes wide is based on the assumption that these roads fell into the pre-1938 first, second, or third classes, plus reports on the number of lanes of traffic. Such reports are based on civilian traffic and the classification of some roads may need to be downgraded for military traffic.

(4) Methods of road construction.

Reports indicate that most of the important roads are constructed of what might be called "traffic-bound macadam." They have a firm stone base laid in a trench the width of the road surface. The sides of the trench are formed by the earth shoulders, generally 3 to 5 feet wide. The rock used ranges in size from 3 inches in diameter to a fine topping of sand or gravel. Ordinarily each layer of rock should be rolled and sprinkled (forming water-bound macadam). In Korea, however, little modern rolling and scraping machinery has been used, and stones have been worked into place largely by the action of traffic. It is reported that some of the main-traveled roads of this type have an excellent hard surface.

Other roads are merely well graded and topped with a thick layer of crushed rock, traffic again acting as the roller to force the rock into a durable surface. Many, like country roads in the United States, are merely graded earth, or earth covered periodically with a layer of fine gravel. The common road-surfacing materials are broken rock and stream gravel, both of which are available throughout the country in numerous small quarries.

Little paving material is used, except in and near the larger cities, where concerted effort has been made to improve the condition of streets and suburban roads. City streets are generally surfaced with asphalt or bituminous macadam; only a little concrete has been used.

Cement is manufactured in several cities and supplies are adequate for the manufacture of what little concrete is used for paving. Asphalt has been produced at Wonsan (Genzan) by the Chōsen Petroleum Oil Company and some has probably been imported.

(5) Maintenance and repair.

Both construction and maintenance of the roads were supervised at first by the Japanese and carried on largely by Korean laborers, who were forced to work several days a year in lieu of paying a road tax. Provincial roads are still kept in repair in this way; persons who live along the road have to supply the stones to keep a specified stretch in good repair. This system was abolished some years ago for government projects and laborers are now paid a nominal wage for work on these roads. There are some indications that the war emergency has necessitated an increased amount of coöperation from all members of the population, and high school students are reported to have volunteered to work on roads during their vacations.

With the exception of trucks and other machinery used for hauling materials, almost all construction and maintenance has been by hand labor. A few road-rollers of Japanese and English origin were used, chiefly in the larger cities. There is practically no equipment available for crushing stone, and most of the rock for road-surfacing is broken by hand.

(6) Bridges and ferries.

Before the advent of the Japanese and the beginning of the program of road improvement, simple ferries were the common means of crossing broad streams which could not be forded. Smaller streams were bridged by structures of timber or natural stone slabs. Within the last 30 years, a considerable number of bridges have been built. The first large bridges were generally of steel through-truss construction with a

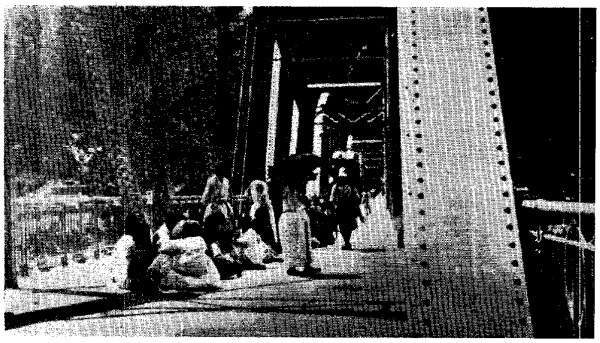


FIGURE VII - 25. *Bridge over Pukhan-gang (Kita-Kankō) just west of Ch'unch'on (Shunsen).*
Old style steel bridge.

rather narrow roadway (FIGURE VII - 25 and FIGURE VII - 31). Many of these are now being supplemented by reinforced concrete bridges of the girder type. Old-style narrow bridges over the smaller streams have been gradually replaced by modern reinforced concrete structures, especially on the more important roads. Most bridges can carry loads of 3 to 5 tons, a few can carry 10 to 15 tons.

Little detailed information is available on individual bridges. Several of the most important are listed in TABLE VII - 5. Perhaps the most important river crossing in the country is at Kyongsong (Keijō), where there are now said to be 3 highway bridges. In keeping with the expansion of roads and railroads linking the Manchurian and Korean systems in the northeast and along the northern boundary, a number of bridges have been reported built or under construction in that region during the last few years. Most of these bridges are combined road and railroad.

TABLE VII - 5

SELECTED HIGHWAY BRIDGES—KOREA

LOCATION	LATITUDE AND LONGITUDE (APPROX.)	CROSSING	BRIDGE DESCRIPTION	DATE BUILT	FIGURE
1. Sinuiju – An-tung (Shingishū – An-tung)	40° 07′ N 124° 23′ E	Yalu River	Railway bridge, 3,097 ft. long; 13 spans—steel, through truss; 1 span—steel, swing type; solid masonry piers. Wide sidewalks on either side could be used by small vehicles if necessary.	1911	VII - 5 VII - 6 VII - 26
2. P'yongyang (Heijō)	39° 01′ N 125° 45′ E	Taedong-gang (Daidō-kō)	10 spans—steel, through truss; solid masonry piers. Width about 27 ft., roadway approximately 15 ft., two 6 ft. walks. Trolley line in center.	—	VII - 27 VII - 28
3. Kyongsong (Keijō)	37° 30′ N 126° 55′ E	Han-gang (Kan-kō)	About 3,400 ft. long; 6 spans, 230 ft. each, steel, through arch; 2 spans, 260 ft. each, steel, through truss; multiple spans of reinforced concrete; deck girder; masonry piers and abutments. About 65 ft. in width, carries electric tramway.	—	VII - 29
4. Kyongsong (Keijō)		Han-gang (Kan-kō)	Wide modern bridge. Double trolley track in center. Steel deck truss.	After 1918	VII - 30
5. Kyongsong (Keijō)		Han-gang (Kan-kō)	7 spans—steel, through truss; solid masonry piers. Width about 27 ft., roadway approximately 15 ft., two 6 ft. walks.	Opened 1918	VII - 31
6. Between Yonan (Enan) and Kaesong (Kaijō)		Yesong-gang (Reisei-kō)	About 2/5 mi. long; steel superstructure. Narrow gauge railway in center, vehicular lane and sidewalk on each side.	—	
7. Just north of Kongju (Kōshū)	36° 28′ N 127° 07′ E	Kum-gang (Kin-kō)	Steel bridge.	About 1935	
8. Two miles south of Hadong (Katō)	35° 03′ N 127° 45′ E	Somjin-gang (Senshin-kō)	Concrete.	—	
9. Pusan (Fusan)	35° 05′ N 129° 02′ E	Connects city with Mok-to (Makino-tō)	7 or more spans—reinforced concrete, deck girder; 1 span—steel, bascule.	—	VII - 32
10. West of Ch'angnyong (Shōnei)	35° 34′ N 128° 21′ E	Naktong-gang (Rakutō-kō)	About 1,160 ft. long; reinforced concrete deck girder; 15 spans, varying from 47 to 105 feet in length; reinforced concrete piers and abutments. About 20 ft. wide.	1935	VII - 33

TABLE VII - 5 *Continud*

LOCATION	LATITUDE AND LONGITUDE (APPROX.)	CROSSING	BRIDGE DESCRIPTION	DATE BUILT	FIGURE
11. East of Uiryong (Ginei), northeast of Chinju (Shinshū)	35° 19′ N 128° 17′ E	Nam-gang (Nan-kō)	850 ft. long; about 20 ft. wide; 2 spans of 134 ft. each, steel, through truss; 8 spans, reinforced concrete, deck girder; masonry piers and abutments.	1935	VII - 34
12. Andong (Antō)	36° 34′ N 128° 43′ E	Naktong-gang (Rakutō-kō)	44 spans; reinforced concrete, deck girder; piers of reinforced concrete, trestle bent.	—	
13. West of Hungnam (Kōnan)	39° 54′ N 127° 31′ E	Inlet near mouth of Songch'on-gang (Jōsen-kō)	At least 25 spans; deck girder; piers of reinforced concrete, trestle bent.	—	
14. Hunyung (Kunjū)	42° 55′ N 130° 10′ E	Tuman-gang (Tōman-kō)	14 spans; steel, deck plate girder; solid masonry piers. This bridge is believed to be half road, half railway.	1927	
15. Namyang-dong (Nanyō-dō) – T'u-men	42° 57′ N 130° 00′ E	Tuman-gang (Tōman-kō)	21 spans; steel, deck girder; solid masonry piers, masonry abutments with wing walls. Believed to be half road, half railroad.	1934	VII - 10
16. Above Chunggangjin (Chūkōchin)	—	Yalu River	Bridge reported under construction in 1938. This would form a bridge link between Korean and Manchurian roads.	—	
17. Sangsambong	42° 40′ N 129° 45′ E	Tuman-gang (Tōman-kō)	14 spans of 70 ft.; deck plate girder; reinforced concrete piers 25 ft. wide, 5′ 10″ thick; pier foundations on rock, some 15′ below water level. This bridge is believed to be half road, half railway, there being a 9 ft. footwalk on the downstream side.	—	VII - 11 and II - 28

FIGURE VII - 26. *Bridge over Yalu river at Sinuiju.*
Walkway of through-truss railroad bridge. Note vehicle in background. 1935.

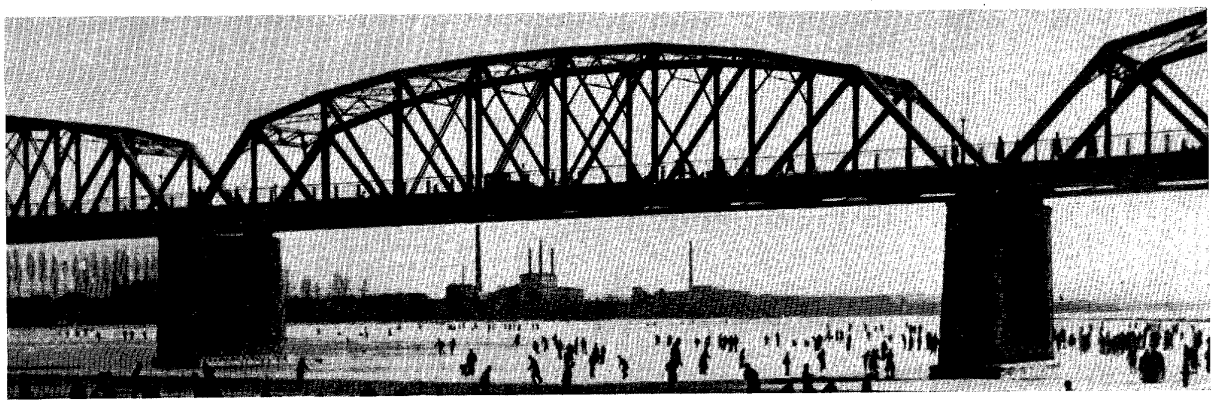


FIGURE VII - 27. *Highway bridge at P'yongyang (Heijō).*
Looking S. Before 1939.

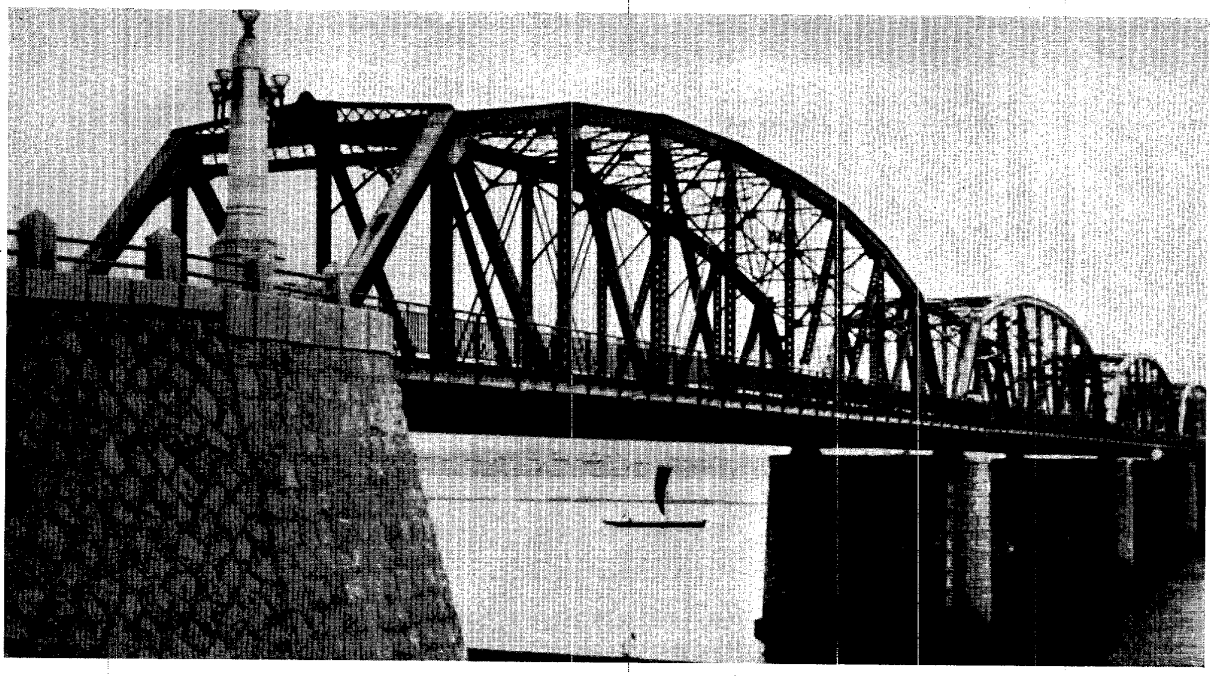


FIGURE VII - 28. *Highway bridge at P'yongyang.*
Another view of same bridge as FIGURE VII - 27.

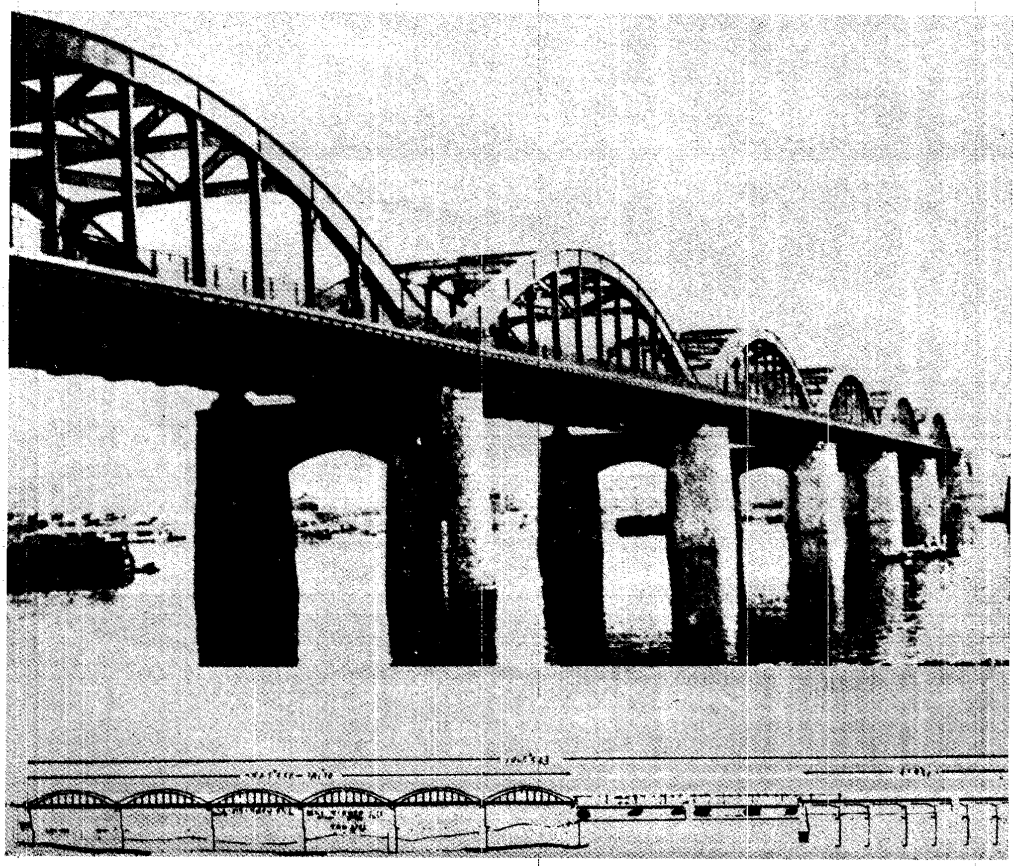


FIGURE VII - 29. *Bridge over Han-gang at Kyongsong.*
Through arch truss and deck girder bridge. Traffic lanes for pedestrians, vehicles and tram line. 1937.

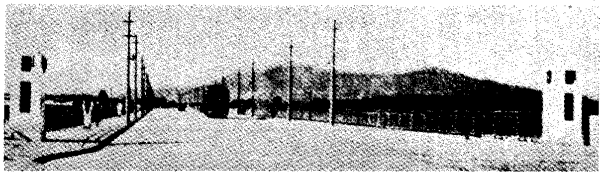


FIGURE VII - 30. *Bridge over Han-gang at Kyongsong.*
Steel deck truss bridge. View shows walks, traffic lanes and double-track tram line. 1929.

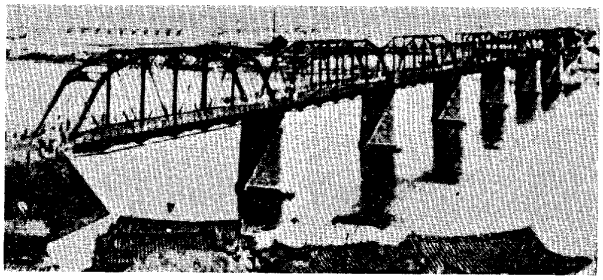


FIGURE VII - 31. *Bridge over Han-gang at Kyongsong.*
Old truss bridge with narrow roadway and walks.

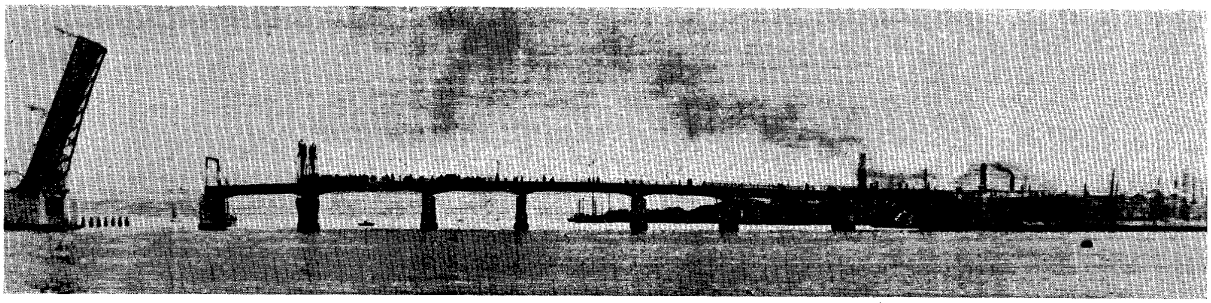


FIGURE VII - 32. *Pusan. Bridge connecting Pusan with Mok-to (Makino-tō).*
Bascule and deck girder bridge. Probably looking E. 1935.

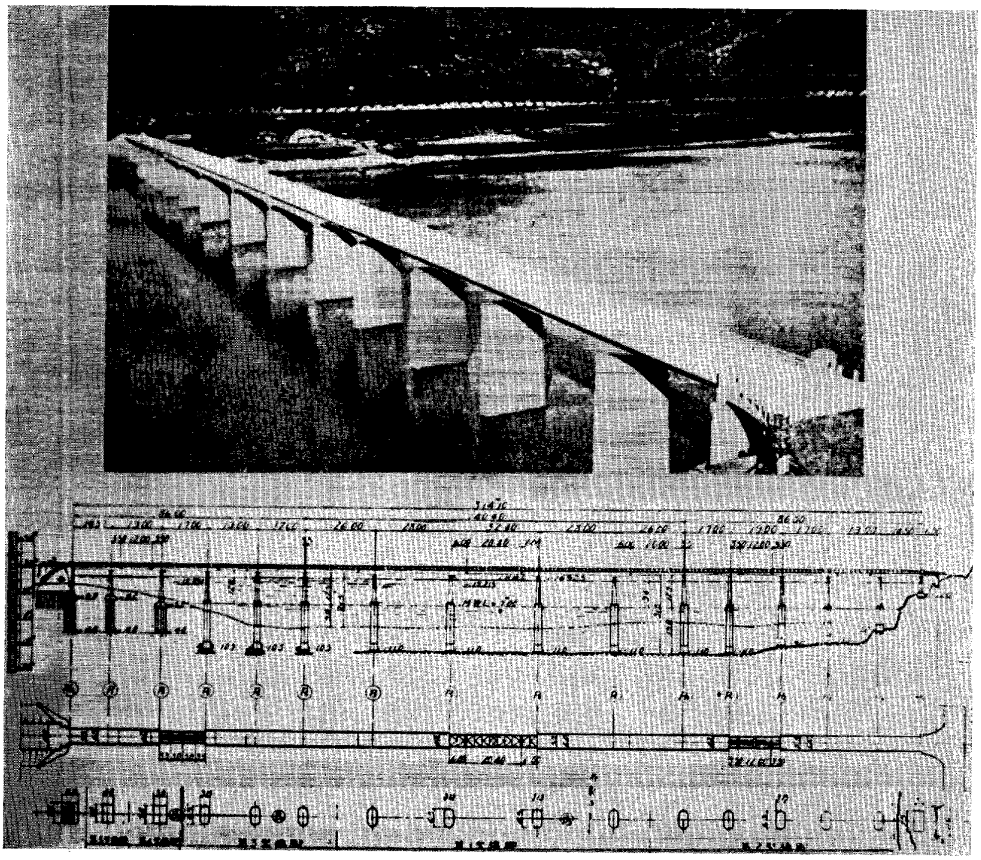


FIGURE VII - 33. *Bridge over Naktong-gang, west of Ch'angyong (Shōnei).*
Reinforced concrete bridge. Probably looking N. 1936.

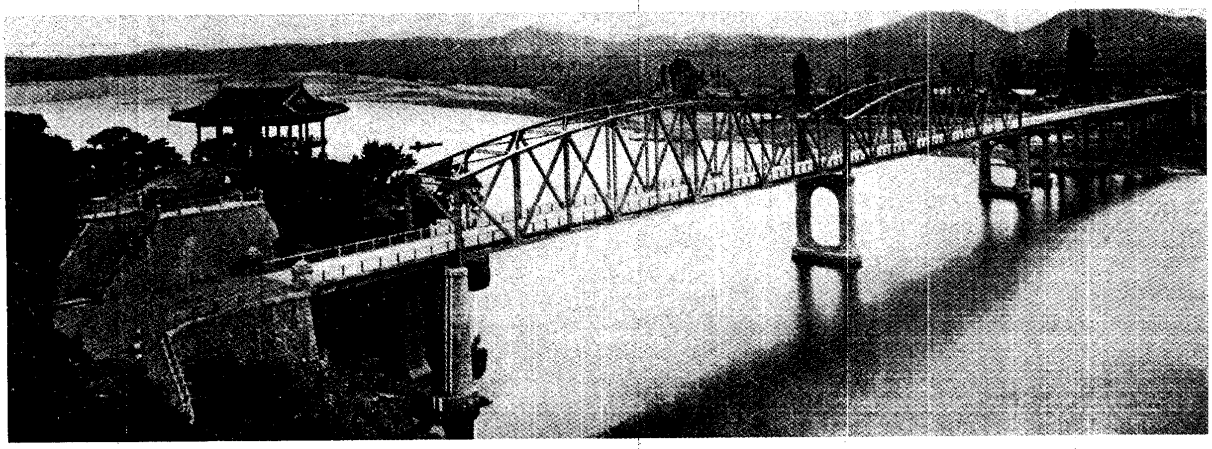


FIGURE VII - 34. *Bridge over Nam-gang, northeast of Chinju (Shinshū).*
Through truss and deck girder bridge. Probably looking NW. 1935.

FIGURE VII - 35. *Kyongsong (Keijō).*
Broad modern street, modern streetcars and safety zone platforms. Note contrasting means of transportation, the bicycle-drawn carts, ox with 4-wheel wagon, and the children pushing and pulling light vehicles.

(7) Types of vehicles and traffic.

The use of motor vehicles in Korea was chiefly for business and commercial purposes. Most of the passenger cars were owned by companies, church societies, and similar groups; or were operated as taxis. Only a few individuals owned passenger cars; about one-fourth were registered in the Kyongsong (Keijō) area. The total number of registered vehicles was small and the largest numbers were of buses and trucks (TABLE VII - 6).

TABLE VII - 6

NUMBER OF REGISTERED MOTOR VEHICLES IN KOREA

TYPE OF VEHICLE	1939	1940	1941
Passenger cars	2700	2250	1850
Buses	2900	2500	2000
Trucks	3900	3500	3000
Total	9500	8250	6850
Motorcycles	2100	2500	—

Before the war, buses were used extensively within the major cities, and it has been estimated that approximately 80% of the total mileage of state and local roads was covered by bus routes. In general, routes did not duplicate the railway service but acted as feeders. Buses were of various types, the largest having a capacity of about 25 to 30 persons; the smaller ones were converted passenger cars or station wagons.

Trucks are reported to have carried over 2,000,000 tons of freight in 1938. Most of the vehicles were light 2- or 3-ton trucks. Many bridges had too low a weight limit to permit use of larger vehicles. Like buses, trucks were principally feeders to the railways rather than long-distance movers.

Garages and repair shops were generally operated by the bus or truck companies, but were open to the general public as well.

The use of motor vehicles for transportation of civilians and civilian goods has been greatly curtailed by the war and it is reported that, beginning in 1938, many buses and trucks were conscripted by the military and in some cases moved to other Japanese-held territory. To avoid unnecessary duplication, buses and trucks not controlled by the army are said to have been put under the direction of the railway administration. Automobiles have been converted to the use of substitute fuels such as charcoal, carbon, and acetylene, because of the shortage of gasoline.

A number of types of non-motor vehicles are used in Korea. Rickshas have returned to use, replacing taxis. Bicycles and various types of attached carts are common, though not as numerous as in Japan (FIGURE VII - 35). Two and 4-wheeled oxcarts are very commonly used in the rural areas for short farm-to-market hauls (FIGURE VII - 36), and are common again in the cities (FIGURE VII - 35).

(8) Seasonal variations in road conditions.

During the period of heavy and persistent rains in July and August there is some interruption of road transport, but traffic on primary roads is seldom held up for more than a day or two.

FIGURE VII - 36. *Typical 2-wheel ox-cart.*

FIGURE VII - 37. *Road between paddy fields.*
Taken from the train between Pusan (Fusan) and Kyongsong (Keijō). 1937.

FIGURE VII - 38. *Near P'yongyang (Heijō).*
Shows Taedong-gang (Daidō-kō) at the left. Typical stone walls along steep cliff. 1936.

Occasionally, more severe floods may destroy small bridges and culverts on all classes of roads.

Interruptions are most common in south Korea, where roads crossing level rice-growing areas are subject to flood, in spite of being built on embankments (FIGURE VII - 37). In the mountainous areas of eastern Korea heavy rains sometimes cause landslides and washouts, but main roads are protected by well-constructed retaining walls and stone-faced banks (FIGURE VII - 38).

Throughout Korea some snow falls, and roads are generally frozen for part of the year. In the mountainous central part of northern Korea snow falls during October through April, with heavier snowfalls during December through February. Roads are promptly plowed and are seldom closed for more than a few days at a time. During the winter the roads are frozen and the surface is hard. Elsewhere, especially near the coast and in the south, snow cover seldom persists and the roads are frozen only for short periods.

No information is available on the condition of road surfaces when frozen roads thaw.

(9) Deployment and cover.

Most of Korea consists of mountains with steep slopes, and the roads in general tend to follow valleys. Even when there is a valley floor, they tend to hug the hillsides to avoid areas subject to flooding. For these reasons it is generally difficult for wheeled vehicles to deploy from the roads (FIGURE VII - 36).

Where topography is more favorable, in valley and coastal lowlands, much of the land is planted to wet rice. Roads are often embanked, hindering deployment, and there are also occasional canals and ditches.

Factors affecting cross-country movement are discussed in general terms in Chapter II, 21, C, and are illustrated by a Soil Trafficability Map (FIGURE II - 83). More details of the occurrence of each of these factors are set out in the description of each Terrain Region in Chapter II. There is more detailed information for certain roads in the Special Route Supplement to Chapters II and VII.

In general the difficulties of relief are much greater than those of vegetation, which is rarely a serious obstacle to deployment from roads. A small proportion of the land is in forest. The only extensive area of forest with dense growth is in the northern highland area. There are other forests, mostly secondary growth, on the eastern and southwestern highlands.

In general, vegetation provides little cover for vehicles in cultivated areas; or near populated areas, where forests are seriously depleted for fuel. The forests provide some cover where the slopes are not too steep to hinder access. The distribution and types of vegetation are discussed in more detail in Chapter II, 21, D, and the descriptions of the Terrain Regions in that chapter.

(10) Administration.

The planning and financing of highways was formerly the responsibility of the Civil Engineering Department of the Bureau of Internal Affairs of the Government General, and of the corresponding civil engineering sections of the provincial governments. In 1943 government bureaus were reorganized and it is believed that, since that time, highways, like railways, waterways, and airways, have been under the jurisdiction of the Communications Bureau.

State roads have been built at national expense, with funds provided from the general budget. Some funds from this source were also distributed to the provincial governments as a subsidy for the construction and maintenance of roads under their jurisdiction. There has been no allocation of special taxes for this purpose. The 1939-40 budget included an item of 5,028,467 *yen* for highway purposes of the Government and an additional 5,000,000 *yen* allocated to the provincial governments. There is little doubt that considerably larger amounts have been included in more recent budgets, as military needs in Manchuria and North China have necessitated increased use of roads, in

FIGURE VII - 39. *Possibly Pusan – Kyongsong road.*
Photograph taken from train between Kyongsong and Pusan. 1937. Note telegraph or telephone wires alongside road and railway.

addition to railways, for the movement of commercial goods, mechanized equipment, and supplies.

B. Route details.

Note: More detailed information on roads (1), (4), and (5) will be found in the form of annotations on the maps in the Special Route Supplement.

(1) Sinuiju (Shingishū) – Pusan (Fusan).

The route between Sinuiju (Shingishū) and Pusan (Fusan) is potentially the most important traffic artery in Korea. It is part of the land portion of the bridge between Japan, Manchuria, and North China. It roughly parallels the railroad, which is the chief carrier of goods between these regions. In any emergency, the highway would be used in an auxiliary capacity. The distance is approximately 600 miles. It is reported that the road is 2 to 4 lanes* in width and that considerable work has been done on it during the past 10 years. Most of it is thought to be traffic-bound macadam.

There are alternative routes between Suwon (Suigen) and Taegu (Taikyū). One follows the railroad through Taejon (Taiden), the other passes through Ch'ongju (Chūshū) (FIGURE VII - 54). Significant bridges along the route are shown in TABLE VII - 5. (FIGURE VII - 39).

A short stretch of good road connects Sinuiju (Shingishū) with the recently developed port at Dasado (Tashitō). At P'yongyang (Heijō) an important branch road leads to the port of Chinnamp'o (Chinnampo). It is a good 2-lane stone-based road and formerly carried a rather heavy traffic. A similar port-to-city road connects Inch'on (Jinsen) and Kyongsong (Keijō). This 20-mile stretch is reported to have been one of the country's few "oiled" roads.

*Throughout this report statements about 'lanes' of traffic refer to civilian traffic.

(2) Kyongsong (Keijō) – Mokp'o (Moppo).

This highway, connecting the capital with one of the country's major ports, follows the Kyongsong-Pusan route to south of Ch'onan (Tenan), continuing southward through Kongju (Kōshū), Chonju (Zenshū), and Kwangju (Kōshū) to Mokp'o (Moppo). Most of the route is reported to be a good 2-lane stone-based road but the stretch between Kwangju (Kōshū) and Mokp'o (Moppo) is said to be 3-lane and tarred. There are few roads of any significance in the area between this main highway and the coast. One very good asphalt-surfaced road connects Chonju (Zenshū) and Kunsan (Gunzan). Because of the agricultural importance of this southwest region, roads here were among the first developed by the Japanese.

(3) South coast highway.

It is thought that during the war there has been considerable improvement of the road extending from the small port town of Usuyong (Usuiei), on the west coast, and following some distance from the south coast to connect with the main Kyongsong – Pusan highway at Samnangjin (Sanrōshin). The shift from sea to land transport, for goods passing between Japan and Manchuria, has brought about a considerable increase in the use of the south coast ports of Yosu (Reisui), Masan (Masan),

and Pusan (Fusan). In addition, the vulnerability of this coast, and its strategic importance to Japan, have undoubtedly necessitated the construction of numerous fortifications, which would have to be served by roads suitable for trucking.

Several important short roads branch from this route. One extends from Sunch'on (Junten), on the main route, to the port and naval base of Yosu (Reisui). Another, reported to be hard-surfaced, connects Masan (Masan) with the important naval and air base at Chinhae (Chinkai). In the triangle, lying north of the south coast highway and enclosed by the Kyongsong – Mokp'o and the Kyongsong – Taejon – Pusan routes, there are numerous secondary roads. Chief among these are the Kwangju – Posong (Hōjō) and the Chonju – Sunch'on roads, both of which follow rail lines (FIGURE VII - 54).

(4) Kyongsong – Wonsan (Genzan) and P'yongyang – Wonsan routes.

Two main roads crossing Korea's mountain backbone connect the two major west coast cities, P'yongyang (Heijō) and Kyongsong (Keijō), with the northeast region. These roads supplement, but do not follow, the railroad routes between the same cities. Both are reported to be fairly good 2-lane roads, but they traverse rather rugged terrain and therefore are winding and have numerous steep grades. There is a snow problem on both roads, but arrangements for the use of plows were generally made with farmers living along the routes and there was seldom long delay.

(5) Wonsan – Ch'ongjin (Seishin).

During the last 10 to 15 years there has been a pronounced development of both industries and mining in the portion of the country north and northeast of Wonsan. As a result the coastal highway between the ports of Wonsan and Ch'ongjin has become a primary traffic route. It is reported to be a good crushed-stone motor highway, 2 to 3 lanes in width, capable of supporting fairly heavy traffic at an average speed of 35 miles per hour. Bridges along the route are of reinforced concrete and are as wide as the road. A branch, reported to be hard-surfaced, extends from the main route at Hamhung (Kankō) and connects that town with the industrial area in the vicinity of Hungnam (Kōnan).

(6) Ch'ongjin (Seishin) – Onsong (Onjō) – Unggi (Yūki).

The northeastern corner of Korea is a gateway for traffic between Manchuria and Japan. The importance of its transportation system is increased by the proximity of the region to the Siberian frontier, and the consequent militarization of the zone. A well-maintained primary road forms a loop around the area, joining the ports of Ch'ongjin (Seishin), Najin-dong (Rashindō), and Unggi (Yūki) and the border towns of Kyonghung (Keikō), Hunyung (Kunjū), Onsong (Onjō), and Hoeryong (Kainei) (FIGURE VII - 54).

(7) The Korea – Manchurian border route.

A road follows the entire land boundary of Korea. From Komusan (Komosan), on the main loop road in the northeast, it extends southwestward through Musan (Mozan), Hyesanjin (Keizanchin), Chunggangjin (Chūkōchin), Manp'ojin (Mampochin), Ch'osan (Sozan), and Sakchu (Sakushū), to Sinuiju (Shingishū). This has been described as a "military highway" and has apparently been improved beyond the needs of the people within the area.

Branches from this road extend to either coast. Three of these branches wind across the rugged northeastern highland, connecting Musan (Mozan) with Kilchu (Kisshū), Hyesanjin (Keizanchin) with Pukch'ong (Hokusei), and Chasong (Jijō) with Hamhung (Kankō). These roads serve an important mining region.

From the western portion of the frontier route, 3 important roads extend south to the well-populated northwest coastal area. One follows the railway between Manp'ojin (Mampochin) and Anju (Anshū) and is much used by trucks in all weather. Another road connects Ch'osan (Sozan) and Pakch'on (Hakusen) via Unsan (Unsan), serving a productive mining area. The third road links Sakchu (Sakushū) Kusong (Kijō) and Chongju (Teishū). All of the roads in the Sinuiju – Manp'ojin – Anju triangle have been considerably improved in the last 10 years. The border route between Sinuiju and Manp'ojin is said to be a good stone-based highway with well-graded curves permitting a 40-mile per hour speed. This and the 3 roads mentioned above have supported a large amount of bus and truck traffic.

The entire border area has extremely cold winters and heavy snows, but traffic on main routes is seldom disrupted for more than a short period.

(8) East coast road, south of Wonsan (Genzan).

Little information is available about the road south of Wonsan; it is reported to be a good road as far as the Japanese army air base at Hupkok (Kyūkoku), and has been reported as a well-constructed secondary road to, and perhaps beyond, Yangyang (Jōyō). It follows the narrow coastal strip to P'ohang-dong (Hoko-do). This route is not as important as its coastal position might indicate; the area it serves is sparsely inhabited and, although a few roads cross the eastern mountains, access to the populous west and southwest is difficult.

C. Roads on Cheju-do (Saishū-tō, Quelpart Island).

Little is known about this island off the southwest coast of Korea. Its rather small agricultural population is clustered around the margin. A road connects all the towns situated on or near the coast. The character and condition of the road are not known, but it is believed that the portion connecting the towns of Kumnyong (Kinnei), Cheju (Saishū), Taejong (Taisei), and Mosulp'o (Boshippo) is probably the best. It is probably a dirt road and has been reported capable of allowing a speed of 25 miles per hour.

A road which skirts the western part of the island's central mountain mass forms a short inland route between Cheju and Taejong. Numerous trails cross the mountainous interior, or connect inland villages with the coastal road.

D. Roads on Tsushima.

Information concerning this island group has been closely guarded by the Japanese, and is therefore meager and not very recent. The best stretch of motorable road connects Kechi and Izuhara, principal towns of Shimono-shima, the southern island.

It is believed that two roads branch westward from Kechi, one to a reported naval base at Takeshiki, the other to Osaki, a cable communications center and seaplane base. The main road continues south from Izuhara to Tsutsu on the southwest coast.

A short motorable road crosses a narrow portion of Kaminoshima, the northern island. There may be other roads in the same vicinity, as reports have been received of new airfield locations. Numerous trails and narrow earth roads connect the many small villages, most of which are on or near the coast.

73. *Water Transport*

By reason of its geographical position, most of Korea's foreign trade, excluding that with Manchuria, was formerly carried by sea, although the shortage of shipping is necessitating the greater use of land routes. At its mainland point nearest to Japan, the sea distance is only 120 miles and the ports and railroads within Korea have been developed accordingly to provide a major transportation system between Japan and Japanese-held territory on the mainland. Coastwise traffic also plays a significant part in the economy of the country. Inland water transport, on the other hand, is relatively unimportant.

A. Overseas and coastal.

Korea's overseas trade is carried mostly by steamers, while her local coastal traffic is transported largely by junks and small motor vessels. The principal imports are military supplies, bituminous coal, fertilizers, textiles, and machinery; exports include rice, wheat, soya beans, anthracite coal, lumber, mineral ores, chemical, and marine products. The greatest volume of shipping normally moves in late fall, winter, and early spring due to the seasonal nature of the trade except at Chinnamp'o, where maritime activity is affected by ice conditions and usually decreases in winter. Practically no shipping lines operate on a regular schedule, aside from the Pusan – Shimonoseki steamers. All passenger travel on ships has been greatly curtailed; a police or military travel permit is a prerequisite.

(1) Number of vessels.

In 1938, 13,062 steamers aggregating 14,167,000 gross tons entered Korean ports. Of these, 11,640 totalling 12,230,000 gross tons, were Japanese-owned. In addition, 11,891 Japanese sailing vessels, aggregating 387,000 gross tons, and 14,384 non-Japanese sailing vessels (mostly Chinese) aggregating 123,000 gross tons, used these ports. As there are no separate figures available for motor vessels, it is possible these are included in the above totals, being classified according to their primary motive power.

Sailing vessels under Korean registry in 1938, as reported by the Merchant Marine Bureau of the Department of Commerce of Japan, totalled 1,096 with an aggregate of 42,715 gross tons. Details of motor vessels under Korean registry in 1939, according to the same source, are given in TABLE VII - 7.

In 1940, 52 steamship lines to Japan and other foreign countries were served by 111 ships with an aggregate of 344,813 gross tons.

TABLE VII - 7

NUMBER AND GROSS TONNAGE OF MOTOR VESSELS UNDER KOREAN REGISTRY IN 1939

	No. of ships	Total gross tonnage
20 to 100 ton class	577	25,608
100 to 300 ton class	48	7,908
300 to 500 ton class	15	5,686
500 to 1000 ton class	8	5,422
1000 to 2000 ton class	9	11,570
2000 to 3000 ton class	12	29,601
3000 to 4000 ton class	4	13,393
total	673	total 99,188

(2) Ports of call.

Most of the small Korean ports and fishing harbors, which number over 300, are on the greatly indented south and west coasts (FIGURE VII - 54). However, the Japanese have developed several ports on the east also. These ports, with their modern facilities and rail connections, have been built and expanded primarily to serve Japanese shipping, although they also handle a large proportion of coastal trade. The most important ones are listed below; reference should be made to Chapter VI for a fuller description.

(*a*) *Unggi* (*Yūki*). Unggi, on the main railroad between Najin (Rashin) and Namyang-dong (Nanyō-dō), is a small port with one of the best natural harbors in northern Korea, which is kept clear in winter by an icebreaker. In addition to vessels anchored in the stream and handled by the use of lighters, a limited number of steamers up to 5,000 tons with a draft less than 24′ can be accommodated at alongside berths which have an estimated daily unloading capacity of 1,500 long tons. This port has been greatly used by 1,500- to 2,000-ton steamers, and before the war had regular steamship service with Japanese west coast ports, and with Dairen, Tientsin, and Shanghai. In 1936, 1,549 steamers aggregating 812,457 gross tons and 88 sailing vessels aggregating 2,824 gross tons entered the port. Principal imports included sheet iron, textiles, fertilizers, and wheat flour. Lumber, millet, soya beans, and peas were important exports.

(*b*) *Najin* (*Rashin*). Najin, a naval base, is the most important port on the northeastern coast (FIGURE VII - 40). It is connected by the Tuman railroad line with the eastern Manchurian railways and handles a large amount of strategic traffic bound for Manchuria. The port, whose facilities at alongside berths alone have an estimated daily unloading capacity of 10,100 long tons, can accommodate 10,000-ton vessels drawing 31 feet. Daily passenger-boat service was maintained with Shimonoseki until 1942. Heavy traffic now moves between Najin and Tsuruga, Niigata, and Kanazawa. Najin is generally free from ice during winter, but is subject to dense fogs in spring and summer.

(*c*) *Ch'ongjin* (*Seishin*). Ch'ongjin, which is ice-free, can accommodate vessels up to 8,000 tons in 29 feet of water at alongside berths whose facilities have an estimated daily unloading capacity of 4,400 long tons (FIGURE VII - 41). This capacity is considerably increased by the use of lighters to ships anchored offshore. Two major steamship lines connect it with Tsuruga and Niigata, and there are rail connections northward to Manchuria and southward to Kyongsong. During 1938, 819 vessels aggregating 1,245,348 gross tons entered this port. In addition to a large coastal trade, Ch'ongjin imports military

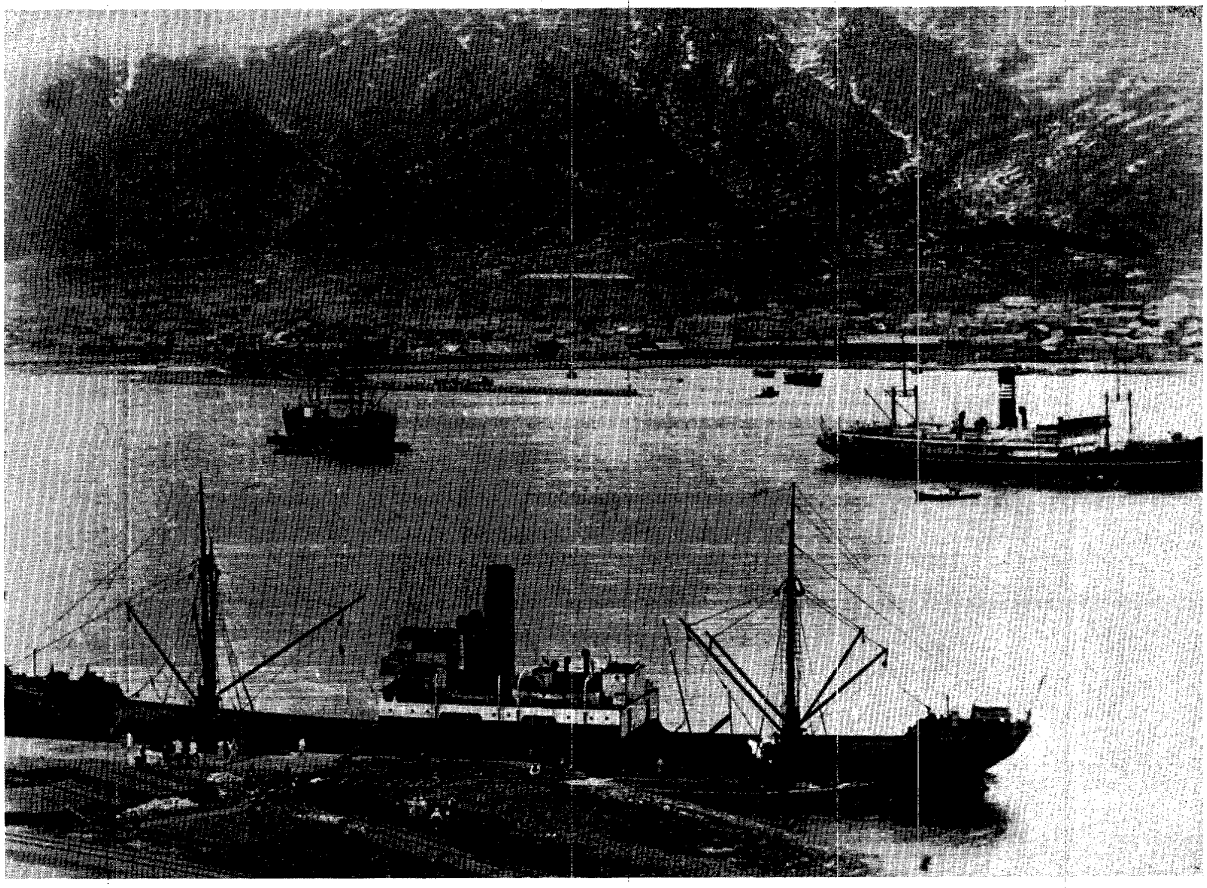


FIGURE VII - 40. *Najin* (*Rashin*).
View of shipping in port.

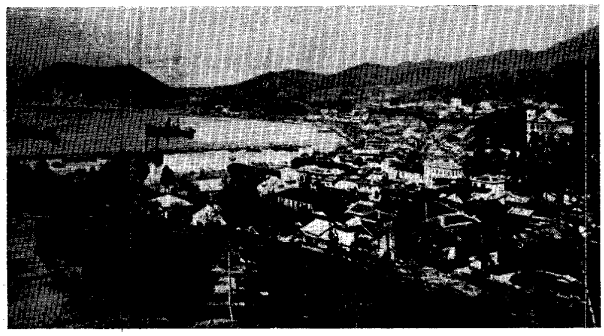


FIGURE VII - 41. *Ch'ongjin* (*Seishin*).
View of port. After 1931.

supplies for Japanese troops in Korea and exports iron ore from the Musan mines to Japan.

(*d*) *Songjin* (*Jōshin*). Songjin, although of growing significance as a commercial port, is less important than Unggi, Najin, and Ch'ongjin, and is served principally by coastal freighters. It exports lumber and magnesite. The port's daily unloading capacity at alongside berths is estimated at 1,800 long tons.

(*e*) *Ch'aho* (*Shako*). Ch'aho, an iron exporting port, can accommodate vessels drawing less than 27 feet. Its capacity for loading iron is estimated at 225 tons per hour.

(*f*) *Hungnam* (*Kōnan*). Hungnam has developed in less than a decade from a small fishing town into an important port with facilities having an estimated daily unloading capacity at alongside berths of 8,000 long tons (FIGURE VII - 42). These berths, although capable of accommodating vessels up to 10,000 tons drawing 26 feet, are, however, often inadequate to deal with the shipping required to handle the considerable export tonnage of ammonium sulphate and other products of the local chemical plants.

(*g*) *Wonsan* (*Genzan*). Wonsan, a Japanese naval base, has a good, natural, practically ice-free harbor. Prior to the war, it had Japanese steamship connections with Pusan every 3 days, Moji weekly, and Kōbe and Ōsaka every 10 days. It has limited alongside accommodation for vessels up to 5,000 or 6,000 tons drawing less than 25 feet, and has an estimated daily unloading capacity of 1,160 long tons in addition to what may be discharged overside to lighters from ships anchored in the stream.

(*h*) *Pusan* (*Fusan*). Pusan is the leading port and principal railroad terminal in southern Korea. Freighters up to 7,500 tons and drawing less than 28 feet can be accommodated at alongside berths which have an estimated daily unloading capacity of about 15,000 long tons. In 1939 it dealt with 3,625 steamers aggregating 3,615,500 gross tons, and in 1943, according to customs records, shipping had increased to an average of about 80,000 tons weekly. Pusan is a terminal of the steamship service to Shimonoseki operated by the Imperial Japanese

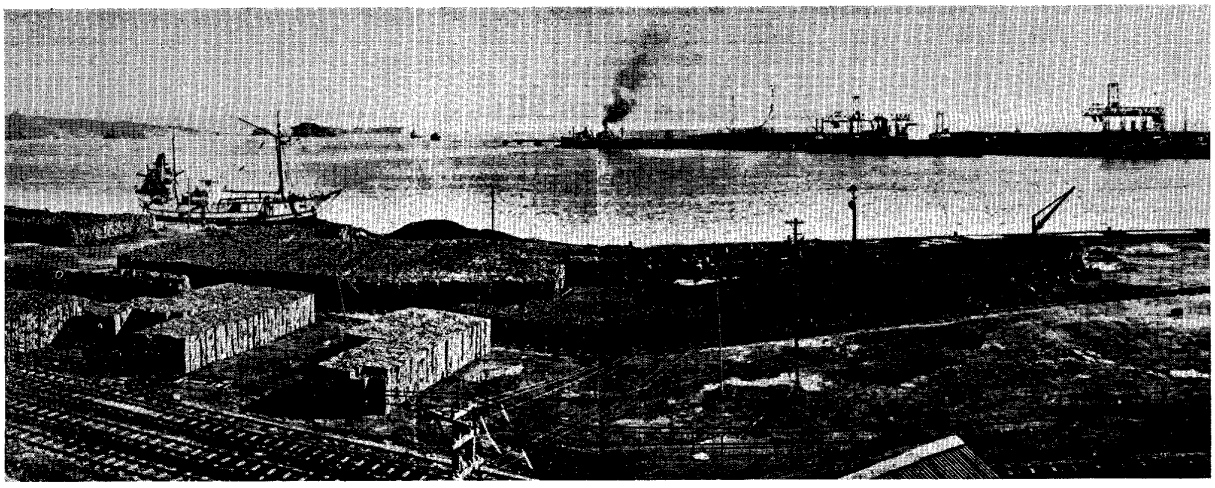


FIGURE VII - 42. *Hungnam (Kōnan)*.
View of port showing wharves and cranes. 1937.

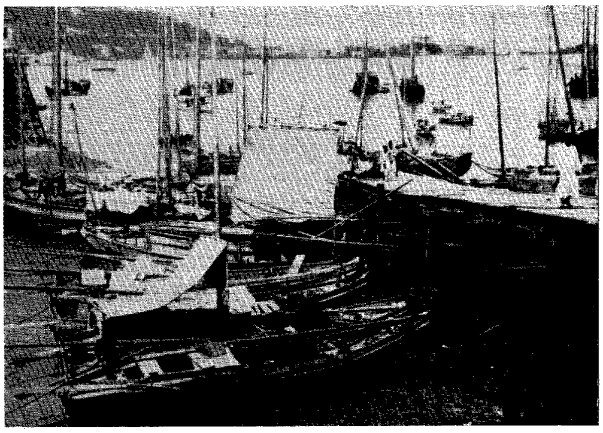


FIGURE VII - 43. *Inch'on (Jinsen)*.
Small sailing vessels in port at low tide.

Government Railways, and handles most of the passenger travel to and from Japan, as well as a large tonnage of general cargo.

(*i*) *Masan.* Masan, part of the Chinhae Naval Base, has a well-sheltered harbor, and can accommodate small vessels at alongside berths. Larger vessels anchor in the stream and discharge overside to lighters.

(*j*) *Yosu (Reisui)*. Yosu is significant as a lumber exporting point, and is an alternative terminal to Pusan for the steamer service to Shimonoseki. It can accommodate a limited number of freighters drawing less than 25 feet and its alongside berths have an estimated daily unloading capacity of 800 long tons. Completion of various improvements which are reportedly being undertaken may substantially increase this capacity. Ships of Ōsaka Shosen Kaisha (Company) and Chōsen Yusen Kaisha (Company) called several times weekly prior to the war.

(*k*) *Mokp'o (Moppo)*. Mokp'o has a well-protected natural harbor, but shipping is handicapped by the great tidal range. Although vessels up to 6,000 tons can enter the harbor, no steamer larger than 2,000 tons can be accommodated at the floating pontoons, which have an estimated daily unloading capacity of 800 long tons. The port is a fishing center, and before the war had regular steamship connections with Japan and other leading Korean ports. Considerable rice is exported, and it is the principal cotton-shipping port in Korea.

(*l*) *Kunsan (Gunzan)*. Kunsan, on the southern side of the Kum-gang (Kin-kō) River mouth, has considerable trade with other Korean ports, and with Japan and China. The harbor is well-protected, but navigation from the sea is difficult because of shoals and the large tidal range. Pontoons accommodate vessels of up to 3,000 tons drawing less than 21 feet of water. These pontoons have an estimated daily unloading capacity of 1,200 long tons. Larger ships anchor in the stream and load and discharge by lighter. The export of wheat and rice represents the principal traffic.

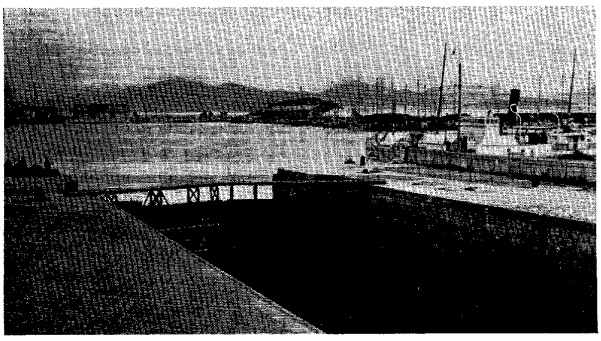


FIGURE VII - 44. *Inch'on (Jinsen)*.
Lock gate built by the Japanese in harbor of Inch'on.

(*m*) *Inch'on (Jinsen)*. Inch'on, an important commercial port, had regular steamship services in 1941 with Japan, Dairen, Tsingtao, and Shanghai. Its harbor is well-sheltered and ice-free (FIGURE VII - 43). Owing to the great tidal range, large vessels have to discharge overside to lighter at a distance of 3 miles offshore, but a double-lock tidal basin with a constant depth of at least 27 feet of water can accommodate 4,500-ton ships at alongside berths having an estimated unloading capacity of 3,000 long tons per day. A new tidal basin, reported near completion in 1941 will permit accommodation of 10,000-ton vessels (FIGURE VII - 44). During 1937, the port handled 1,950,000 gross tons of shipping which increased to 2,500,000 tons in 1939.

(*n*) *Chinnamp'o.* Chinnamp'o, on the north bank of the Taedong-gang (Daidō-kō), is ice-free except for two or three weeks in January and February. It handles general cargoes, including the export of rice. Formerly much high-grade anthracite was exported, and bituminous coal was imported from Japan and southern Manchuria (FIGURE VII - 45). Vessels up to 6,000 tons can be accommodated alongside the coal bunkers. The estimated daily unloading capacity of the other alongside berths, which have a 20-foot depth of water, is 1,600 long tons. In 1937, 905 steamers with an aggregate tonnage of 1,063,108 tons entered the port.

FIGURE VII - 45. *Chinnamp'o (Chinnampo).* Shipping activity at port. About 1931.

(3) Routes.

Routes parallel the entire coastline, and connect the Korean ports with Japan, Manchuria and China. Offshore dangers on the eastern coast are relatively few and the tidal range is small, but navigation along the southern and western coastal routes is difficult because of the many islands and shoals, numerous intricate channels, strong tidal currents (often exceeding 5 knots and sometimes under the influence of freshets or strong winds as high as 13 knots), and large tidal ranges (spring tide at Inch'on is 30.5 feet). Navigation aids in 1938 numbered 365, consisting of 192 night, 145 day, and 28 fog signals. The Japanese system of buoyage is used.

The most important route, which joins Pusan and Shimonoseki, is the shortest route between Japan and Korea (TABLE VII - 8), and is becoming an increasingly vital link as Allied interference with Japanese shipping mounts. It is used by a Japanese Government Railways passenger and freight service, which in April 1944 was reported to be operating 1 steamer each way per day. This service is important, as it carries most of the Korean-Japanese passenger traffic, as well as some freight and an estimated 5,000 tons of coal per week for use on the Japanese Government Railways. Alternative terminals of this service are Yosu (Reisui) and Hakata (Kyūshū).

Other major routes operated by the shipping lines are:

1, Northeast coast ports to Japan (Niigata, Fushiki, Kanazawa, and Tsuruga).

2, Pusan to Mokp'o, Kunsan, Inch'on, Chinnamp'o, Dasado (Tashitō), and Yongamp'o.

3, Pusan to Wonsan, Hungnam, Najin, and Unggi.

TABLE VII - 8

DISTANCES FROM SELECTED KOREAN PORTS

	Chinnamp'o	Inch'on	Pusan	Wonsan	Dairen (Manchuria)	Shimonoseki (Honshū)	Hakodate (Hokkaidō)	Mokp'o	Nagasaki (Kyūshū)	Shanghai (Kiangsu)	Tsingtao (Shantung)	Vladivostok (U.S.S.R.)
Chinnamp'o	—	216	496	801	180			288		561	309	997
Inch'on	216	—	402	707	290	485	1096	189	453	503	333	893
Pusan	496	430	—	308	543	123	686	225	163	491	497	514
Wonsan	801	707	308	—	848		638	530	452	797	802	324

In addition, there are numerous minor coastal lines which call at many small ports and islands en route and serve as feeder lines to the main ports.

The volume of shipping across the Yellow Sea between Occupied China and Korea is small, and is handled by small coastal steamers and junks.

(4) Administration and personnel.

Navigation and closely related activities are under the administration of the Communications Bureau of the Government General of Korea. In 1933, a Seamen's Training School was established in Inch'on; it was later moved to Chinhae. It is modelled on Japanese lines, and teaching is in Japanese. In 1938, Korea had 11,135 seamen, including 4,171 officers.

B. Inland.

Few rivers of Korea are navigable. Most of them flow through rough terrain, and have swift, turbulent currents and numerous rapids impassable even by small native river craft. Nearly all are frozen at least part of the winter, and are subject to floods after periods of heavy rainfall.

Only one river (Tuman) on the east coast and one Naktong) on the south coast are navigable for any appreciable distance inland (FIGURE VII - 54). Rivers on the west coast, however, tend to be longer, less swift in their middle and lower courses, and have channels more suitable for navigation (TABLE VII - 9). Several of them, especially the lower Yalu River and Taedong-gang, carry considerable traffic.

Barges, launches, junks, and rafts are the commonest types of river craft; air-propelled boats on the Yalu, and steamers on the lower reaches of the Taedong-gang and Yalu Rivers are also used.

The chief cargoes are timber, agricultural produce, coal, salt, marine products, and general merchandise.

Information on individual streams is given in TABLE VII - 9.

TABLE VII - 9

NAVIGABLE RIVERS OF KOREA
(Distances are approximate)

NAME	LOCATION OF MOUTH	NAVIGABILITY	REMARKS
1. Tuman (Tōman)	NE Korea, on Korea – USSR border.	Small steamers go upstream 12 mi., junks 58 mi., native boats 205 mi. River freezes during winter months. Recordings at Ryudō (42° 40′ N, 130° 10′ E) give average period 24 Nov. to 31 March. River is swollen during spring thaws and heavy summer rains.	Salt, marine products, general mdse., etc. transported upstream. Timber, soya beans, charcoal, and hemp shipped downstream. Long, shallow-draft Korean sampans and Chinese junks are poled and sailed. During mid-winter river is used for sled and cart traffic. Soya bean shipments reach peak in Sept. and Oct. (FIGURE VII - 46).
2. Naktong (Rakutō)	SE Korea, 8 mi. W of Pusan.	Small junks and sampans go 215 mi., steam launches 75 mi. upstream. The estuary divides into several shallow channels separated by low sandflats and islands. Lower reaches of river are ice-free all year. Depth greatly increases during rainy season (July-Aug.)	Least traffic Jan. to May. Greatest traffic Sept. to Dec. Main cargoes are rice and cotton.
3. Somjin	15 mi. N of Yosu.	Small vessels go 22 mi. upstream.	
4. Kum (Kin)	At Kunsan.	Seagoing vessels reach Kunsan; junks and sampans go 80 mi. upstream.	The river is used mainly for irrigation.
5. Han (Kan)	30 mi. NW of Inch'on.	Vessels of 13′ draft go 34 mi., 6′ draft vessels go 38 mi., small boats go 180 mi. upstream. The main approach is through the Yen-ga which has depths varying from 4½ – 9 fathoms in narrow sections, to about 2 fathoms in wide sections. Tidal currents up to 8 knots. Tidal range at springs 25′. At Kyongsong recordings give average period of freezing as 17 Dec. to 4 March.	The Han contains many serious rapids, but it carries a considerable volume of traffic. Small river steamers formerly plied between Inch'on and Yongsan, but stopped after completion of railway between Kyongsong and Inch'on (FIGURE VII - 47). A tributary, the Pukhan, is navigable 21 mi. for small craft. Another tributary, the Imjin, is navigable 73 mi. for small craft. The port of Kyongsong has both railroad and highway connections.
6. Reisei	30 mi. NW of Kyongsong.	Small craft go 38 mi. upstream.	
7. Taedong (Daidō)	NW Korea, 12 mi. W of Chinnamp'o.	Large seagoing vessels go to Chinnamp'o, 12′ draft vessels to Hosan, 10′ draft vessels to Pyongyang during flood tide. Cargoes are also lightered to Pyongyang from 8 mi. below in launches and barges. Native boats go 140 – 150 mi. from mouth. Ice prevents navigation above Chinnamp'o from December to March. Average period of freezing recorded at Pyongyang is 17 Dec. to 8 March. Masses of ice block the entrance to Chinnamp'o often cutting it off from the sea for 3 weeks. The estuary is broad and has minimum depth of 5 fathoms. Tides extend considerable distances inland and are affected by floods in July and Aug., rising 10′ or more.	Width of stream varies from ½ to 1 mi. from mouth to Pyongyang. Above Pyongyang, upstream cargo is mostly general mdse. and salt; downstream cargo is farm produce, firewood, charcoal, hemp, etc. Barges have been extensively used to ship anthracite from Jido to Chinnamp'o. Least traffic occurs June-July and Dec.-Mar. The tributaries Chaeryong, Futsuryu, and Namgang are navigable by shallow-draft boats for 3, 19, and 41 mi., respectively. River ports include Kyomip'o and Pyongyang; the latter had steamboat service to Chinnamp'o in 4 hrs.
8. Ch'ongch'on (Seisen)	NW Korea, 15 mi. SE of Chongju.	100 mi. for junks. Tides extend to Anju, beyond which the river is shallow and rocky.	Formerly mining companies transported freight on it, and some coal is still carried.
9. Yalu (Oryoku)	NW Korea, 20 mi. S of Antung.	Vessels drawing 18′ reach San-tao-lang-t'ou at spring tide, at other times it is accessible by vessels of 14′ draft. Vessels drawing 14′ reach Sinuiju and Antung at spring tides, and about 9′ draft at other times. Junks ascend 200 mi., smallest native craft go 435 mi. except where navigation is blocked by Suiho hydroelectric system (FIGURE VII - 48).	Air-propelled, government-subsidized boats, with 2 enclosed cabins, accommodating 30 – 40 passengers, operate to Chukochin. Smaller air-propelled boats ascend to Hyesanjin. Much freight was carried until 1942 on river on 40′ flatboats equipped with sails. River closed by ice from late Nov. to late Mar. Tasa-do and Sinuiju are river ports; the latter handled 68,000 tons of shipping in 1937.

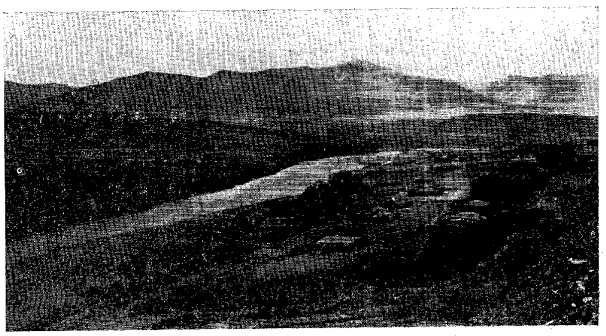


FIGURE VII - 46. *Tuman-gang (Tōman-kō) near Musan (Mosan).* View of Tuman-gang, navigable only by native boats because of swift current and numerous rapids. 1912.

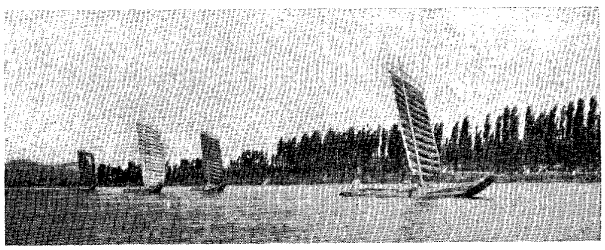


FIGURE VII - 47. *Han-gang (Kan-kō), near Kyongsong (Keijō).* Flat-bottomed sailing craft.

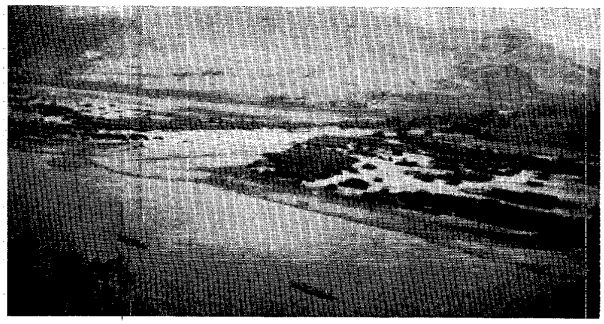


FIGURE VII - 48. *Yalu River near Wiwon (Igen).*
Two small craft navigating the Yalu River.

74. Radio

Korea's communication facilities constitute an integral part of Japan's communication system on the mainland. They are of vital importance in the administration of government, in the use of Korean resources, and as connecting links between Japan and Manchuria.

A. Administration.

Radio broadcasting in Korea is a monopoly of the Korea Broadcasting Corporation (Chōsen Hoso Kyokai), which is closely affiliated with the Japan Broadcasting Corporation. Radiotelegraph and radiotelephone services, with the exception of military installations, are operated by the Communications Bureau of the Government General. Radio communications of all kinds are subject to close government supervision, and are censored in accordance with government policies.

The Korea Broadcasting Corporation is financed in part by a monthly license fee of 75 *sen* (about 17 cents U.S.) for each home receiver. It also receives an annual subsidy from the Government General, amounting in 1939 to 32,286 *yen* (about $7,500 U.S.).

It is illegal to own short-wave home receiving sets, except by special permission. The government promotes the use of low-power home receivers capable of receiving only domestic programs. Recent reports indicate that stations in Korea are still broadcasting on frequencies between 550 and 1100 kilocycles.

The Engineering Section of the Communications Bureau conducts authorized research in telecommunications. Prior to Pearl Harbor, a few licenses were granted for amateur radio operation.

B. Radiobroadcasting.

Radiobroadcasting is one of the government's chief means of issuing official statements and propaganda. The Korea Broadcasting Corporation monopolizes radiobroadcasting and operates at least 7 stations, which are distributed regionally to make reception possible anywhere in Korea (FIGURE VII-55).

All broadcasting is censored and conforms to government policies. A large proportion of programs are in Japanese and originate in Japan; most of the Korean language programs originate in Kyongsong. The majority of programs on other Korean stations are rebroadcast from these 2 sources. By using 2 frequencies, it is possible to broadcast programs in both languages at the same time. In Kyongsong, programs in Japanese are broadcast from 0600 through 2200 hours; and programs in Korean from 1200 through 2200 hours.

(1) Broadcasting transmitters.

As far as can be ascertained all transmitting equipment in Korea is of Japanese manufacture. Basic designs are copied from American or German models, but usually have Japanese refinements; workmanship is comparable to that of Allied nations.

Most radio broadcasting stations in Korea have 250- to 500-watt transmitters, but Ch'ongjin (Seishin) and Kyongsong (Keijō) have 10,000-watt units. The most powerful transmitter reported is a 50,000-watt unit installed at Kyongsong in 1937 (TABLE VII - 10, and FIGURES VII - 49, VII - 50).

Transcribing equipment had also been installed at the main station in Kyongsong by 1938.

(2) Radio receivers.

Virtually all home receiving sets in Korea are of Japanese make. A few American and European sets were owned by foreign-born residents until 1942. In 1941 there were 220,000 sets, mostly 3- or 4-tube table models with magnetic or dynamic speakers, and were designed for 100-volt, 60-cycle alternating current.

The sale and maintenance of receiving sets were handled mostly by the Keijō Electric Company and Korea Broadcasting Corporation. In 1940, 56% of all Japanese households in Korea had radios, while less than 2% of Korean families were so equipped.

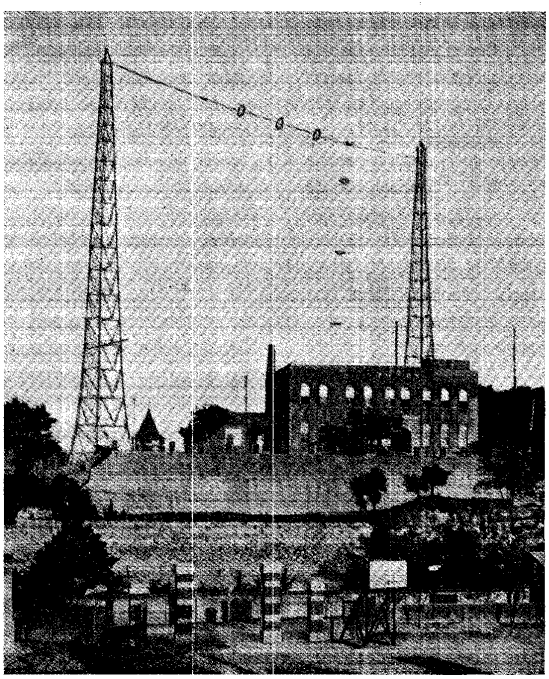


FIGURE VII - 49. *Kyongsong (Keijō).*
View of Radio Broadcasting Station JODK.

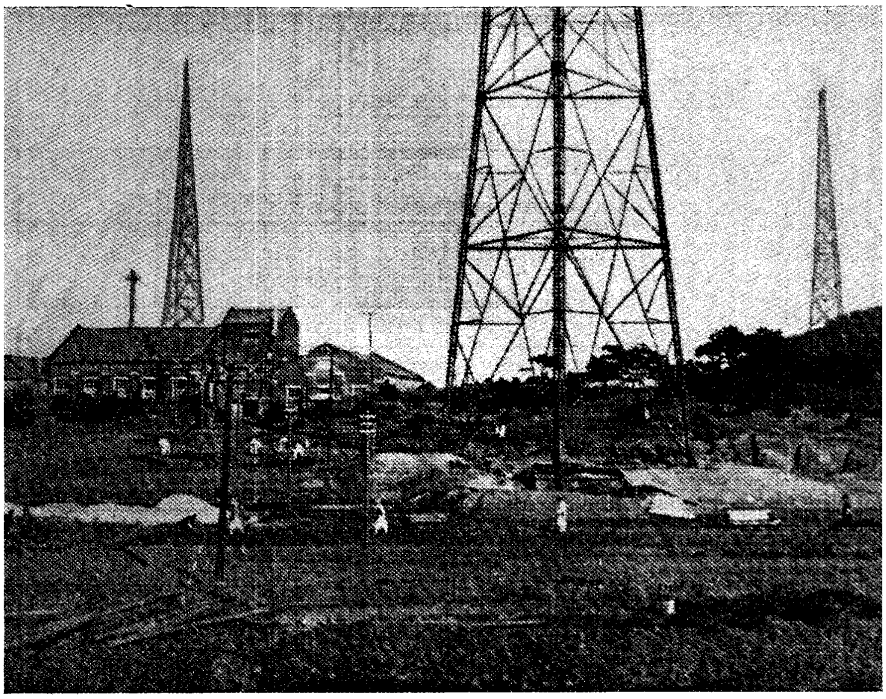


FIGURE VII - 50. *Kyongsong (Keijō).*
Another view of Radio Broadcasting Station JODK. 1934.

C. Radiotelegraph.

The development of radiotelegraph in Korea has been influenced by several factors: the importance of coastal shipping, the growth of aviation, and the use of point-to-point radiotelegraph. The Japanese army and navy have also favored radiotelegraph because of its adaptability as compared with land telecommunications.

In 1910, the year in which Japan annexed Korea, radiotelegraph equipment was installed on a government inspecting vessel and at 3 lighthouses on the west coast. Since that time, radiotelegraph, radio beacons, and radio direction finders have been installed at many coastal points and on adjacent islands (TABLE VII - 10 and FIGURE VII - 55).

Point-to-point and ship-to-shore radiotelegraph have developed steadily since 1923, when the first office was opened in Kyongsong (Keijō). Other cities with important radiotelegraph stations are: Cheju (Saishū), Chinnamp'o, Ch'ongjin (Seishin), Mokp'o (Moppo), Pusan (Fusan), Sinuiju (Shingishū), and Ulsan (Urusan). Most of the circuits are between Korean cities, but a number are maintained with cities in North China, Manchuria, and Japan.

In line with the Japanese policy of expanding commercial and military aviation, airfields in Korea have been equipped with radiotelegraph. Important among these fields are: Ch'ongjin (Seishin), Hamhung (Kankō), Kangnung (Kōryō), Kyongsong (Keijō), P'yongyang (Heijō), Sinuiju (Shingishū), Taegu (Taikyu), and Ulsan (Urusan).

International or overseas radiotelegraph has not been fostered by the Japanese in Korea. Most overseas telegraph messages are routed by submarine telegraph cable from Pusan to Japan, where direct radiotelegraph circuits were maintained, in 1941, with most of the leading cities of North and South America, Europe, and Asia.

D. Radiotelephone.

A limited number of radiotelephone circuits provide service among Korean cities. Most of the equipment is used for official communications and has apparently not been made available for public use. Radiotelephone stations for point-to-point service are at Ch'ongjin, P'ohang-dong (Hokō-do), Oryuk-to (Goroku-tō) in Pusan-hang, Sinuiju, and Kyongsong. (TABLE VII - 10 and FIGURE VII - 55).

Considerable demand for radiotelephone equipment in Koret has come from the growth of commercial and military aviation between Japan and the mainland. Radiotelephone for aeronautical service was installed by 1942 at Kyongsong, Ch'ongjin, Sinuiju, P'yongyang, and Hamhung.

International or overseas radiotelephone service from Korea is apparently routed by submarine telephone cable from Pusan to Japan where there were connections in 1941 with international circuits to principal cities of Europe, America, and Asia.

E. Radio installations.

Radio installations in Korea are listed in TABLE VII - 10. Information is believed to be accurate up to 1942, with additional data from more recent sources. The table is probably incomplete, as secret stations have been built in strategic places, and stations used as aids to navigation do not operate in the usual manner in wartime.

TABLE VII - 10

RADIO STATIONS OF KOREA

NOTE: (1) Korean names are given first with Japanese names in parentheses. Pukto (Hokudō) are the respective terms for "North," and Namdo (Nandō) for "South."
(2) Where no data is available a "—" has been put in the table.

STATION AND PROVINCE	COORDINATES (APPROX) IN DEGREES, MINUTES AND SECONDS)	CALL LETTERS	FREQUENCIES (KILOCYCLES)	POWER (WATTS)	REMARKS
ANDONG (ANTŌ) Kyongsang – pukto (Keishō – hokudō)	36 34 N 128 38 E	—	—	—	Unidentified radio installation.
CHEJU (SAISHŪ) Cheju-do (Saishū-tō) Cholla – namdo (Zenra – nandō)	33 31 00 N 126 31 35 E	JBI	185	250	Radiotelegraph – point-to-point.
		JBI	391	100	Radiotelegraph – ship-to-shore and public service.
		JBI	500	100	Radiotelegraph – ship-to-shore.
		JWD	4240	100	Radiotelegraph – point-to-point.
		JWD	5260	100	Radiotelegraph – point-to-point.
		JWD	7840	100	Radiotelegraph – point-to-point.
		—	4550	50	Radiotelegraph – meteorological station.
		JWD2	3420	500	Radiotelegraph – point-to-point.
		JWD2	5892.5	500	Radiotelegraph – point-to-point.
CHEMAE-DO (SHIMAI-TŌ) Hwanghae-do Kōkai-dō	38 43 N 124 59 E	JTL	3800	—	Radiotelegraph – point-to-point and ship-to-shore.
		—	500	—	Radiotelegraph – weather information.
CH'ILBAL-TO (SHICHIHATSU-TŌ) Cholla – namdo (Zenra – nandō)	34 47 07 N 125 47 28 E	JWF	2750	20	Radiotelegraph – point-to-point.
		JWF	500	—	Radio direction finder.
		JWF	375	—	Radio direction finder.
		JWF	310	—	Radio beacon.
CHINHAE (CHINKAI) Kyongsang – namdo (Keishō – nandō)	35 09 N 128 36 E	—	—	—	Unidentified radio installation.
CHINNAMP'O (CHINNAMPO) P'yongan – namdo (Heian – nandō)	38 43 12 N 125 23 45 E	JBL	101	750	Radiotelegraph – point-to-point and ship-to-shore.
		JBL	143	750	Radiotelegraph – ship-to-shore.
		JBL	433	750	Radiotelegraph – ship-to-shore.
		JBL	500	750	Radiotelegraph – ship-to-shore.
		JWH	4370	100	Radiotelegraph – point-to-point.
		JWH	6970	100	Radiotelegraph – point-to-point. Two towers on hill about ¼ mi. SW of town.
CH'ONGJIN (SEISHIN) Hamgyong – pukto (Kankyō – hokudō)	41 46 51 N 129 48 54 E	JBJ	107	750	Radiotelegraph – point-to-point and ship-to-shore.
		JBJ	143	750	Radiotelegraph – ship-to-shore.
		JBJ	460	750	Radiotelegraph – ship-to-shore.
		JBJ	500	750	Radiotelegraph – ship-to-shore.
		—	5469	1000	Radiotelegraph – aeronautical service.
		—	6593	1000	Radiotelegraph – aeronautical service.
		—	6975	1000	Radiotelegraph – aeronautical service.
		JBJ	8515	500	Radiotelegraph – service not known.
		—	9207.5	1000	Radiotelegraph and radiotelephone – aeronautical service.
		JWO	3730	1000	Radiotelegraph – point-to-point and public service.
		JWP	4100	1000	Radiotelegraph and radiotelephone – point-to-point and aeronautical service.
		JWP	4750	1000	Radiotelegraph – point-to-point and aeronautical service.
		JWP	5930	1000	Radiotelegraph – point-to-point and aeronautical service.
		JWP	7407	1000	Radiotelegraph – point-to-point and aeronautical service.
		JWN	4785	500	Radiotelegraph – point-to-point and aeronautical service.
		JWN	5230	1000	Radiotelegraph – point-to-point and aeronautical service.
		JWJ	7830	1000	Radiotelegraph – point-to-point and aeronautical service.
		JWM	8940	500	Radiotelegraph – point-to-point and aeronautical service.
		JWL	10460	1000	Radiotelegraph – point-to-point and aeronautical service.
		JWI	11960	1000	Radiotelegraph – point-to-point and aeronautical service.
		—	2930	100	Radiotelegraph – point-to-point and aeronautical service.
	41 55 43 N 129 51 01 E	JBCK	850	10000	Broadcasting station – opened June 1937.
		JBCK	1100	300	
CHUK-TO (CHIKU-TŌ) Cholla – namdo (Zenra – nandō)	34 13 18 N 125 51 00 E	—	290	—	Radio beacon.
		JSG2	375	—	Radio direction finder.
		—	500	—	Radio direction finder.
CHUNGGANJIN (CHŪKŌCHIN) P'yongan – pukto (Heian – hokudō)	41 40 N 126 50 E	—	—	—	Radiotelegraph – meteorological service.
HAMHUNG (KANKŌ) Hangyong – namdo (Kankyō – nandō)	39 45 N 127 36 E	—	4100	250	Radiotelegraph – point-to-point and aeronautical.
		—	4750	250	Radiotelegraph – point-to-point and aeronautical.
		—	5930	250	Radiotelegraph – point-to-point and aeronautical.
		—	5465	500	Radiotelegraph and radiotelephone – aeronautical.
	39 55 00 N 127 31 28 E	JBDK	780	50	Broadcasting station – opened Oct. 1938.
		JBDK	1050	250	

TABLE VII - 10 *Continued*

STATION AND PROVINCE	COORDINATES (APPROX) IN DEGREES, MINUTES AND SECONDS)	CALL LETTERS	FREQUENCIES (KILOCYCLES)	POWER (WATTS)	REMARKS
INCH'ON (JINSEN or CHEMULPO) Kyonggi – do (Keiki-dō)	37 28 N 126 36 E	—	—	—	Two radio towers are on Wolmi-do (Getsubi-tō) an island on Inch'on-hang (Jinsen-kō).
I-RI (RI-RI) Cholla – pukto (Zenra – hokudō)	35 56 40 N 126 58 04 E	JBFK JBFK	570 1100	500 500	Broadcasting station – opened Oct. 1938. Transmitting towers about 1 mi. E of railway junction E of Iri.
KANGNUNG (KŌRYŌ) Kangwon-do (Kōgen-dō)	37 44 24 N 128 53 13 E	JWW JWW JWY2 JWY2	5350 6593 1950 4265	1000 1000 500 500	Radiotelegraph and radiotelephone – aeronautical. Radiotelegraph and radiotelephone – aeronautical. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point.
	37 46 24 128 55 42	JWY JWY JWY JWY	106 143 437 500	— — — —	Radiotelegraph – ship-to-shore and public service. Radiotelegraph – ship-to-shore. Radiotelegraph – radio beacon and radio direction finder. Radiotelegraph – ship-to-shore and public service.
HANGMUN-DO (KŌMON-TŌ) Cholla – namdo (Zenra – nandō)	34 05 40 N 126 36 15 E	JKM JKM JKM JKM	190 315 375 500	100 — 100 100	Radiotelegraph – point-to-point and ship-to-shore. Radiotelegraph – radio direction finder and radio beacon. Radiotelegraph – ship-to-shore and radio direction finder. Radiotelegraph – ship-to-shore and radio direction finder.
KOMUN-DO (KYOBUN-TŌ) Cholla – namdo (Zenra – nandō)	34 01 N 127 19 E	JSP2 JSP2	190 285	15 —	Radiotelegraph – point-to-point. Radio beacon and radio direction finder installations near southern point of island.
KWANGJU (KŌSHŪ) Cholla – namdo (Zenra – nandō)	35 08 N 126 56 E	— —	780 1040	50 50	Broadcasting station – opened in Sept. 1941. Reported as not making regular broadcasts.
KWAN-NI (KAN-RI) Ch'ungch'ong – pukto (Chūsei – hokudō)	36 15 128 02	— — — — —	4100 4750 5930 5350 6593	250 250 250 500 500	Radiotelegraph – point-to-point and aeronautical. Radiotelegraph – point-to-point and aeronautical. Radiotelegraph – point-to-point and aeronautical. Radiotelegraph and radiotelephone – aeronautical. Radiotelegraph and radiotelephone – aeronautical.
KYONGSONG (KEIJŌ or SEOUL) Kyonggi-do (Keiki-dō)	37 29 18 N 126 44 28 E	JBA — — — JBB — JBB JBB JBB — — — — JBB — JBB JBB JWT — JBW JWT JBP JWG — — JBR — — JBB JBB JBB JBB — JWT JBQ — — —	44 48.4 53.6 60 65 86 94 143 150 161 170 172 178 205 361 394 500 3262.5 3450 4080 4387.5 4500 4750 4892.5 5020 5080 5127.5 5220 5350 5465 6593 6975 8515 5680 5712.5 5930 6000 6720 6740	5000 — — — 2500 — 2500 2500 2500 — — — — 2500 750 2500 2500 500 — 1000 500 1000 500 5000 — 1000 500 — 1000 1000 500 1000 1000 — 500 2000 — — —	Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph – ship-to-shore and public service. Radiotelegraph – ship-to-shore and public service. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph and radiotelephone – point-to-point and aeronautical. Radiotelegraph – ship-to-shore and public service. Radiotelegraph – ship-to-shore and public service. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point and aeronautical. Radiotelegraph – meteorological. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph – meteorological. Radiotelegraph – point-to-point. Radiotelegraph and radiotelephone – point-to-point and aeronautical. Radiotelegraph and radiotelephone – point-to-point and aeronautical. Radiotelegraph and radiotelephone – point-to-point and aeronautical. Radiotelegraph and radiotelephone – point-to-point and aeronautical. Radiotelegraph and radiotelephone – point-to-point and aeronautical. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point.

TABLE VII - 10 *Continued*

STATION AND PROVINCE	COORDINATES (APPROX) IN DEGREES, MINUTES AND SECONDS)	CALL LETTERS	FREQUENCIES (KILOCYCLES)	POWER (WATTS)	REMARKS
KYONGSONG (KEIJŌ or SEOUL) Kyonggi-do (Keiki-dō) (Cont'd)		JBV	6800	500	Radiotelegraph – point-to-point.
		—	7140	—	Radiotelegraph – point-to-point.
		—	7365	500	Radiotelegraph – point-to-point.
		JBY	7370	1000	Radiotelegraph – point-to-point.
		JWG	7407	500	Radiotelegraph – point-to-point and aeronautical.
		JBG	7700	2000	Radiotelegraph – point-to-point.
		JBD	7740	6000	Radiotelegraph – point-to-point.
		—	8560	—	Radiotelegraph – point-to-point.
		JBF	8760	2000	Radiotelegraph – point-to-point.
		JBO	9020	1000	Radiotelegraph – point-to-point.
		JBX	9070	1000	Radiotelegraph – point-to-point.
		JBB	9560	1000	Radiotelegraph – point-to-point and aeronautical.
		JBU	9640	500	Radiotelegraph – point-to-point.
		—	10040	5000	Radiotelegraph – meteorological.
		JBN	10720	1000	Radiotelegraph – point-to-point.
		—	11240	—	Radiotelegraph – point-to-point.
		—	11400	—	Radiotelegraph – point-to-point.
		JBC	11620	6000	Radiotelegraph – point-to-point.
		JBE	12960	1000	Radiotelegraph – point-to-point.
		—	14950	500	Radiotelegraph – meteorological.
	37 31 18 N	—	3640	500	Radiotelegraph – point-to-point.
	126 58 41 E	JBZ	6770	1000	Radiotelegraph – point-to-point and public service to China.
		JBZ	8115	1000	Radiotelegraph – point-to-point and public service to China.
	37 32 52 N	JODK	710	10000	Broadcasting station – opened April 1933.
	126 55 12 E	JODK	970	50000	Broadcasting station – opened April 1937. Transmitter towers – 2 large and 2 small – 2 mi. W of city, north of Han River and airport, and S of railway.
MAEGA-DO (BAIKA-TŌ or KŌ-TŌ) Cholla – namdo (Zenra – nandō)	34 42 30 N	JSQ2	285	—	Radio beacon.
	125 12 30 E	JSQ2	375	—	Radio direction finder.
		JSQ2	500	—	Radio direction finder.
MARA-DO (BARA-TŌ) Cholla – namdo (Zenra – nandō)	33 07 17 N	JSF2	295	—	Radio beacon.
	126 15 02 E	JSF2	2850	20	Radiotelegraph – point-to-point.
MOKP'O (MOPPO) Cholla – namdo (Zenra – nandō)	34 46 49 N	JWB	180	500	Radiotelegraph – point-to-point.
	126 22 59 E	JWC	2220	750	Radiotelegraph – point-to-point.
		—	3730	250	Radiotelegraph – point-to-point and meteorological.
		JWC	4330	750	Radiotelegraph – point-to-point.
		JWC	7960	500	Radiotelegraph – point-to-point.
		JBH	117	500	Radiotelegraph – ship-to-shore and public service.
		JBH	143	500	Radiotelegraph – ship-to-shore.
		JBH	460	750	Radiotelegraph – ship-to-shore.
		JBH	500	750	Radiotelegraph – ship-to-shore.
	34 46 N 126 23 E	—	1000	500	Broadcasting station – opened Jan. 1940.
	Location not known	—	—	—	Large new military radio installation reported just north of Mokp'o.
NAN-DO (RAN-TŌ) Hamgyong – pukto (Kankyō – hokudō)	40 39 N 129 31 E	—	3480	20	Radiotelegraph – point-to-point.
OCH'ONG-DO (OSEI-TŌ) Ch'ungch'ong – pukto (Chūsei – hokudō)	36 15 N 125 59 E	—	4550	50	Radiotelegraph – meteorological.
ORYUK-TO (GOROKU-TŌ) Kyongsang – namdo (Keishō – nandō)	35 06 N 129 08 E	—	35000	2	Radiotelephone – point-to-point.
		—	40000	2	Radiotelephone – point-to-point. Oryuk-to is an island in Pusan-hang (Fusan-kō).
P'OHANG-DONG (HOKŌ-DŌ) Kyongsang – pukto (Keishō – hokudō)	36 02 N 129 18 E	—	3460	—	Radiotelephone – point-to-point.

TABLE VII - 10 *Continued*

STATION AND PROVINCE	COORDINATES (APPROX) IN DEGREES, MINUTES AND SECONDS)	CALL LETTERS	FREQUENCIES (KILOCYCLES)	POWER (WATTS)	REMARKS
PUSAN (FUSAN) Kyongsang – namdo (Keishō – nandō)	35 05 43 N 129 03 26 E	JBT JBT JBT JBT JBT JWV JWV JWV JWV JWV	101 143 215 435 500 3840 4830 5850 7940 9340	750 750 750 750 750 500 500 500 500 500	Radiotelegraph – point-to-point and ship-to-shore. Radiotelegraph – ship-to-shore. Radiotelegraph – ship-to-shore. Radiotelegraph – ship-to-shore. Radiotelegraph – ship-to-shore. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point.
	35 06 09 N 129 02 10 E	JBAK JBAK	650 1030	250 250	Broadcasting station – opened Sept. 1935. Towers are near meteorological station west of main piers.
	35 05 N 129 05 E	—	—	—	Two masts near northern end of Mok-to (Makino-tō) in Pusan-hang.
P'YONGYANG (HEIJŌ) P'yongan – namdo (Heian – nandō)	39 01 N 125 45 E	— — — — — —	4100 4750 5950 5350 5465 6593	— — — — — —	Radiotelegraph – point-to-point and official service. Radiotelegraph – point-to-point and aeronautical. Radiotelegraph – point-to-point and aeronautical. Radiotelegraph and radiotelephone – aeronautical. Radiotelegraph and radiotelephone – aeronautical. Radiotelegraph and radiotelephone – aeronautical.
	38 59 00 N 125 44 26 E	JBBK JBBK	820 1090	500 500	Broadcasting station – opened April 1936. Towers on low hill across Taedong-gang (Daidō-kō) – south of city – about ¾ mi. W. of Mitsubishi aircraft plant.
SANGCH'UJA-DO (JŌSHŪSHI-TŌ) Cholla – namdo (Zenra – nandō)	33 53 N 126 16 E	JSP JSP	3300 4340	500 500	Radiotelegraph – point-to-point. Radiotelegraph – point-to-point.
SINUIJU (SHINGISHŪ) P'yongan – pukto (Heian – hokudō)	40 06 00 N 124 23 35 E	JWR2 JWS JWQ JWR	3480 4100 9380 7407	100 500 1000 500	Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point. Radiotelegraph – point-to-point.
	40 05 40 N 124 22 54 E	JWQ JWQ JWQ JWQ	4750 6593 6975 9010	1000 500 1000 1000	Radiotelegraph and radiotelephone – point-to-point and aeronautical. Radiotelegraph and radiotelephone – point-to-point and aeronautical. Radiotelegraph and radiotelephone – point-to-point and aeronautical. Radiotelegraph and radiotelephone – point-to-point and aeronautical.
	40 06 00 N 124 25 35 E	JBZ JBZ JBZ —	265 5350 5465 8515	1000 500 500 500	Radiotelegraph and radiotelephone – aeronautical. Radiotelegraph and radiotelephone – aeronautical. Radiotelegraph and radiotelephone – aeronautical. Radiotelegraph and radiotelephone – aeronautical.
SOCH'ONG-DO (SHŌSEI-TŌ) Hwanghae-do (Kōkai-dō)	37 45 36 N 124 43 45 E	JSS JSS	190 295	100 100	Radiotelegraph – point-to-point. Radio beacon.
SOHUKSAN-DO (SHŌ-KOKUSAN-TŌ) Chŏlla – namdo (Zenra – nandō)	34 05 24 N 125 06 06 E	JSO2 JSO2	375 500	— —	Radio direction finder. Radio direction finder.
	34 05 37 N 125 06 00 E	JSO2 JSO2	300 2850	— 20	Radio beacon. Radiotelegraph – point-to-point.
SOSA (SOSHA) (Kyonggi-do (Keiki-dō)	37 29 N 126 47 E	—	—	—	Large radio installation reported at Sosa, about 12 mi. WSW of Kyongsong (Keijō).
TAEGU (TAIKYŪ) Kyongsang – pukto (Keishō – hokudō)	35 53 05 N 128 38 06 E	JSD JSC JSF	4750 6593 9380	250 250 250	Radiotelegraph – point-to-point. Radiotelegraph – aeronautical. Radiotelegraph – point-to-point.
	35 53 02 N 128 36 48 E	JSD JSD JSC —	4100 5930 5350 8515	100 100 100 100	Radiotelegraph – point-to-point and aeronautical. Radiotelegraph – point-to-point and aeronautical. Radiotelegraph and radiotelephone – aeronautical. Radiotelegraph and radiotelephone – aeronautical.
	35 52 N 128 35 E	JBGK JBGK	800 1070	500 500	Broadcasting station – opened Nov. 1940.
TAECH'O-DO (DAISŌ-TŌ) Hamgyong – pukto (Kankyō – hokudō)	42 09 18 N 130 17 02 E	JWX JWX JWX	285 375 500	100 — —	Radio beacon. Radio direction finder. Radio direction finder.
T'ONGYONG TŌEI) Kyongsang – namdo (Keishō – nandō)	34 50 N 128 25 E	JWT	1850	—	Radiotelegraph – point-to-point.

TABLE VII - 10 *Continued*

STATION AND PROVINCE	COORDINATES (APPROX) IN DEGREES, MINUTES AND SECONDS)	CALL LETTERS	FREQUENCIES (KILOCYCLES)	POWER (WATTS)	REMARKS
ULLUNG-DO (UTSURYŌ-TŌ)	37 31 55 N	JWZ	2320	50	Radiotelegraph – point-to-point.
Kangwon-do (Kōgen-dō)	130 51 36 E	JWZ	4905	50	Radiotelegraph – point-to-point.
		—	4550	1000	Radiotelegraph – meteorological service.
ULSAN (URUSAN)	35 33 23 N	JBM	200	500	Radiotelegraph – aeronautical.
Kyongsang – namdo	129 19 20 E	JBM	215	500	Radiotelegraph – point-to-point and aeronautical.
(Keishō – nandō)		JBM	333	500	Radiotelegraph – aeronautical.
		JBM	4750	500	Radiotelegraph – aeronautical.
		JBM	6820	500	Radiotelegraph – point-to-point and aeronautical.
		JBM	9380	500	Radiotelegraph and radiotelephone – aeronautical.
		JBM	500	500	Radiotelegraph and radiotelephone – aeronautical.
		JBM	5350	—	Radiotelegraph and radiotelephone – aeronautical.
		JBM	6593	—	Radiotelegraph and radiotelephone – aeronautical.
WONSAN (GENZAN)	39 09 N	—	98	500	Radiotelegraph – ship-to-shore.
Hamgyong – namdo	127 30 E	—	119	500	Radiotelegraph – ship-to-shore.
(Kankyō – nandō)		—	398	500	Radiotelegraph – ship-to-shore.
		—	504	500	Radiotelegraph – ship-to-shore.
		—	2850	200	Radiotelegraph – point-to-point.
YOKCHI-DO (YOKUCHI-TŌ)	34 38 N	JWU	2120	100	Radiotelegraph – point-to-point.
Kyongsang – namdo	128 16 E	JWU	4540	250	Radiotelegraph – point-to-point.
(Keishō – nandō)					

75. *Land Telegraph*

Korea's land telegraph network has been extended to all parts of the country to serve administrative, commercial, and industrial needs. In recent years, however, a shortage of equipment has caused serious curtailment of telegraph service, and priorities have been established for transmission of telegrams.

A. Administration.

Control over equipment and operation of the land telegraph network for public use, is held by the Communications Bureau of the Government General. Special or private telegraph lines are operated by railway, police, and military authorities.

Until 1937, when restrictions began to be imposed, telegrams could be sent in any language or code to all parts of the world. Since 1941, telegrams sent or received in Korea must be in either Japanese or Korean.

B. Network.

(FIGURE VII - 55)

Telegraph routes usually run parallel to railways and main highways throughout Korea (FIGURE VII - 39). All important cities and towns have telegraph service, and the larger centers are generally connected by alternative routes. There are also land telegraph connections with Manchuria and China.

Main routes include the following:

1. Pusan (Fusan) – Kyongsong (Keijō) – Sinuiju (Shingishū) – Manchuria – China.
2. Kyongsong – Wonsan (Genzan).
3. Pusan – Wonsan – Ch'ongjin – Unggi (Yūki).
4. Kyongsong – I-ri (Riri) – Mokp'o (Moppo).
5. P'yongyang (Heijō) – Manp'ojin (Mampochin) – Manchuria.

Some main telegraph lines have been installed underground in recent years, but information on individual lines is incomplete.

At Pusan at least 6 submarine cables link Korea with Japan (Topic 77). From Japan other submarine cables, as well as radiotelegraph service, are available for overseas and international telegrams.

TABLE VII - 11

TELEGRAPH SERVICE IN KOREA, 1939

Number of telegraph offices	1,019
Total routes (miles)	5,599
Length of wire (miles)	32,080
Number of Telegrams	
Dispatched	
Japanese language	10,793,000
Code	896,000
Other languages	22,000
Received	
Japanese language	10,588,000
Code	874,000
Other languages	25,000
TOTAL	23,198,000

Most telegraph offices are in post offices, (FIGURE VII - 51) but 175 were for the exclusive use of telegraph and telephone.

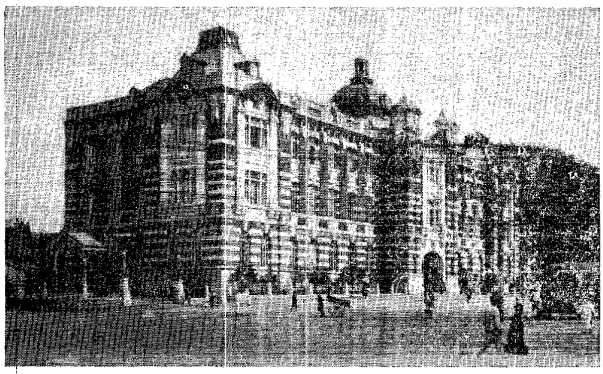


FIGURE VII - 51. *Kyongsong (Keijō).*
View of General Post Office Building, Nandaimon Dori and Hasegawa-Cho. Telephone and telegraph offices were also in this building. In 1935, there was a large telephone exchange in the rear of this post office. 1920.

All telegraph installations are of Japanese make, and in 1935 about 25 "automatic typing machines" were in operation.

In cities and towns with telegraph facilities, telegrams are delivered by messengers. Elsewhere they are delivered by mail.

C. Personnel and training.

Although most of the operators, linesmen, and laborers are Koreans, supervisory positions are held by Japanese.

The Communications Bureau operates Employees' Training Schools at Kyongsong and Pusan, and provides laboratory and field training.

All employees handling messages must be proficient in Japanese, and operators with a knowledge of foreign languages were assigned to large cities before the war.

76. *Telephone*

Public use of telephones has never been extensive in Korea. In 1939, only 53,306 telephone subscribers were reported, for a population of over 22,000,000. However, the telephone system extends throughout the country and important Korean cities are connected by through telephone circuits with Manchuria, China, and Japan (FIGURE VII - 55).

The shortage of telephone equipment has become increasingly serious in recent years.

A. Administration.

The telephone system is controlled and operated by the Communications Bureau of the Government-General. Special or private lines are operated by railways, Japanese military, and police. In 1938, there were 254 police stations, 2,500 substations, and 197 border patrol offices scattered through the country. Virtually all of these were connected by telephone.

Telephones for private use were installed subject to approval of the Communications Bureau. Cost of installation was from 400-600 *yen* ($100-150 U.S.). Delays of 6 months to a year or more were common in making installations. The subscriber did not acquire ownership of the telephone instrument, but only of a number and of the right to use the telephone service. In general, regular monthly rental fees provided only for local calls, and additional charges were made for the right to use long-distance service, and for each long-distance call.

During the war drastic restrictions have been placed on the use of telephones. Only the Japanese language may be used, and all calls are subject to censorship. Under the "Telephone Service Wartime Special Ordinance," passed in 1944, priority for "urgent" telephone service is based on the applicant's importance to the war effort. A special telephone service was also planned for the most important war industries and agencies. Telephone service can be cancelled and installations removed at the discretion of the Communications Bureau.

B. Network.

(FIGURE VII - 55)

Kyongsong (Keijō) is the center of Korea's telephone network. Main circuits connect the following cities:

1. Pusan (Fusan) – Taegu (Taikyū) – Kyongsong – P'yongyang (Heijō) – Sinuiju (Shingishū) – and on to Harbin, Manchuria. Alternative routes from Sinuiju and Mukden provide connection with Tientsin, Pei-p'ing, Dairen and Port Arthur (Ryojun).
2. Kyongsong – Wonsan (Genzan) – Ch'ongjin (Seishin) – Namyang-dong (Nanyō-dō) – and to Ch'ang-ch'un (Hsinching) or Harbin, Manchuria.
3. Kyongsong – I-ri (Riri) – and Mokp'o (Moppo).
4. P'yongyang – Manp'ojin (Mampochin) – and on to Ssu-p'ing-kai, Manchuria.

In general, telephone lines parallel railways and main highways (FIGURE VII - 39). Reports indicate that some aerial lines have been replaced by underground cables laid in concrete conduits.

Submarine telephone cables between Korea and Japan are described in Topic 77 and FIGURE VII - 55).

The Tōkyō – Mukden non-loaded telephone cable, completed in 1930-40, runs underground through Korea (Topic 76, C, (4) and FIGURE VII - 55).

C. Telephone facilities.

(1) Installations and use.

In proportion to the number of telephone exchanges in Korea, the number of subscribers is very small (TABLE VII - 12). The excess of local telephone calls over long-distance calls also indicates the limited use of the telephone service.

TABLE VII - 12

TELEPHONE SERVICE IN KOREA, 1939

Offices	
First Class	5
Telephone and telegraph offices	180
Telephone exchanges	278
Telephone offices	580
Public telephones	113
Total routes (miles)	7,142
Length of wire (miles)	174,777
Number of subscribers	53,306
Calls	
Local	303,451,000
Long-distance	4,850,000

(2) Exchanges and offices.

Most of Korea's telephone exchanges and offices are located in post office buildings, although in a few larger cities separate

FIGURE VII - 52. *Pusan (Fusan).*
View of Main Post Office. Telephone and telegraph offices were also in this building.

telephone buildings have been reported (FIGURE VII - 52). By 1936, automatic exchanges were in operation in Kyongsong, Najin (Rashin), Ch'ongjin, Wonsan, and Sinuiju.

(3) Telephone instruments.

Most of the telephone equipment used is of Japanese manufacture. Newer installations include desk-type dial instruments, which are duplicates of American models. The greatest number, however, connects with manual exchanges. In rural areas, most instruments are wall hand-crank telephones.

(4) Tōkyō – Mukden telephone cable.

One of the most important telephone installations is the section of the Tōkyō – Mukden non-loaded telephone cable completed in 1940. It is laid underground from Pusan to Sinuiju, with repeater stations at Pusan, Miryang (Mitsuyō), Taegu, Kumch'on (Kinsen), Yongdong (Eidō), Yusong (Jujō), Ch'onan (Tenan), Osan (Usan), Kyongsong, P'yongyang, and Sinuiju. There are probably several other repeater stations between Kyongsong and Sinuiju.

For a distance of 8 to 16 kilometers on either side of each repeater station there are 2 separate cables. Other sections of the cable are covered with static shields to reduce "cross-talk" interference to a minimum.

D. Shortage of telephone equipment.

The supply of telephone equipment has been inadequate for many years. The shortage became serious after 1931, when much equipment that would normally have been imported from Japan began to be diverted to Manchuria. In 1936, there were over 8,000 applications for telephone service; only about 2,200 were filled. The Communications Bureau has even resorted to lotteries as a means of allocating service, and telephone brokers have received up to several thousand *yen* from the sale of a single installation.

The industrial expansion in Korea has imposed an additional strain on the telephone system, which in 1939 had only 1 subscriber for every 400 people. Repeated appeals have been made for voluntary gifts of telephone equipment for military use, and war-time restrictions have become increasingly severe (Topic 76, A).

E. Personnel and training.

All employees must convince the authorities of their loyalty to Japan, and switchboard personnel must be proficient in the Japanese language. Most of the operators in public telephone exchanges are Korean women, but most of the supervisors are Japanese women. Many large firms have Korean switchboard operators, but government and semi-government offices almost invariably employ Japanese operators.

Linesmen, technicians, and officials are mostly Japanese; assistants and practically all laborers are Korean. The Communications Bureau provides technical instruction at the Employees' Training Schools at Kyongsong and Pusan.

77. *Submarine Cables*

At least 10 submarine cables connect Korea with Japan. The landings in Korea are mostly in the vicinity of Pusan (FIGURE VII - 55). The cables, which were laid between 1883 and 1940, include several through circuits for telegraph or telephone service between Japan, Korea, and Manchuria. In general, maintenance has been poor and interruptions of service have been frequent.

A. Administration.

All submarine cables between Korea and Japan are under the direct control of the Transportation and Communications Ministry of the Japanese Government. Actual operations are nominally in the hands of the International Telecommunications Company, which is, however, a government-sponsored monopoly. Control and operation of land telegraph and telephone facilities, which connect with these cables in Korea, are functions of the Communications Bureau of the Government General of Korea (Topics 75, A and 76, A).

B. Equipment.

Although most of the equipment used in older cables was imported from Europe or the United States, an increasing proportion of Japanese equipment was used in later years. Japan claimed to be virtually self-sufficient in the production of cable and cable equipment a few years before the war.

The Japanese had 3 cable-laying ships in 1938, and it is likely that those formerly used by foreign cable companies in the Far East have been taken over by the Japanese.

C. Maintenance.

All of the telephone cables and several of the telegraph cables have been laid within the past 15 years. However, replacement of weak sections has not been uniform, and many of the older lines are in very poor condition. Interruptions of service caused by mechanical faults were increasing rapidly before the war.

D. Network.

(1) Routes and centers.

The submarine cable network not only connects Korea and Japan, but is a part of through circuits between Japan and Manchuria. It is supplemented by radiotelegraph and radiotelephone services.

At least 6 cables from the vicinity of Pusan, Korea, land near Shimonoseki, Japan. Five of these are telegraph lines to Yoshimi, and the other is a telephone cable to Murotsu.

There are also telegraph and telephone cables between Pusan and Yobuko (Saga-ken), Japan, via Tsushima and Iki. Koje-do (Kyosai-tō) is linked to Tsushima by at least 2 telegraph cables (FIGURE VII - 55). Another telegraph cable connects Wonsan (Genzan), Korea, and Chikumi (near Matsue), Japan, via Ullung-do (Utsuryō-tō) (FIGURE VII - 55).

(2) Important installations.

A submarine telephone cable between Pusan and Yobuko, Japan, via Tsushima and Iki, was completed in 1933. It is a loaded 4-pair cable. The section between Pusan and Tsushima was manufactured by Furukawa Electric Company of Japan, and the one from Tsushima to Yobuko was made by Felten Guilleaume Karlswerke A. G. of Germany.

One of the most important cable installations between Korea and Japan is a section of the Tōkyō – Mukden Telephone Cable from Nogita (Fukuoka-ken), Japan, to Pusan, via Iki and Tsushima. The equipment was entirely Japanese and the cable is reported to be a "28 core" type. Conductors are about 1.9 millimeters in diameter and are twisted in pairs. The entire cable has paper insulation and is sheathed with lead. Repeater stations are at Fukuoka, Japan; Mushōzu (Gōnoura), Iki; Gō-saki, Tsushima; and Pusan, Korea (FIGURE VII - 55). Two independent cables were laid on either side of repeater stations for distances varying from 2 to 15 kilometers, to prevent "cross-talk" interference. Other sections of the cable are covered with special magnetic and static shields. The submarine sections of the Tōkyō – Mukden Telephone Cable were laid in 1937, although the entire circuit was not completed until 1940 (Topic 76, C).

E. New construction.

Little information is available on recent cable installations in Korean waters. Even before the war the Japanese recognized the military significance of information on cables. "Prohibited areas," from which foreigners are excluded, have included several possible cable landings. Report of a projected non-loaded telephone cable from Yobuko to Shanghai via Cheju-do (Saishū-tō) has not been confirmed.

TABLE VII - 13

SELECTED SUBMARINE CABLES — KOREA AND VICINITY

FROM (JAPANESE NAMES IN PARENTHESES)	LOCATION OF LANDING. COORDINATES IN DEGREES, MINUTES AND SECONDS (APPROX.)	TO (JAPANESE NAMES IN PARENTHESES)	LOCATION OF LANDING. COORDINATES IN DEGREES, MINUTES AND SECONDS (APPROX.)	DATE LAID	LENGTH IN NAUTICAL MILES	TYPE OR NUMBER
Che-do (Cho-tō), Korea	35 01 30 N 128 44 30 E	Kadok-to (Katoku-tō), Korea	35 02 15 N 128 48 40 E	—	—	Telegraph 3 cables
Indōji, Iki	33 44 15 N 129 46 45 E	Yobuko (near Saga), Japan	33 32 30 N 129 54 35 E	—	—	Telegraph 1 cable
Indōji, Iki	33 44 15 N 129 46 45 E	Nogita (near Fukuoka), Japan	33 37 25 N 130 09 50 E	1937	22.1	Telephone 28-core (Tōkyō – Mukden line).
Izuhara, Tsushima	34 11 45 N 129 17 40 E	Mushōzu (Gōnoura), Iki	33 43 45 N 129 40 50 E	1883	41.3	Telegraph 1-core
Izuhara, Tsushima	34 11 45 N 129 17 40 E	Mushōzu (Gōnoura), Iki	33 43 45 N 129 40 50 E	1895	43.3	Telegraph 1-core
Kechi, Tsushima	34 16 15 N 129 20 00 E	Okino-shima, Tsushima-kaikyō	34 14 12 N 130 06 22 E	1904	42.4	Telegraph 1-core
Kechi, Tsushima	34 16 15 N 129 20 00 E	Yobuko (near Saga), Japan	33 32 30 N 129 54 35 E	—	—	Telegraph 1 cable
Kechi, Tsushima	34 16 15 N 129 20 00 E	Mushōzu (Gōnoura), Iki	33 46 10 N 129 40 45 E	1937	36.7	Telephone 28-core (Tōkyō – Mukden line).
Koje-do (Kyosai-tō), Korea	35 00 35 N 128 42 30 E	Tsutsu (Sottogahama), Tsushima	34 06 30 N 129 12 50 E	1904	72.9	Telegraph 1-core
Koje-do (Kyosai-tō), Korea	35 00 35 N 128 42 30 E	Gō-saki, Tsushima	34 19 20 N 129 13 08 E	1904	61.0	Telegraph 1-core
Komun-do (Kyobun-tō), Korea	34 01 N 127 19 E	Dairen, Kwantung Leased Territory	38 53 N 121 35 E	1904	538	Telegraph 1-core
Komun-do (Kyobun-tō), Korea	34 01 N 127 19 E	Sasebo, Japan	33 15 N 129 45 E	1904	147.4	Telegraph 1-core
Kuyong-ni (Kyūei-ri) on Koje-do, Korea	35 01 40 N 128 43 30 E	Che-do (Cho-tō), Korea	35 01 30 N 128 44 30 E	—	—	Telegraph 1 cable
Mushōzu (Gōnoura), Iki	33 43 45 N 129 40 50 E	Yobuko (near Saga), Japan	33 32 30 N 129 54 35 E	1924	19.6	Telephone 4-core
Mushōzu (Gōnoura), Iki	33 43 45 N 129 40 50 E	Yobuko (near Saga), Japan	33 32 30 N 129 54 35 E	1924	18.7	Telephone 4-core
Okino-shima, Tsushima-kaikyō	34 14 12 N 130 06 22 E	Tsuno-shima, Japan	34 20 N 130 52 E	1904	44.2	Telegraph 1-core
Pusan (Fusan), Korea	35 07 26 N 129 07 11 E	Murotsu (near Shimonoseki), Japan	34 08 02 N 130 53 10 E	1926	116.5	Telephone 2-core
Pusan (Fusan), Korea	35 04 30 N 129 01 19 E	Komodo, Tsushima	34 13 55 N 129 11 35 E	1883	54	Telegraph 1-core
Pusan (Fusan), Korea	35 04 30 N 129 01 19 E	Go-saki, Tsushima	34 19 20 N 129 13 08 E	1933	49.1	Telephone 4-core
Pusan (Fusan), Korea	35 04 30 N 129 01 19 E	Go-saki, Tsushima	34 19 20 N 129 13 08 E	1937	49.7	Telephone 28-core (Tōkyō – Mukden line).
Pusan (Fusan), Korea	35 04 30 N 129 01 30 E	Yoshimi (near Shimonoseki), Japan	34 03 30 N 130 54 00 E	1912	117.6	Telegraph 1-core
Pusan (Fusan), Korea	35 04 30 N 129 01 30 E	Yoshimi (near Shimonoseki), Japan	34 03 30 N 130 54 00 E	1918	117.3	Telegraph 1-core

TABLE VII - 13 *Continued*

FROM (JAPANESE NAMES IN PARENTHESES)	LOCATION OF LANDING. COORDINATES IN DEGREES, MINUTE AND SECONDS (APPROX.)	TO (JAPANESE NAMES IN PARENTHESES)	LOCATION OF LANDING. COORDINATES IN DEGREES, MINUTES AND SECONDS (APPROX.)	DATE LAID	LENGTH IN NAUTICAL MILES	TYPE OR NUMBER
Pusan (Fusan), Korea	35 04 30 N 129 01 30 E	Yoshimi (near Shimonoseki), Japan	34 03 30 N 130 54 00 E	1919	115.7	Telegraph 1-core
Pusan (Fusan), Korea	35 04 30 N 129 01 30 E	Yoshimi (near Shimonoseki), Japan	34 03 30 N 130 54 00 E	1919	120.2	Telegraph 1-core
Pusan (Fusan), Korea	35 04 30 N 129 01 30 E	Yoshimi (near Shimonoseki), Japan	34 03 30 N 130 54 00 E	1920	121.9	Telegraph 1-core
Pusan (Fusan), Korea	35 06 30 N 129 05 30 E	Mok-to (Makino-tō), Korea	35 04 18 N 129 04 40 E	—	—	Telegraph 3 cables
Songsan-ni (Jōsan-ri), Cheju-do (Saishu-to), Korea	33 28 N 126 55 E	Naebal-li, Korea (About 10 mi. SE of Kohung (Kōkō), Korea)	34 29 N 127 21 E	—	—	Telegraph 1 cable
Songsan-ni (Jōsan-ri), Cheju-do (Saishū-tō), Korea	33 28 N 126 55 E	Mosulp'o (Boshippo), Cheju-do (Saishū-tō), Korea	33 13 N 126 18 E	—	—	Telegraph 1 cable
Tsutsu (Sottogahama), Tsushima	34 06 30 N 129 12 50 E	Mushōzu (Gōnoura), Iki	33 43 45 N 129 40 50 E	1905	43.6	Telegraph 2-core
Ullung-do (Utsuryō-tō), Korea	37 28 35 N 130 54 00 E	Chikumi (near Matsue), Japan	35 33 30 N 133 08 30 E	1905	187.9	Telegraph 1-core
Wonsan (Genzan), Korea — via Suwon-dan (Suigen-tan), Korea	39 11 12 N 127 29 00 E	Ullung-do (Utsuryō-tō), Korea	37 28 35 N 130 54 00 E	1905	185.8	Telegraph 1-core
Yosu (Reisui), Korea	34 43 50 N 127 43 40 E	Tolsan-do (Totsuzan-tō), Korea	34 43 40 N 127 44 30 E	—	—	Telegraph 1 cable

78. *Principal Sources*

1. Bureau de l'union Internationale des Communications.
   Feb. 1943. LISTE DES FRÉQUENCES. Ed. 13. Berne.
2. Bureau of International Telecommunication Union.
   1934. OFFICIAL LIST OF TELEGRAPH OFFICES OPENED FOR INTERNATIONAL TRAFFIC. Berne.
3. DeFellner, F. V.
   1934. COMMUNICATIONS IN THE FAR EAST. London, King & Son.

25X1

5. Japan, Department of Railways.
   1917-1937. ANNUAL REPORTS. English edition. Tokyo.
6. Mainichi Shimbun-sha.
   20 Oct. 1943. MAINICHI SHIMBUN (Daily News). Tokyo.
7. Far Eastern Review.
   1925-1940. SELECTED ARTICLES. Shanghai.
8. Far East Year Book, Inc.
   1941. THE FAR EAST YEAR BOOK. Tokyo.
9. Railway Gazette.
   1935-1945. SELECTED ARTICLES. London.
10. U. S. War Department, Army Air Forces, Intelligence.
    12 Aug. 1944. AIR OBJECTIVE FOLDER 84.1 TO 84.8. KOREA AREAS. (Confidential).
11. U. S. Department of Commerce.
    12 May 1941. ECONOMIC VULNERABILITY OF JAPAN IN INLAND TRANSPORT AND COASTWISE SHIPPING. TC-1. (Confidential).
12. U. S. Department of Justice, Economic Warfare Section.
    12 Jan. 1943. THE RAILWAYS OF KOREA. Submitted by Charles Layng, Chicago. (Confidential).
13. U. S. Department of State.
    1935-1940. CONSULAR REPORTS.
14. U. S. Department of State, Division of Economic Studies.
    2 Aug. 1943. PRELIMINARY ECONOMIC SURVEY OF KOREA. Prepared by Charles N. Henning, Far Eastern Unit, Bureau of Foreign and Domestic Commerce. (Confidential).
15. U. S. Federal Communications Commission, Foreign Broadcast Intelligence Service.
    22 Feb. 1944. BROADCASTING STATIONS OF THE WORLD. (Confidential).
16. U. S. Navy Department, Hydrographic Office.
    1932. SAILING DIRECTIONS FOR SIBERIA AND CHOSEN. No. 122, Vol. 1.
17. U. S. Office of Strategic Services.
    5 Aug. 1942. KOREA ECONOMIC SURVEY. (Confidential).
18. U. S. War Department, Army Service Forces, Transportation Corps.
    1944. OSS CID Report 94384. (Secret).
19. U. S. War Department, General Staff, Military Intelligence Division.
    15 June 1943. SURVEY OF KOREA. (Confidential).
20. U. S. War Department, Office Chief of Engineers, Intelligence Branch.
    26 Feb. 1944. KOREA, ENGINEERING RESEARCH OFFICE REPORT NO. 47. Vols. 1, 2, 3. (Confidential).
21. ———.
    Jan. 1945. HIGHWAYS OF KOREA. Strategic Eng. Study 154, illus. (Confidential).

MAP SOURCES

22. Japan, Imperial Land Survey.
    1:50,000 series.
    1:200,000 series
23. U. S. Navy Department, Hydrographic Office.
    1939-1944. HO Charts, 2508, 3236-41, 3244, 3247-49, 3258, 3319-20, 5312, 5454-60, 5462-64, 5598, 5667-69.
24. U. S. War Department, Army War College.
    1941. JAPANESE NAVAL AIR CHARTS.
25. U. S. War Department, Army Map Service.
    1944. KOREA. AMS 1551. Scale 1:250,000.

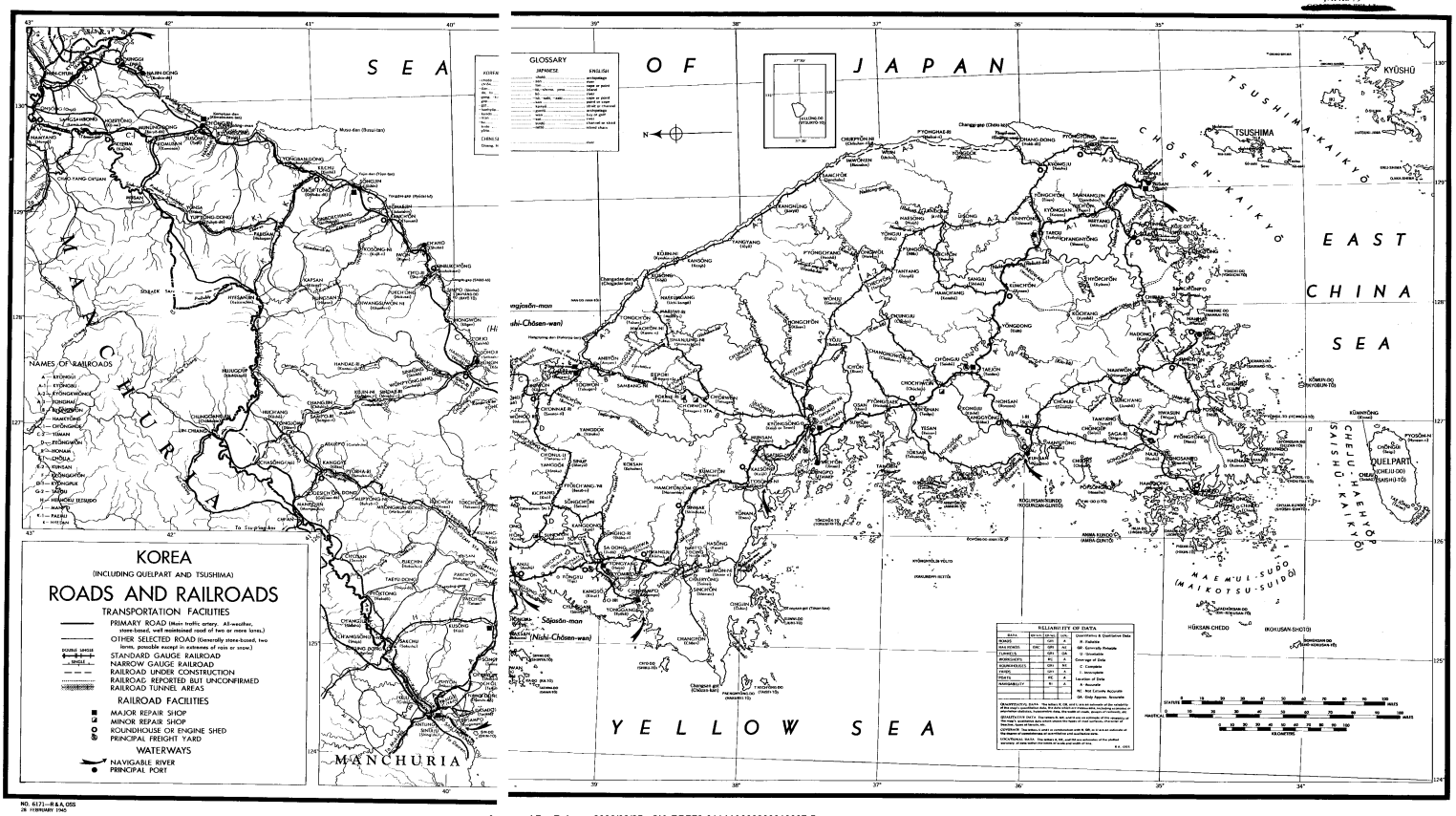
OTHER SOURCES

A great deal of valuable information was obtained from INTERVIEW REPORTS secured through:

U. S. Navy Department, Office of Naval Intelligence.
U. S. Office of Strategic Services, Outpost Units.
U. S. Survey of Foreign Experts.
U. S. War Department, General Staff, Military Intelligence Division.

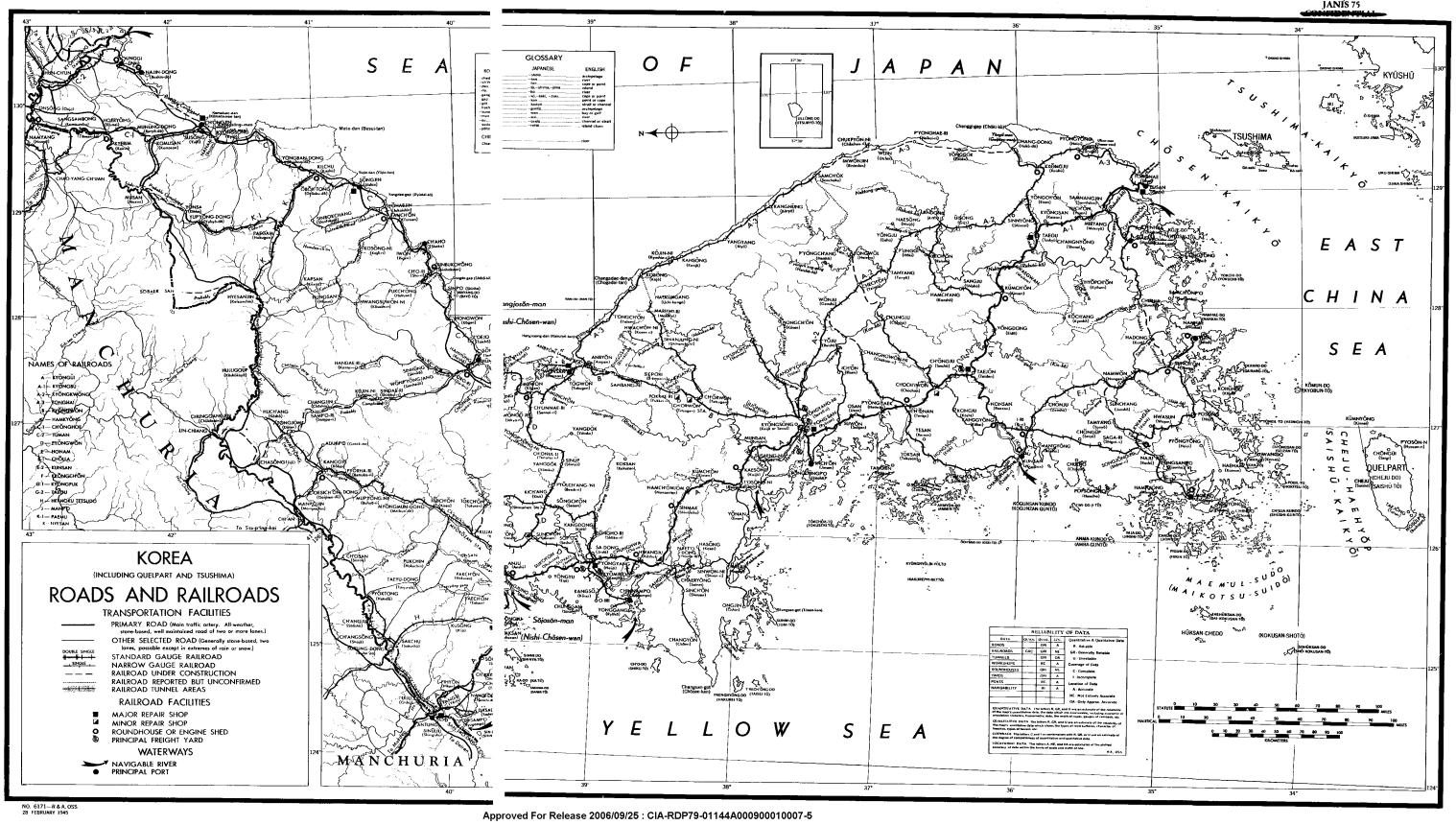
Aerial photographs taken and interpreted by the U. S. Army Air Forces also were consulted.

FIGURE VII - 53
KOREA (INCLUDING QUELPART AND TSUSHIMA): ROADS, RAILROADS, AND RELIEF.
JANIS 75



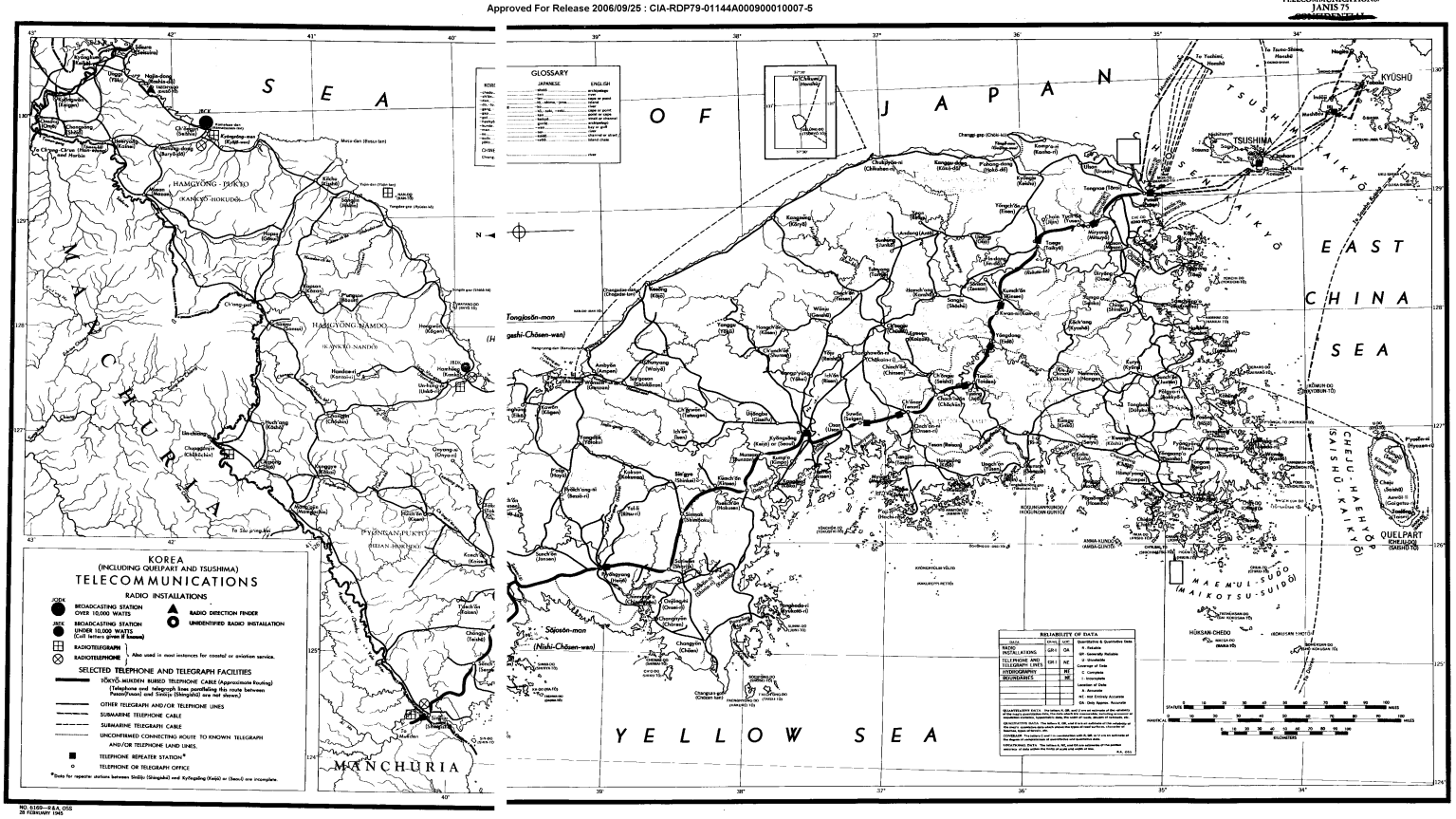
NO. 6171-R & A, OSS
28 FEBRUARY 1945

FIGURE VII - 54
KOREA (INCLUDING QUELPART AND TSUSHIMA): ROADS AND RAILROADS, JANIS 75
~~CONFIDENTIAL~~



NO. 6171—R & A, OSS
28 FEBRUARY 1945

FIGURE VII - 55
KOREA (INCLUDING QUELPART AND TSUSHIMA):
TELECOMMUNICATIONS.
JANIS 75



NO. 51659—8-A, OSD
28 FEBRUARY 1945

Published by

THE JOINT INTELLIGENCE STUDY PUBLISHING BOARD

Military Intelligence Division, G-2 *Division of Naval Intelligence*
Office of Assistant Chief of Air Staff, Intelligence *Office of Strategic Services*
Office Chief of Engineers

AT WASHINGTON, D. C.