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A PROVISIONAL SURVEY OF JAPAN'S
ELECTRICAL EQUIPMENT REQUIREMENTS IN 1950

DEPARTMENT OF STATE

INTELLIGENCE RESEARCH REPORT

OCL-4134

December 1, 1946

A projection of Japan's electrical equipment requirements in a typical early post-reconstruction year labeled 1950 for convenience. This projection is based on an analysis of Japanese production, exports, and imports of electrical equipment from 1928 to 1936. The years 1930-34 are used as a base period, and allowance is made for population growth.

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RESTRICTEDFOREWORD

This study is one of a series of special industry analyses undertaken to determine Japanese production, imports, and exports and civilian consumption of various commodities in the past, and to project the findings into the future in order to determine Japan's peaceful requirements in a typical early post-reconstruction year which has been labeled 1950 for convenience. It must be emphasized that the hypothetical year 1950 referred to in these studies is not identical with the calendar year 1950; it is recognized that certain of the criteria for normality in the Japanese economy will not have been met by the calendar year 1950. For purpose of convenience, however, the population estimated for the calendar year 1950 has been used in the projections.

The historical period included in the studies covers the years from 1928 to 1936 provided sufficient data are available, and later years if the data for the earlier period appear to be inadequate. In general the period 1930-34 has been used as the base for provisional projections of the peaceful needs of the Japanese people in 1950. For many of the industries data for the period 1928-30 are available and are presented, but from an over-all point of view the statistics for 1928-30 are not as satisfactory as those of the period 1930-34 as a basis for projections. Japanese statistical reporting improved after 1928-29; in addition, adjustments for technological change cannot be made on the basis of the inadequate data available for many of the industries in the earlier period. The data for 1935-36 are useful so far as they serve as a check on trends beyond the earlier period.

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Because of the urgent need for even a preliminary survey, each industry analysis is being issued independently as completed. Attention, therefore, is directed to the provisional nature of the individual studies, particularly in regard to the projections of Japanese requirements to 1950. Upon completion of all the provisional surveys, it is planned to reconsider each in the light of the others and to synthesize the projections into an over-all picture of the Japanese economy in 1950.

Similarly, because of the urgent need for a trade balance estimate prior to the completion of the industry analyses, a preliminary set of projections of Japan's exports and imports in 1950, as yet unrelated to the industry studies, has been issued in Vol. I, Part I of OCL-2815, The Place of Foreign Trade in the Japanese Economy. Upon completion of the industry studies, a final step will be to synthesize these studies and the trade balance estimates in order to make such modifications in both the individual industry levels and in the total export and import balance as may be required to meet the peaceful needs of Japan as defined by the Far Eastern Commission.

This synthesis will entail a revision of some of the industry studies and, in certain cases, a choice among several possible projections. Because the appropriate choice cannot be made until each industry can be reexamined with full regard for mutual relationships with other industries and with full regard for the over-all trade balance, several alternative projections are presented for certain of the industries. It is anticipated that the final projection in certain cases may differ somewhat from any

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of those now provisionally presented.

Most of the data in these analyses were taken from official and semi-official Japanese sources. Not only have inconsistencies and errors frequently been detected within a single source, but also many data from different sources, presumably reporting on the same subject, are irreconcilable.

All references to Japan in this study, unless otherwise noted, refer only to the four main islands -- Hokkaido, Honshu, Shikoku, and Kyushu -- and immediately adjacent small islands. Similarly, the trade of Japan with Korea and Formosa, as well as with other countries, is classified as external trade unless otherwise indicated.

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RESTRICTEDSUMMARY

Japan's electrical equipment production increased more than five-fold between 1928 and 1936, from 107 million yen to 577 million yen annually in 1930 prices. Average annual production in 1930-34 was about 262 million yen, with imports of about 4.7 million yen and exports of about 27 million yen. From 1928 to 1936 exports of electrical equipment increased steadily, while imports declined. In the period 1928-29 Japan had an average annual net import balance of 3.6 million yen. Beginning in 1930, however, exports exceeded imports; Japan had an average annual net export balance of 22 million yen in 1930-34 and 62 million yen in 1935-36.

Japan's average annual net new supply of electrical equipment during 1930-34 was 240 million yen, or a per capita average of 3.62 yen, as contrasted with 2.12 yen in 1928-29 and 6.52 yen in 1935-36. A provisional projection of Japan's requirements for electrical equipment in 1950, based on the 1930-34 supply pattern, would be: production of 312.6 million yen, imports of 5.6 million yen, and exports of 32 million yen. This level of supply would provide an annual net new supply of electrical equipment in 1950 of about 286 million yen, an amount which is somewhat greater than if projected from a 1928-29 base but is about 40 percent less than if projected on a 1935-36 base.

Present productive capacity of the electrical equipment industry is estimated at about one billion yen in 1930 prices, or almost four times actual average annual production during the period 1930-34. Therefore,

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an excess productive capacity of over one-half billion yen exists after supplying domestic requirements. Exports of electrical equipment in 1950 can be estimated at between 100 and 150 million yen, on the assumptions that the export market will be as large in 1950 as it was from 1937 to 1940, and that Allied policy will permit exports of such items. Imports of electrical equipment will not be necessary, except for very small amounts of highly specialized equipment, carbon for electrical use, etc.

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RESTRICTEDI. INTRODUCTIONA. Scope of the Report

The term electrical equipment covers a wide range of products, not all of which are considered in this report. The products considered herein are generators, rotary converters, electric motors, transformers, electric fans, electric heaters, electric lamps, wet and dry cell batteries, insulated wire, cables, insulators, meters, radio equipment, and telephone and telegraph equipment. Bare copper wire, steam turbines, turbine water wheels, Pelton water wheels, and locomotives have been excluded, but are considered in other reports in this series. Other exclusions are electric furnaces and optical and medical equipment.

Chapter II is a survey of Japan's electrical equipment position from 1928 to 1936. Statistical information has been presented to show the changes in production trends in terms of both current and 1930 prices. Import and export trade balances are similarly analyzed to indicate the annual net new additions to supply of electrical equipment.

Chapter III is a provisional projection of electrical equipment requirements to 1950, based on the average annual per capita new equipment supply during the period 1930-34. In analyzing the methods by which these requirements may be met, the production, import, and export pattern obtaining in 1930-34 is examined first. Consideration is then given to the possibility of changing the pattern by eliminating most of the former imports, increasing domestic production above 1930-34, and increasing exports as a means of obtaining foreign exchange.

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B. Availability and Validity of Sources

Statistics used in this report came principally from four official Japanese sources:

1. Ministry of Commerce and Industry, Kojo Tokei-hyo (Factory Statistics), 1932 and 1936.
2. Ministry of Finance, Nippon Gaikoku Boeki Nempyo (Annual Returns of the Foreign Trade of Japan), 1928-36.
3. Government General of Korea, Chosen Boeki Nempyo (Annual Trade Returns of Korea), 1928-36.
4. Government General of Formosa, Taiwan Boeki Nempyo (Annual Trade Returns of Formosa), 1928-36.

Production statistics include only factories employing five or more workers. There were inadequacies in the production statistics for 1928 because of lack of data or an inadequate breakdown of general classifications. Where data were lacking, estimates were made on the basis of trend; where breakdowns were inadequate, the totals for a general classification were prorated to its individual component products on the basis of the 1929 proportions.¹

Statistical information on exports for each year was based primarily on the Annual Returns of the Foreign Trade of Japan. Since this source did not include trade with Korea and Formosa, the totals given were augmented by the amount of exports to Korea and Formosa shown in the Annual Trade Returns of Korea and the Annual Trade Returns of Formosa.

1. See Table 5, footnotes.

Imports were taken directly from the Annual Returns of the Foreign Trade of Japan, since imports from Korea and Formosa were negligible. In classifying exports, it was necessary to include meters, electric motors, dynamos, transformers, switchboards, flashlights, electrical machinery, and electrical wares in the general classification "electrical machinery" because breakdowns of this classification were not available for certain years.

Only value figures have been used in making this study because of the heterogeneous nature of electrical equipment and the lack of any other convenient unit of measurement. In order to avoid distortion by price level changes, these value figures -- unless otherwise specified -- have been converted to 1930 prices by means of indexes.¹

II. JAPANESE ELECTRICAL EQUIPMENT POSITION, 1928-36

A. Production

In the nine-year period 1928-36, Japanese production of electrical equipment increased from 107 million yen to 577 million yen annually in terms of 1930 prices. (See Table 1.) Except for the depression year 1931, when production was about 25 percent less than in the previous year, the industry expanded its output each year. Annual average production for 1935-36 was approximately twice that of the period 1930-34 and quadruple that of 1928-29.

1. These indexes are explained in footnotes to Tables 8, 9, and 10.

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Table 1. SUMMARY OF VALUE OF JAPANESE ELECTRICAL EQUIPMENT PRODUCTION
IN CURRENT AND 1930 PRICES; 1928-36
(In 1,000 yen)

<u>Year</u>	<u>Current Prices</u>	<u>1930 Prices</u>
1928	193,503	107,501
1929	198,784	152,909
1930	167,534	167,534
1931	131,098	123,678
1932	146,501	209,288
1933	223,489	372,469
1934	276,077	438,218
1935	348,753	458,887
1936	415,232	576,711
 <u>Annual Averages</u>		
1928-29	196,143	130,205
1930-34	188,940	262,237
1935-36	381,992	517,799

Source: Tables 5 and 8.

The growth of the electrical equipment industry is attributed to various factors. The general advance in the industrialization of Japan naturally resulted in an increase in the demands upon the electrical industry. More specifically, there was a government-ordered increase in power generating capacity which, in turn, resulted in greater demands for generators, transformers, and wire. Communications facilities were also expanded by increasing the production of radio, telephone, and telegraph equipment. Communications equipment constituted only 5 percent of the total electrical equipment produced in 1928-29, but in 1935-36 it formed almost 30 percent of the total.

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In 1930-34, "other electrical equipment" ¹ and insulated wire were the items of highest total valuation. (See Table 8.) They were followed by electric motors, electric lamps, radio equipment, cables, transformers, and telephone equipment. Production of all these items increased between 1930 and 1934; production of electric motors expanded more than three and one-half times, while that of radio equipment increased more than five-fold. The only items which declined during this period were those which had never been produced in very large quantities, such as frequency converters, searchlights, and glass insulators. These items made up only about 1 percent of the total production of electrical equipment during the period. The decline in glass insulator output was probably due to greater use of pottery insulators, output of which increased.

B. Imports, Exports, and Trade Balances

1. In Terms of 1930 Prices. Imports of electrical equipment dropped after 1928 and 1929, in which years average annual imports amounted to about 17 million yen in terms of 1930 prices. Average annual imports in 1930-34 were less than 5 million yen; in 1935-36, they amounted to approximately 3 million yen, or less than one-fifth of the 1928-29 value. (See Table 2.) The drop in imports during 1930-34 may have been caused in part by the depreciation of the yen during 1932-33, and in part by the exchange control which came into effect in May 1933, and which undoubtedly prevented the importation of some electrical machinery. A more important factor, however, was the fact that the electrical industry of Japan was becoming more and more self-sufficient in even the more complicated types.

1. The exact nature of this classification is not known, but it probably includes switchboards, switching gear, condensers, and lightning arrestors.

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Table 2. SUMMARY OF VALUE OF JAPANESE IMPORTS AND EXPORTS
OF ELECTRICAL EQUIPMENT IN 1930 PRICES; 1928-36
(In 1,000 yen)

<u>Year</u>	<u>Imports</u>	<u>Exports</u>	<u>Net Exports</u>
1928	15,133	11,911	-3,222
1929	18,547	14,507	-4,040
1930	8,933	19,147	10,214
1931	5,293	19,816	14,523
1932	3,064	22,314	19,250
1933	3,312	29,751	26,439
1934	3,014	43,809	40,795
1935	3,194	53,796	50,602
1936	3,197	77,548	74,351
<u>Annual Averages</u>			
1928-29	16,840	13,209	-3,631
1930-34	4,723	26,967	22,244
1935-36	3,196	65,672	62,476

Sources: Tables 9 and 10.

The principal items of import in the period 1928-29 were generators and electric motors (6.9 million yen), telephone equipment (2.5 million yen), submarine wire and cable (1.2 million yen), and meters (1.2 million yen). In the period 1935-36, generators and electric motors (1.2 million yen), carbon for electrical use (.8 million yen), and telephone equipment (.4 million yen) were the items of greatest value.¹ Except for carbon for electrical use, the value of imports of all electrical equipment items declined from 1928-29 to 1935-36. In 1935-36 Japan was able to supply its domestic requirements with only a minimum of imports of items such as

1. See Table 9 for details of imports in terms of 1930 prices.

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highly specialized telephone equipment and electric motors.

The principal suppliers of electrical equipment to Japan during the period 1930 to 1934 were, in the order of importance, the United States, Germany, Great Britain, and Switzerland. France and Sweden supplied a small quantity.

Exports of electrical equipment from Japan increased rapidly from 1928 to 1936; their value expanded more than sixfold, from 12 million yen to 78 million yen. (See Table 2.) The average for the 1928-29 period was 13 million yen, as contrasted with 27 million yen for 1930-34 and 66 million yen for 1935-36.

Chief export items during 1930-34 were, in order of their value, electric lamps, insulated wire, electrical machinery, and telegraphic and telephonic equipment. In 1935-36 electrical machinery and insulated wire were the principal export items; the value of these two constituted approximately 65 percent of the value of total electrical equipment exports in terms of 1930 prices. If electric lamps are included in the calculation, the three constitute more than 80 percent of the total. ¹ The greater proportion of these items was exported to Korea, Kwantung Leased Territory, and Formosa. However, a substantial amount of incandescent lamps were shipped to the United States, Great Britain, China, and British India.

Japan's trade balance has become increasingly favorable in the electrical equipment field. In terms of 1930 prices, there was a slight excess of imports over exports prior to 1930; however, beginning with a net export balance of 10 million yen for that year, the situation was reversed.

1. See Table 10 for details of exports in terms of 1930 prices.

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Annual net exports increased in 1936 to 74 million yen. The average annual excess of exports for 1935-36 was 62 million yen, or more than two and one-half times the average of 22 million yen for the 1930-34 period.

2. In Terms of Current Prices. In terms of current prices, Japan had succeeded in achieving a small export balance in its electrical equipment trade in 1928; exports exceeded imports by 0.1 million yen. Chiefly through a curtailment of imports, Japan increased its net export balance to 11 million yen in 1930. It maintained its net balance the following year by a further curtailment of imports, although exports for 1931 had dropped by about 3 million yen. (See Table 3.) By 1936 net exports had reached a peak of approximately 71 million yen. In terms of 1930 prices this total was even greater. (74 million yen.) The reason for this difference of 3 million yen was a decline in unit prices chiefly as a result of reduction in costs through technological improvements made in winding techniques.

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Table 3. SUMMARY OF VALUE OF JAPANESE IMPORTS AND EXPORTS OF
ELECTRICAL EQUIPMENT IN CURRENT PRICES: 1928-36
(In 1,000 yen)

<u>Year</u>	<u>Imports</u>	<u>Exports</u>	<u>Net Exports</u>
1928	14,981	15,127	146
1929	17,063	17,669	606
1930	8,933	19,147	10,214
1931	5,082	16,249	11,167
1932	4,995	19,637	14,642
1933	6,827	27,074	20,247
1934	4,640	42,057	37,417
1935	1,276	51,644	50,368
1936	1,357	72,120	70,763
<u>Annual Averages</u>			
1928-29	16,022	16,398	376
1930-34	6,095	24,833	18,737
1935-36	1,317	61,882	60,565

Sources: Tables 6 and 7.

The average annual net export balance for the period 1930-34 in terms of current prices was 18.7 million yen, as contrasted with 0.4 million yen for 1928-29. By 1935-36 the net average balance had jumped to 61 million yen, or more than treble the 1930-34 level. This balance theoretically gave Japan considerable foreign exchange. However, since many of Japan's exports went to the "co-prosperity sphere" while imports came from outside the yen bloc, Japan's available foreign exchange obtained through trade in electrical equipment during this period was not as great as the net export balance would indicate.

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RESTRICTEDC. Annual Net New Supply in Terms of 1930 Prices

The value of the net new supply of electrical equipment made available annually to the people of Japan increased markedly from 1928 to 1936, from 111 million yen to 502 million yen in terms of 1930 prices. ¹ Net new supply per capita increased from 2.12 yen in 1928-29 to 3.62 yen in 1930-34 and 6.52 yen in 1935-36. (See Table 4.)

Table 4. SUMMARY OF VALUE OF NET NEW ADDITIONS TO SUPPLY OF ELECTRICAL EQUIPMENT IN JAPAN IN 1930 PRICES; 1928-36

<u>Year</u>	<u>Production</u> ^a	<u>Net Exports</u> ^b	<u>Total</u>	<u>Population</u> ^c	<u>Net New Supply Per Capita</u>
		(in 1,000 yen)		(in millions)	(in yen)
1928	107,501	-3,222	110,723	62.70	1.77
1929	152,909	-4,040	156,949	63.60	2.46
1930	167,534	10,214	157,320	64.45	2.44
1931	123,678	14,523	109,155	65.37	1.67
1932	209,288	19,250	190,038	66.31	2.86
1933	372,469	26,439	346,030	67.29	5.14
1934	438,218	40,795	397,423	68.29	5.82
1935	458,887	50,602	408,285	69.40	5.88
1936	576,711	74,351	502,360	70.31	7.14
<u>Annual Averages</u>					
1928-29	130,205	3,631	133,836	63.15	2.12
1930-34	262,237	22,244	239,993	66.34	3.62
1935-36	517,799	62,476	455,323	69.86	6.52

a. Source: Table 8.

b. Source: Table 2.

c. Source: For years 1930 and 1935, official Japanese census; estimates for all other years made in Japan Branch, DRF.

1. Value of annual net new supply was calculated by adding the value of annual net import balance to the value of production.

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Total annual net new supply, which was about 111 million yen in 1928, increased by more than 56 million yen in 1929, remained about the same in 1930, and dropped in 1931 to 109 million yen. However, in 1932, following the depression, a recovery was made. With an increase of about 75 percent over 1931, net new supplies in 1932 exceeded the 1929 figure, the previous high. It is of interest to note that the increase in both total and per capita net new supplies was accomplished at the same time that exports were expanded and imports reduced to a minimum.

An analysis of the trend of new supplies indicates that during the period 1930-34 there was an increase in all items of electrical equipment, both industrial and consumer goods. The relative increase of new supply of each item cannot be estimated accurately because of insufficient data with respect to a breakdown of exports and imports.

III. JAPANESE ELECTRICAL EQUIPMENT REQUIREMENTS, 1950

A. Requirements

The value of net new supply of electrical equipment requirements for 1950, projected on the basis of the average annual per capita supply of 3.62 yen for the period 1930-34, would be approximately 286 million yen in 1930 prices. The estimate assumes a population of 79 million in 1950.¹

As in 1930-34 the Japanese will require over-all exports sufficient in value to pay for essential imports of food and raw materials. In the period 1930-34, Japan obtained a portion of its foreign exchange through net exports of electrical equipment. These net exports averaged 22.2 million

1. This figure was estimated by the Japan Branch, DRF, July 1946.

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yen annually from 1930 to 1934. Assuming that the annual per capita net exports of electrical equipment in 1950 will be equal to the average for 1930-34, these exports would be valued at about 26.5 million yen in 1930 prices. The 1930-34 pattern of supply and the 1950 projection based on this pattern are summarized below in million yen in 1930 prices:

	<u>1930-34</u>	<u>1950</u>
Imports	4.7	5.6
Exports	27.0	32.1
Net Exports	22.2	26.5
Production	262.2	312.6
Net New Supply	240.0	286.1

Requirements estimated as above are somewhat greater than if projected from a 1928-29 base but are about 40 percent less than if projected on a 1935-36 base. However, attention should be called to technological improvements resulting in reduced costs of production in the electrical equipment field. Although no attempt is made herein to measure statistically the effect of these improvements, the projection in 1930 prices will undoubtedly permit the Japanese to maintain a greater aggregate per capita supply of equipment of reasonably good quality in 1950 than they maintained in the 1930-34 period. Another point which should be considered is the fact that Japan already has considerable supplies of semipermanent electrical installations, such as telephone and telegraph lines, switchboards, etc., and little if any expansion of these facilities will be required. Since technological improvements, changes in the demand pattern, and the increased difficulty of finding adequate permissible

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exports to pay for essential imports in 1950 have not been considered in the above projection, it must be regarded as provisional and subject to modification.

B. Possibility of Changing the 1930-34 Trade Pattern

On the basis of the 1930-34 pattern of trade, exports of approximately 32 million yen and imports of about 5.6 million yen would be expected in 1950. This pattern could be changed, however, imports could be either reduced to a minimum or eliminated, and exports could be increased to a maximum. The 1935-36 production was already approximately 80 percent greater than the average annual production in the period 1930-34. Expansion of the industry since then appears phenomenal when compared with the level of production which obtained during 1930-34.

Estimates made by the United States Strategic Bombing Survey indicate that the peak production in electrical equipment industry was reached in 1944, when the total value of production was 1,754 million yen¹ in 1936 prices, or about 2.4 billion yen in terms of 1930 prices. Physical damage to the industry has been estimated to have been about 40 percent. The loss in productive capacity has been estimated at 60 percent, a figure which takes into consideration the damage to subcontractors; dispersal; and the flight of the labor force, with concomitant housing and food shortages. If this estimate is correct, productive capacity at the close of war was about one billion yen in 1930 prices, or almost four times the 1930-34

1. United States Strategic Bombing Survey (USSBS), Capital Equipment Division, Japanese Electrical Equipment, 1946, p. 10. Since the method used and the items included in the computation of the USSBS index are not known, the relating of that index to the one used in this report is necessarily subject to qualifications.

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average annual output and about twice that of 1935-36. Present productive capacity is therefore more than half a billion yen in excess of domestic requirements in terms of 1930 prices.

The Japanese could supply all the domestic requirements for electrical equipment without any imports except perhaps about 1 or 2 million yen of highly specialized equipment, carbon for electrical use, etc. The amount of actual imports which will be necessary will depend not upon the Japanese electrical industry's development but upon Allied policy in regard to the amount of electrical equipment manufacturing facilities that Japan will be allowed to retain, considering the need for security measures.

Exports, Allied policy permitting, could be considerably higher than the 66 million yen which were exported during the years 1935-36. In 1937-39 exports of electrical equipment amounted to over 100 million yen in 1930 prices. In the following year, 1940, exports reached a peak of 130 million yen in 1930 prices.¹ Although the great bulk of these exports went to the co-prosperity sphere, which is no longer under Japan's domination, it seems possible that Japan could continue to supply these areas if it were permitted to do so. Assuming that the volume of exports in these years can be considered a barometer of the size of the export market for this equipment, it seems reasonable to estimate that exports in 1950 could range between 100 and 150 million yen.

1. USSBS, Capital Equipment Division, Japanese Electrical Equipment, 1946, p. 16. In current values exports totaled 139.9 million yen.

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Japan's economy seems to be well adapted to the manufacture of electrical equipment, especially such items as copper wire, electrical machines, electric lamps, and other household equipment. Although indigenous supplies of copper are probably inadequate to satisfy even domestic needs, the export returns allow such a substantial margin above import costs of copper that this industry, if Allied policy permits, may make an important contribution to Japan's foreign exchange.

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PRELIMINARY STUDY OF JAPANESE
REQUIREMENTS IN THE ELECTRICAL EQUIPMENT INDUSTRY, 1950Note by the Secretary General

1. The enclosure, a preliminary United States study of estimated Japanese peacetime requirements in the electrical equipment industry in 1950, is submitted by the United States Representative for the information of the Far Eastern Commission, and is referred to COMMITTEE NO. 2: ECONOMIC AND FINANCIAL AFFAIRS.

2. The United States Representative wishes to draw attention to the fact that any conclusions presented in this study have been formulated within the terms of reference indicated in the foreword and do not represent statements of United States policy.

3. Due to the limited number of copies available only three copies of the enclosure can be furnished each delegation.

NELSON T. JOHNSON
Secretary General

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Table 5. VALUE OF JAPANESE PRODUCTION OF ELECTRICAL EQUIPMENT BY ITEMS, IN CURRENT PRICES
(In 1,000 yen)

	1928	1929	1930	1931	1932	1933
Generators	6,285 ^a	7,914	4,415	4,866	4,638	7,721
Electric motors	12,734 ^a	16,033	14,796	10,369	9,886	21,554
Rotary converters	1,361 ^a	1,714	1,578	1,083	599	1,470
Frequency converters	42 ^a	52	109	22	12	14
Transformers	13,000 ^b	12,331	9,308	5,884	6,618	9,977
Rectifiers	180 ^b	190	160	315	157	279
Electric fans	1,500 ^b	1,719	1,855	762	610	866
Electric heaters	1,000 ^b	1,905	990	1,131	1,311	1,416
Electric clocks	300 ^b	304	580	366	216	241
Electric lamps	24,327	17,764	15,192	18,039	19,685	21,971
Searchlights	2,000 ^b	2,465	2,401	969	831	681
Other lighting goods	2,000 ^b	2,597	3,539	3,560	4,692	6,941
Wet cell batteries	2,483 ^c	6,489	4,144	3,338	3,425	4,821
Dry cell batteries	2,275 ^c	5,940	9,658	4,243	5,172	6,631
Insulated wire	58,680 ^d	36,651	27,135	21,442	26,329	39,481
Cable	34,128 ^d	21,316	18,052	10,422	10,190	17,851
Meters	3,365	2,129	2,772	2,657	3,997	7,311
Radio equipment ^e	1,806 ^e	4,715	6,357	9,582	11,552	19,291
Telephone and telegraph equipment ^e	3,490 ^e	9,111	9,109	6,284	7,034	7,691
Other electrical equipment	15,172 ^c	39,624	29,295	21,929	24,167	39,171
Carbon electrodes	500 ^b	568	804	778	1,159	2,291
Pottery insulators	5,869	6,210	4,042	2,221	2,650	3,881
Glass insulators	1,000 ^b	1,142	1,243	936	1,571	1,901
Total	193,503	198,784	167,534	131,098	146,501	223,481

a. Computed from given total for generators, electric motors, rotary converters, and frequency converters on the basis of 1929 proportions.

b. Estimated on the basis of trend.

c. Computed from given total for wet and dry cell batteries, communications equipment, and other electrical equipment on the basis of 1929 proportions.

d. Computed from given total for insulated wire and cable on the basis of 1929 proportions. The value for insulated wire is unaccountably high.

e. For the years 1929-35, data were obtained from the Japan Year Book, 1939-40. For 1933, data for telephone and telegraph equipment are lumped together as a single item, the value was apportioned to them on the basis of their relative value in 1935.

Source: Factory Statistics, 1932 and 1936, except where otherwise indicated in footnotes.

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PRODUCTION OF ELECTRICAL EQUIPMENT BY ITEMS, IN CURRENT PRICES; 1928-36
(In 1,000 yen)

RESTRICTED

	1928	1929	1930	1931	1932	1933	1934	1935	1936
3,285 ^a	7,914	4,415	4,866	4,638	4,638	7,721	11,244	14,784	19,059
2,734 ^a	16,033	14,796	10,369	9,886	21,554	34,751	43,915	45,082	
1,361 ^a	1,714	1,578	1,083	599	1,470	1,358	1,776	1,696	
42 ^a	52	109	22	12	14	6	13	243	
3,000 ^b	12,331	9,308	5,884	6,618	9,977	15,400	19,936	26,259	
180 ^b	190	160	315	157	279	239	523	782	
1,500 ^b	1,719	1,855	762	610	866	1,188	912	1,670	
1,000 ^b	1,905	990	1,131	1,311	1,416	2,125	2,647	2,528	
300 ^b	304	580	366	216	241	574	893	978	
4,327	17,764	15,192	18,639	19,685	21,971	19,998	21,210	21,353	
2,000 ^b	2,465	2,401	969	831	680	894	100	109	
2,000 ^b	2,597	3,539	3,560	4,692	6,943	7,115	9,041	10,733	
2,463 ^c	6,489	4,144	3,338	3,425	4,820	6,576	7,567	8,235	
2,275 ^c	5,940	9,658	4,243	5,172	6,637	7,269	8,514	8,268	
8,680 ^d	36,651	27,135	21,442	26,329	39,488	42,930	56,721	65,799	
4,128 ^d	21,316	18,052	10,422	10,190	17,850	16,188	21,921	36,592	
3,365	2,129	2,772	2,657	3,997	7,312	7,248	8,902	8,176	
1,806 ^e	4,715	6,357	9,582	11,552	19,293	26,421	24,591	39,479	
3,490 ^e	9,111	9,109	6,284	7,034	7,697	13,143	12,625	20,337	
5,178 ^e	39,624	29,295	21,929	24,167	39,176	50,722	78,233	79,233	
500 ^b	568	804	778	1,159	2,292	4,414	6,232	9,589	
5,869	6,210	4,042	2,221	2,650	3,382	6,180	7,277	8,473	
1,000 ^b	1,142	1,243	936	1,571	1,904	96	220	554	
3,503	198,784	167,534	131,098	146,501	223,489	276,077	348,753	415,232	

generators, electric motors, rotary converters, and frequency converters on the basis

and dry cell batteries, communications equipment, and "other electrical equipment"

insulated wire and cable on the basis of 1929 proportions. Total for 1928 seems

obtained from the Japan Year Book, 1939-40. For 1936, since radio and telephone and

together as a single item, the value was apportioned to individual items according to

1936, except where otherwise indicated in footnotes.

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Table 6. VALUE OF JAPANESE IMPORTS^a OF ELECTRICAL EQUIPMENT BY ITEMS, IN CURRENT PRICES
(In 1,000 yen)

	1928	1929	1930	1931	1932	1933	1934
Submarine cable	658	1,635	260	193	79	---	---
Other insulated wire and cable	539	257	167	96	122	75	100
Meters ^b	973	1,235	582	512	312	178	128
Batteries	354	422	259	176	176	106	134
Telegraph equipments	894	930	530	87	219	384	111
Radio equipment	594	568	322	417	490	338	355
Telephone equipment	2,494	2,323	980	719	955	2,269	1,002
Generators and electric meters	6,415	6,831	3,537	1,998	1,642	1,735	1,224
Transformers	1,015	653	354	162	111	65	85
Generator prime-mover sets	349	1,325	1,199	161	47	113	3
Carbon for electrical use	696	834	743	561	842	1,564	1,493
Total	14,981	17,063	8,933	5,082	4,995	6,327	4,640

a. Includes only imports from areas considered foreign by the Japanese.

b. Another classification, "other meters", may contain an unknown amount of electric meters under this classification are large.

Source: Annual Returns of the Foreign Trade of Japan, 1928-36.

IMPORTS^a OF ELECTRICAL EQUIPMENT BY ITEMS, IN CURRENT PRICES; 1928-36
(In 1,000 yen)

1929	1930	1931	1932	1933	1934	1935	1936
1,635	260	193	79	---	---	4	---
257	167	96	122	75	100	108	95
1,235	582	512	312	178	128	136	173
422	259	176	176	106	134	85	100
939	530	87	219	384	111	548	151
568	322	417	490	338	355	384	350
2,323	900	719	955	2,269	1,002	581	792
6,831	3,537	1,998	1,642	1,735	1,224	2,257	1,669
653	354	162	111	65	85	75	136
1,325	1,199	161	47	113	3	6	102
834	743	561	842	1,564	1,493	1,276	1,357
17,063	8,933	5,082	4,995	6,327	4,640	5,460	4,925

as considered foreign by the Japanese.
meters", may contain an unknown amount of electric meters. The total imports
large.

Foreign Trade of Japan, 1928-36.

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Table 7. VALUE OF JAPANESE EXPORTS OF ELECTRICAL EQUIPMENT BY ITEMS, IN CURRENCY
(In 1,000 yen)

	1928	1929	1930	1931	1932
Insulated wire	4,527	5,414	5,973	4,052	4,029
Telephone and telegraph equipment	1,080	1,602	1,325	1,411	1,630
Electrical machinery ^a	3,774	4,220	5,504	3,990	2,650
Electric lamps ^b	5,746	6,433	6,265	6,796	11,328
Potteries for electrical use	NA	NA	NA	NA	NA
Batteries	NA	NA	NA	NA	NA
Total	15,127	17,669	19,147	16,249	19,637

NA = data not available.

- a. Electrical machinery includes transformers, motors, generators, dynamos, electrical machinery, and flashlights.
b. Includes relatively small exports of oil lamps to Korea.

Sources: Annual Returns of the Foreign Trade of Japan, 1928-36
Annual Trade Returns of Korea, 1928-36
Annual Returns of the Foreign Trade of Formosa, 1928-36.

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EXPORTS OF ELECTRICAL EQUIPMENT BY ITEMS, IN CURRENT PRICES; 1923-36
(In 1,000 yen)

	1929	1930	1931	1932	1933	1934	1935	1936
928								
527	5,414	5,973	4,052	4,029	6,893	10,276	15,547	21,833
080	1,602	1,325	1,411	1,630	4,309	6,753	6,839	8,189
774	4,220	5,504	3,990	2,650	4,191	11,725	14,596	25,704
746	6,433	6,265	6,796	11,328	11,676	10,877	11,583	12,489
NA	NA	NA	NA	NA	NA	960	1,355	1,046
NA	NA	NA	NA	NA	NA	<u>1,444</u>	<u>1,724</u>	<u>2,779</u>
,127	17,669	19,147	16,249	19,637	27,074	42,057	51,644	72,120

transformers, motors, generators, dynamos, electrical wires, meters, switchboards,
lights.
parts of oil lamps to Korea.

Foreign Trade of Japan, 1928-36
Korea, 1928-36
Foreign Trade of Formosa, 1928-36.

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Table 8. VALUE OF JAPANESE PRODUCTION OF ELECTRICAL EQUIPMENT BY ITEMS, I
(In 1,000 yen)

	1928	1929	1930	1931	1932	
Generators	3,492	6,088	4,415	4,591	6,626	12
Electric motors	7,074	12,333	14,796	9,782	14,123	35
Rotary converters	756	1,318	1,578	1,022	856	2
Frequency converters	23	40	109	21	17	
Transformers	7,222	9,485	9,308	5,551	9,454	16
Rectifiers	100	146	160	297	224	
Electric fans	833	1,322	1,855	719	871	1
Electric heaters	556	1,465	990	1,067	1,873	2
Electric clocks	167	234	580	345	309	
Electric lamps	13,515	13,665	15,192	17,018	28,121	36
Searchlights	1,111	1,896	2,401	914	1,187	1
Other lighting goods	1,111	1,928	3,539	3,264	6,703	11
Wet cell batteries	1,379	4,905	4,144	3,149	4,893	8
Dry cell batteries	1,264	4,569	9,658	4,003	7,389	11
Insulated wire	32,600	28,193	27,135	20,228	37,613	65
Cable	18,960	16,397	18,052	9,832	14,557	29
Meters	1,869	1,638	2,772	2,507	5,710	12
Radio equipment	1,003	3,627	6,357	9,640	16,503	32
Telephone and telegraph equipment	1,939	7,008	9,109	5,928	10,049	12
Other electrical equipment	8,432	30,480	29,295	20,638	34,524	65
Carbon electrodes	278	437	804	734	1,656	3
Battery insulators	3,261	4,777	4,042	2,095	3,786	6
Glass insulators	556	878	1,243	883	2,244	3
Total	107,501	152,909	167,534	123,678	209,288	372

Source: Derived from Table 5. The price index used to reduce current prices to 1936 a base year quantity weighted index including electric lamp, generator, and in Factory Statistics, 1936. The resultant index is: 1928-180; 1929-130; 1934-63; 1935-76; 1936-72.

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PRODUCTION OF ELECTRICAL EQUIPMENT BY ITEMS, IN 1930 PRICES; 1928-36
(In 1,000 yen)

1929	1930	1931	1932	1933	1934	1935	1936
6,088	4,415	4,591	6,626	12,868	17,848	19,453	26,471
12,333	14,796	9,782	14,123	35,923	55,160	57,783	62,614
1,318	1,578	1,022	856	2,450	2,156	2,337	2,356
40	109	21	17	23	10	17	333
9,485	9,308	5,551	9,454	16,628	24,444	26,232	36,471
146	160	297	224	465	379	683	1,036
1,322	1,855	719	871	1,433	1,886	1,200	2,319
1,465	990	1,067	1,873	2,360	3,373	3,483	3,511
234	580	345	309	402	911	1,175	1,356
13,665	15,192	17,018	28,121	36,618	31,743	27,908	29,665
1,896	2,401	914	1,187	1,133	1,419	132	151
1,928	3,539	3,264	6,703	11,572	11,294	11,896	14,907
4,905	4,144	3,149	4,893	8,033	10,138	9,957	11,438
4,569	9,658	4,003	7,389	11,062	11,538	11,203	11,483
28,193	27,135	20,228	37,613	65,813	68,143	74,633	91,386
16,397	18,052	9,832	14,557	29,750	25,692	28,843	50,822
1,638	2,772	2,507	5,710	12,187	11,505	11,713	11,356
3,627	6,357	9,040	16,503	32,155	41,938	32,357	54,831
7,008	9,109	5,928	10,049	12,828	20,862	16,875	28,247
30,480	29,295	20,638	34,524	65,293	30,511	102,938	110,046
437	804	734	1,656	3,830	7,006	8,200	13,318
4,777	4,042	2,095	3,786	6,470	9,810	9,575	11,768
878	1,243	883	2,244	3,173	152	289	769
152,909	167,534	123,678	209,286	372,469	438,218	458,887	576,711

The price index used to reduce current prices to 1930 prices was developed by the use of a weighted index including electric lamp, generator, and electric motor production as given in Table 2. The resultant index is: 1928-180; 1929-130; 1930-100; 1931-106; 1932-70; 1933-60; 1934-52.

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Table 9. VALUE OF JAPANESE IMPORTS OF ELECTRICAL EQUIPMENT BY ITEMS, IN 1930 PRICES
(In 1,000 yen)

	1928	1929	1930	1931	1932	1933	
Submarine wire and cable	665	1,832	260	201	48	---	
Insulated wire and cable	544	279	167	100	75	36	
Meters	983	1,342	562	533	191	86	
Batteries	358	459	259	183	108	51	
Telegraph equipment	903	1,011	530	91	134	186	
Radio equipment	600	617	322	434	301	164	
Telephone equipment	2,519	2,525	980	749	586	1,101	
Generators and electric motors	6,480	7,425	3,537	2,081	1,007	842	
Transformers	1,025	710	354	169	68	32	
Generator prime-mover sets	353	1,440	1,199	168	29	55	
Carbon for electrical use	<u>703</u>	<u>907</u>	<u>743</u>	<u>584</u>	<u>517</u>	<u>759</u>	9
Total	15,133	18,547	8,933	5,293	3,064	3,312	3,0

Source: Derived from Table 6. The price index used to reduce current prices to 1930 prices is the use of a base year quantity weighted index including import prices of meters, transformers, and weight categories of generators and electric motors, and ordinary insulated wire. Returns of the Foreign Trade of Japan, 1928-36. The resultant index is: 1928-99, 1932-163; 1933-206; 1934-154; 1935-171; 1936-154.

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RESTRICTEDIMPORTS OF ELECTRICAL EQUIPMENT BY ITEMS, IN 1930 PRICES; 1928-36
(In 1,000 yen)

1928	1929	1930	1931	1932	1933	1934	1935	1936
665	1,832	260	201	48	---	---	2	---
544	279	167	100	75	36	65	63	62
983	1,342	562	533	191	86	83	80	112
358	459	259	183	108	51	87	50	65
903	1,011	530	91	134	186	72	320	98
600	617	322	434	301	164	231	225	227
2,519	2,525	980	749	586	1,101	651	340	514
6,480	7,425	3,537	2,081	1,007	842	795	1,320	1,084
1,025	710	354	169	68	32	55	44	80
353	1,440	1,199	168	29	55	2	4	66
<u>703</u>	<u>907</u>	<u>743</u>	<u>584</u>	<u>517</u>	<u>759</u>	<u>973</u>	<u>746</u>	<u>681</u>
15,133	18,547	8,933	5,293	3,064	3,312	3,014	3,194	3,197

The price index used to reduce current prices to 1930 prices was developed by the quantity weighted index including import prices of meters, transformers, three different generators and electric motors, and ordinary insulated wire and cable as given in Annual Trade of Japan, 1928-36. The resultant index is: 1928-99; 1929-92; 1930-100; 1931-96; 1932-154; 1933-171; 1934-154.

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Table 10. VALUE OF JAPANESE EXPORTS OF ELECTRICAL EQUIPMENT BY ITEMS, IN 1930 PR
(In 1,000 yen)

	1928	1929	1930	1931	1932	1933
Insulated wire	3,565	4,550	5,973	4,941	4,578	7,580
Telephone and telegraph equipment	850	1,346	1,325	1,721	1,852	4,735
Electrical machinery	2,972	3,546	5,584	4,866	3,011	4,605
Electric lamps	4,524	5,065	6,265	8,288	12,873	12,831
Potteries for electrical use	NA	NA	NA	NA	NA	NA
Batteries	NA	NA	NA	NA	NA	NA
Total	11,911	14,507	19,147	19,816	22,314	29,751

NA = data not available.

Source: Derived from Table 7. The price index used to reduce current prices to 1930 price use of a base year quantity weighted index including export prices of insulated and electric lamps as given in Annual Returns of the Foreign Trade of Japan, 1928-1934. Price index is: 1928-127; 1929-119; 1930-100; 1931-82; 1932-38; 1933-91; 1934-96; 1935-100.

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JAPANESE EXPORTS OF ELECTRICAL EQUIPMENT BY ITEMS, IN 1930 PRICES; 1928-36
(In 1,000 yen)

	1928	1929	1930	1931	1932	1933	1934	1935	1936
	3,565	4,550	5,973	4,941	4,578	7,580	10,706	16,195	23,476
ment	850	1,346	1,325	1,721	1,852	4,735	7,034	7,124	8,805
	2,972	3,546	5,584	4,866	3,011	4,605	12,214	15,204	27,725
	4,524	5,065	6,265	8,268	12,873	12,831	11,330	12,066	13,429
	NA	NA	NA	NA	NA	NA	1,021	1,411	1,125
	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>1,504</u>	<u>1,796</u>	<u>2,988</u>
	11,911	14,507	19,147	19,816	22,314	29,751	43,809	53,796	77,548

The price index used to reduce current prices to 1930 prices was developed by the quantity weighted index including export prices of insulated wire, electrical machinery as given in Annual Returns of the Foreign Trade of Japan, 1928-36. The resultant 1929-119; 1930-100; 1931-82; 1932-88; 1933-91; 1934-96; 1935-98; 1936-93.

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A PROVISIONAL SURVEY OF
JAPAN'S RAILROAD ROLLING STOCK REQUIREMENTS IN 1950

DEPARTMENT OF STATE
INTELLIGENCE RESEARCH REPORT

OCL 4137

December 31, 1946

A survey of Japan's rolling stock position in the period 1928-36, analyzing holdings by railroads, production, exports and imports, and traffic volume. A provisional projection of Japan's rolling stock requirements to 1950 is made on the basis of the supply pattern from 1930 to 1934, allowing for estimated population growth.

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RESTRICTEDFOREWORD

This study is one of a series of special industry analyses undertaken to determine Japanese production, imports, and exports and civilian consumption of various commodities in the past, and to project the findings into the future in order to determine Japan's peaceful requirements in a typical early post-reconstruction year which has been labeled 1950 for convenience. It must be emphasized that the hypothetical year 1950 referred to in these studies is not identical with the calendar year 1950; it is recognized that certain of the criteria for normality in the Japanese economy will not have been met by the calendar year 1950. For purpose of convenience, however, the population estimated for the calendar year 1950 has been used in the projections.

The historical period included in the studies covers the years from 1928 to 1936 provided sufficient data are available, and later years if the data for the earlier period appear to be inadequate. In general the period 1930-34 has been used as the base for provisional projections of the peaceful needs of the Japanese people in 1950. For many of the industries data for the period 1928-30 are available and are presented, but from an over-all point of view the statistics for 1928-30 are not as satisfactory as those of the period 1930-34 as a basis for projections. Japanese statistical reporting improved after 1928-29; in addition, adjustments for technological change cannot be made on the basis of the inadequate data available for many of the industries in the earlier period. The data for 1935-36 are useful so far as they serve as a check on trends beyond the earlier period.

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Because of the urgent need for even a preliminary survey, each industry analysis is being issued independently as completed. Attention, therefore, is directed to the provisional nature of the individual studies, particularly in regard to the projections of Japanese requirements to 1950. Upon completion of all the provisional surveys, it is planned to reconsider each in the light of the others and to synthesize the projections into an over-all picture of the Japanese economy in 1950.

Similarly, because of the urgent need for a trade balance estimate prior to the completion of the industry analyses, a preliminary set of projections of Japan's exports and imports in 1950, as yet unrelated to the industry studies, has been issued in Vol. I, Part I of OCL-2815, The Place of Foreign Trade in the Japanese Economy. Upon completion of the industry studies, a final step will be to synthesize these studies and the trade balance estimates in order to make such modifications in both the individual industry levels and in the total export and import balance as may be required to meet the peaceful needs of Japan as defined by the Far Eastern Commission.

This synthesis will entail a revision of some of the industry studies and, in certain cases, a choice among several possible projections. Because the appropriate choice cannot be made until each industry can be re-examined with full regard for mutual relationships with other industries and with full regard for the over-all trade balance, several alternative projections are presented for certain of the industries. It is anticipated that the final projection in certain cases may differ somewhat from any of those now provisionally presented.

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Most of the data in these analyses were taken from official and semi-official Japanese sources. Not only have inconsistencies and errors frequently been detected within a single source, but also many data from different sources, presumably reporting on the same subject, are irreconcilable.

All references to Japan in this study, unless otherwise noted, refer only to the four main islands -- Hokkaido, Honshu, Shikoku, and Kyushu -- and immediately adjacent small islands. Similarly, the trade of Japan with Korea and Formosa, as well as with other countries, is classified as external trade unless otherwise indicated.

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RESTRICTEDSUMMARY

The amount of railroad rolling stock used in Japan in the period 1928-36 remained nearly stationary at about 5,200 locomotives, 22,000 passenger cars, and 80,000 freight cars; an increase of 7 percent in freight cars between 1934 and 1936 was the most notable change. About 79 percent of the locomotives, 50 percent of the passenger cars, and 83 percent of the freight cars in operation were used on government lines. Private lines operated most of the remaining locomotives and freight cars, but tramways operated one-third of the total number of passenger cars. About 93 percent of the locomotives were steam, 6 percent electric, and 1 percent gasoline or diesel.

Japanese rolling stock production supplied nearly all local needs, and, from 1934 onward, considerable amounts were exported, mostly to Manchuria. Annual production of locomotives between 1930 and 1934 averaged 152 steam, 48 electric, and 191 gasoline locomotives, most of the last group being for mining and industrial establishments rather than railroads. Annual passenger and freight car production averaged 2,352 units in the period 1930-34, with much higher production both in 1928-29 and 1935-36. Both imports and exports were insignificant until 1934, but by 1936 Japan was exporting rolling stock valued at 30.6 million yen (1930 prices).

Assuming levels of operating efficiency and utilization of equipment above the 1930-34 averages, but well below the emergency levels of 1944, it appears probable that Japanese railroads could operate with the same amount of equipment as was used in the 1930-34 period, despite the 19 percent increase in population. Annual production to maintain these latter

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levels is estimated at 260 locomotives, 870 passenger cars, and 3,200 freight cars; no allowance is made for export, but small amounts might be made available for export, in the absence of controls, if replacements of Japanese rolling stock were kept at a minimum. Considerable amounts of rolling stock, especially freight cars, now in use are regarded as in excess of probable requirements in 1950.

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RESTRICTEDI. INTRODUCTIONA. Scope of the Report

The report is a survey of the main characteristics of the Japanese railroad system and of the Japanese rolling stock position from 1928 to 1936 in terms of net annual supply, annual production, value of imports and exports, and volume and composition of traffic. Japan's rolling stock requirements are projected to 1950, assumed to be a normal post-war year, on the basis of the 1930-34 average holdings, with allowances for population growth and increased efficiency of operation. Estimates are then made of the annual production necessary to maintain these levels. The possibility of resumed exports and of reparations payments from existing surpluses are then considered.

B. Sources

Conclusions are based mostly on official Japanese Government data. The sources include the following:

- (1) Japan, Ministry of Commerce and Industry, Kejo Tokei-hyo (Factory Statistics), 1936
- (2) Japan, Ministry of Finance, Gaikoku Boeki Nenpyo (Annual Returns of the Foreign Trade of Japan), 1928-37
- (3) Japan, Ministry of Railways, Annual Reports, 1927-28 -- 1936-37
- (4) Taiwan Government-General, Taiwan Boeki Nenpyo (Annual Returns of the Trade of Formosa), 1928-37
- (5) Chosen Government-General, Chosen Boeki Nenpyo (Annual Returns of the Trade of Korea), 1928-37

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C. Characteristics of the Japanese Railroad System

As of March 31, 1946, ¹ Japan had about 27,000 kilometers of railroads, of which 19,500 kilometers were operated by the government and the remainder by private companies. About 3,000 kilometers of the state railroads and almost 5,300 kilometers of the privately owned railroads were electrified. The state railroads utilize rolling stock for lines of 3'6" gauge. Private railroads are partly local feeder lines and partly light railway, interurban, and special industrial lines; they operate equipment of various gauges from 2'6" to 4'8½". The operating capacities of private or local railroads and state railroads are shown by comparative data for traffic volume in Table 1 and for rolling stock in Table 2.

From 1928 to 1937, state and private railroads maintained nearly constant relative positions in traffic volume and rolling stock. The light railway character of most of the private lines is clearly indicated by the traffic volume carried. In the period 1933-37, the average annual number of passengers carried by private lines was 55 percent of the number carried by state railroads, but the proportion of passenger-kilometers was only 19 percent. The tonnage of freight carried by private lines amounted to 34 percent of that carried by the state lines; but, in terms of ton-kilometers, the proportion was only 4 percent. Volume figures for both state and private railroads after 1937 are only fragmentary, but rolling stock data supplied by SCAP for March 1946 indicate a sharply

1. All years in the period 1928-36 used in this report are fiscal years, April 1 - March 31. For example, inventory figures for 1928 are as of March 31, 1929; production in 1928 is from April 1, 1928 to March 31, 1929.

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diminished importance of private lines as freight carriers in recent years. The number of freight cars and locomotives was substantially reduced after 1935, although holdings of passenger cars increased. Using inventory figures as an index of operating capacity, the short-haul passenger service by private lines appears to have increased over 40 percent from 1935 to 1946, but the freight capacity appears to have dropped about 25 percent. Data on tramways, which operated 2,521 kilometers of track in 1937, are given where available, since much of the tramway rolling stock is very similar to that of the private railroads.

II. JAPANESE ROLLING STOCK POSITION, 1928-36

Between 1928 and 1936, Japanese production of locomotives and cars varied cyclically, with the production peaks at the beginning and end of the period being considerably higher than the depression lows of 1931 and 1932. The amount of equipment operated, however, showed only slight changes from year to year, the most marked being the 7 percent increase in freight cars from 1934 to 1936.

A. Rolling Stock Supply

1. Locomotives. The total number of locomotives in Japan declined from 5,360 in 1928 to 5,136 in 1936; locomotive capacity may, nevertheless, have remained constant or even increased as improved models replaced smaller, less efficient types. The average number of locomotives operated during the period 1930-34 was 5,168, of which 4,776 were steam, 313 were electric, and 79 were gasoline or diesel. The state-owned system operated an average of 4,070 locomotives, about 79 percent of the total; private railroads and tramways operated 961 and 137 locomotives, or about 19 percent and 2 percent of the total, respectively (see Table 2).

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a. Steam locomotives. The number of steam locomotives in Japan reached a peak of 5,040 in 1929 and thereafter declined almost 10 percent to 4,590 in 1934. Most of this decrease was in locomotives used by the government lines, but the rate of decline was most marked in locomotives used by tramways.

Government lines operated about 82 percent of the steam locomotives, a slightly greater percentage than for all locomotives. Private railroads operated about 16½ percent, and tramways about 1½ percent, of the steam locomotives.

Production of steam locomotives, as indicated in Table 3, decreased from 230 units in 1929 to 60 in 1932, rising steadily thereafter to 424 in 1936. Average annual production in the period 1930-34 was 152 steam locomotives.

b. Electric locomotives. In contrast to the decline in steam locomotives operated in Japan, electric locomotives increased from 272 in 1928 to 336 in 1934; most of this increase occurred in the government system, where the number in use advanced from 99 to 165.

Before 1934, the private railroads had operated most of the electric locomotives, but in that year the number operated by the private railroads fell to 164, after having reached a peak of 180 in 1931. The number operated by tramways was negligible in all years after 1928.

An average of 48 electric locomotives was produced annually during the period 1930-34. The gradual upward trend of production from 36 locomotives in 1929 to 56 in 1936 was broken by a low of 32 in 1933, immediately followed by a high of 71 in 1934.

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c. Gasoline and diesel locomotives. Gasoline locomotives used on tramways are the chief items of this group. The 1930-34 average of 67 gasoline locomotives represented nearly half the locomotives used by tramway companies; the largest number operated in any year was 77 in 1931. The government railroads used diesel locomotives for the first time in 1930, when 4 were operated, but the number had risen only to 10 by 1934. The number of gasoline locomotives used by private railroads was even less significant.

Production of gasoline locomotives for all purposes rose from 78 in 1929 to 490 in 1936. Average annual production was 191 in the period 1930-34 (see Table 3). The bulk of the production was presumably for mining and industrial establishments not covered by the statistics used in this report.

d. Imports and exports of locomotives. Trade statistics for Japanese locomotives are not given in terms of physical units in official sources; value statistics do not differentiate among various types of locomotives imported and exported. The value of locomotive imports became negligible after 1931 and exports did not become a factor of importance until after 1932.

2. Passenger and Freight Cars

a. Inventory of passenger cars. Passenger car holdings in Japan averaged 21,748 annually during the period 1930-34. Between 1928 and 1936, holdings fluctuated within narrow limits; a high of 22,742 was attained in 1930 and a low of 21,283 in 1932. In all years government railroad holdings represented about one-half of the total; private railroads operated from one-sixth to one-fifth of the total, and tramways operated one-third

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PRELIMINARY STUDY OF JAPANESE
REQUIREMENTS IN THE ROLLING STOCK INDUSTRY, 1950Note by the Secretary General

1. The enclosure, a preliminary United States study of estimated Japanese peacetime requirements in the rolling stock industry in 1950, is submitted by the United States Representative for the information of the Far Eastern Commission, and is referred to COMMITTEE NO. 2: ECONOMIC AND FINANCIAL AFFAIRS.

2. The United States Representative wishes to draw attention to the fact that any conclusions presented in this study have been formulated within the terms of reference indicated in the foreward and do not represent statements of United States policy.

3. Due to the limited number of copies available only three copies of the enclosure can be furnished each delegation.

NELSON T. JOHNSON
Secretary General

FEC-058/9

or less. Private railroad holdings increased steadily until 1932, thereafter declining slightly; a more marked decline in tramway holdings began as early as 1930 (see Table 2).

About 90 percent of the government-operated passenger equipment was ordinary passenger cars, but the number of these declined about 12 percent during the years 1928-36. On the other hand, cars equipped with electric and gasoline motors showed substantial increases. From data available, no differentiation by type is possible for private railroad and tramway equipment.

b. Inventory of freight cars. Nearly 80,000 freight cars, as an average, were in use annually in Japan between 1930 and 1934. Government railroad holdings made up 83.3 percent of the total, and private railroad and tramway holdings 14.3 and 2.4 percent, respectively. The preponderant importance of the government holdings of rolling stock in general was most marked for freight cars.

The number of freight cars increased by some 3,000 between 1928 and 1930, declined by more than that amount by 1932, and resumed its increase in 1934. Between 1928 and 1936, net holdings increased by 7,000 cars, in contrast to a very slight over-all gain in the number of passenger cars and a slight decline in the number of locomotives. There was a similar over-all increase in the number of government freight cars, whereas private railroad holdings decreased after 1931 and tramway holdings after 1928 (see Table 2).

More than half of the government holdings were covered freight cars; most of the remainder were open, mainly coal cars. Special cars, largely

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caboose, formed a little over 1 percent of the total, and tank cars one-third of 1 percent (see Table 2). The 67,231 freight cars on the government railroads in 1934 had a total loading capacity of 891,282 metric tons, an average of 13.26 tons per car.

c. Production of passenger and freight cars. As indicated in Table 4, production of passenger and freight cars (not including electric cars) increased from an estimated 5600 in 1928 to 6500 in 1936. Production declined between 1928 and 1932 and increased slowly thereafter. Average annual production during the period 1930-34 was 2146 passenger and freight cars; no data are available showing differentiation by type.

The production of electric cars decreased from 845 in 1928 to 199 in 1936, a decrease of 76 percent (see Table 5). An average of 206 electric cars was produced annually during the period 1930-34.

d. Imports and exports of passenger and freight cars. As in the case of locomotives, trade statistics for Japanese passenger and freight cars are not given in terms of physical units in official sources; value statistics combine all types of passenger and freight cars. Imports became negligible after 1930, but exports steadily increased after 1929.

B. Imports, Exports, and Trade Balance, 1928-36

Incomplete statistical data, in at least two instances, make it impossible to get a complete picture of Japanese external trade in railroad rolling stock. Data on exports of locomotives to foreign countries from 1928 through 1933 and of passenger and freight cars through 1934, and data on imports and exports of electric cars for the period 1928-36 are lacking. The following analysis, therefore, is subject to these limitations.

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At no time during the period covered by this paper did Japan's imports or exports of railroad equipment represent a major portion of Japan's external trade. In current prices, total imports declined from 3 million yen in 1928 to 0.1 million yen in 1936; exports increased from somewhat more than 2.5 million yen in 1928 to 37.5 million yen in 1936 (see Table 6).

In terms of 1930 prices (see Table 7), Japan's net exports during the period 1930-34 averaged 3.2 million yen annually, in comparison with average net imports of 1.0 million yen in 1928-29 and average net exports of 28.8 million yen in 1935-36. The 1930-34 average was undoubtedly somewhat higher than the figure shown as data are incomplete in those years. In most of the years covered in this report, Japan had larger net exports of locomotives than of passenger and freight cars, averaging net exports of 1.0 million yen annually for passenger and freight cars in 1930-34 and 2.2 million yen for locomotives in the same period. After 1929, the total value of imports of all types of rolling stock never rose above one million yen annually, and were negligible after 1930.

C. Volume of Traffic

As shown in Table 1, the number of passengers carried on Japanese state railroads¹ increased from 847.3 million in 1928 to 1,058.6 million in 1936, an increase of 25 percent. Between 1930 and 1934 the number of passengers carried averaged 819.5 million annually. Passenger-kilometers averaged 20.3 billion during the same period.

1. Similar data for private railroads are not available.

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Freight carried by the state railroads increased from 79.8 million metric tons in 1928 to 89.3 million tons in 1936, an increase of only 12 percent. The average volume carried annually during the period 1930-34 was 67.2 million metric tons. Freight ton-kilometers averaged 11.5 billion in the same period.

The pattern of freight tonnage carried by the state railroads is available for the calendar year 1934 (see Table 8). During that year, over 50 percent of the tonnage carried was mineral products, 13 percent forest products, and 11 percent agricultural products. In terms of ton-kilometers, however, mineral products represented only 30 percent of the total, agricultural products 17 percent, and forest products 16 percent.

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III. JAPANESE ROLLING STOCK REQUIREMENTS, 1950A. Inventory Requirements

Assuming a population increase of 19 percent over the 1930-34 average, and a comparable increase in rolling stock needs, but disregarding technological changes, possible improvements in operating efficiency, and increased utilization of equipment, Japan would require 6,150 locomotives, 25,850 passenger cars, and 94,730 freight cars in 1950. Since the 1930-34 period, however, a great increase in utilization, some technological changes, and an appreciable but not readily measurable advance in operating efficiency has occurred. Data for 1944 show that, on the government railroads, the ratio of ton-kilometers carried per freight car in service in that year was twice the ratio prevailing in the 1930-34 period, while the ratio of passenger-kilometers to passenger cars in service was three times that in the 1930-34 period.¹ A very large share of this increased utilization, however, undoubtedly represents the overtaxing of equipment and trackage that was forced on the railroads by the war emergency. In 1944 the railroads were carrying much freight normally borne by shipping, notably the heavy coal shipments from Kyushu and Hokkaido to central and southern Honshu. Passenger traffic, likewise, was abnormally heavy because of troop movements and the

1. This comparison was arrived at from data in Table 1 of this study and in the Summation of Non-Military Activities in Japan and Korea, (Supreme Commander for the Allied Powers, No. 2, November 1945, pp. 90-93.)

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dispersal of much of the urban population in anticipation of bombing raids. During the war, much repair and maintenance work was postponed for lack of materials and labor, and deterioration of equipment and roadbed advanced rapidly. In view of these circumstances the considerable increase in utilization is misleading, and does not indicate a comparable advance in technology and operating efficiency. Furthermore the Japanese rail net was substantially complete as early as 1930, and the limitations of the terrain serve to prevent the realization of major economies from the elimination of curves and grades. Such genuine advances in operating efficiency as have occurred since the 1930-34 period, or may be expected in the future, can presumably be ascribed mainly to improved traffic control techniques and other improvements in management.

It appears probable that the above improvements have been achieved in sufficient degree to enable the Japanese railroads to meet the needs of the increased population in 1950 with no more rolling stock than was used in the 1930-34 period (see below). This estimate must be considered provisional; a more refined projection will require more definitive information with respect to the present technological condition and operational efficiency of Japanese railroads, future shifts in population, and changes in the magnitude and pattern of commodity movements.

The data shown below, while incomplete, indicate that Japan now has a surplus of several items of rolling stock, notably freight cars, over the 1930-34 holdings.

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	<u>1930-34</u> <u>holdings</u>	<u>Operable</u> <u>March 1946</u> ^a
<u>Locomotives</u>	5,168	b
State railroads	4,070	4,824 ^c
Steam	3,931	4,549
Electric	131	275
Diesel	8	b
Private railroads	961	543
Steam	783	393
Electric	174	132
Gasoline	4	18
Tramways	137	b
Steam	62	b
Electric	8	b
Diesel	67	b
Total steam	4,776	b
Total electric	313	b
Total gasoline and diesel	79	b
<u>Passenger equipment</u>	21,749	b
State railroads	10,636	11,549 ^c
Passenger cars	9,280	10,177
Electric cars	1,279	1,372
Gasoline cars	77	b
Private railroads	4,360	5,509
Tramways	6,753	b
<u>Freight Cars</u>	79,617	b
State railroads	66,341	114,899
Covered	35,672	b
Tank	215	b
Open	29,619	b
Special	835	b
Private railroads	11,408	7,980
Tramways	1,868	b

- a. Supreme Commander for the Allied Powers, Summation of Non-Military Activities in Japan and Korea, No. 7, April 1946, pp. 157-158.
- b. Not available.
- c. Incomplete.

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The government railroads, which suffered relatively slight bomb damage during the war, have somewhat more locomotives and passenger cars and far more freight cars than in the 1930-34 period. The deficiencies in private railroad holdings of locomotives and freight cars could be met from excess holdings of the government railroads, insofar as gauges permit. These deficiencies may to some extent represent transferrals to the government railways by purchase or other means. No figures are available for tramways, but their losses were undoubtedly severe, since war damage was concentrated in urban areas served by tramways. Total holdings of freight cars are well above, and of locomotives somewhat above, 1930-34 levels; but it is probable that total passenger equipment holdings are no more than equal to, and possibly somewhat below, the 1930-34 levels. The current acute shortage of passenger equipment in Japan, attested by the overcrowded trains, is in large part temporary, as much of the traffic consists of urban dwellers travelling to and from rural areas in search of food.

B. Replacement Requirements to Maintain 1950 Inventories

The postponable nature of many repairs and most replacements of railroad equipment makes any estimate of annual needs hazardous. The number of units retired in any one year, or even a series of years, is affected greatly by general economic conditions. Costs of repair or rebuilding must be weighed against the cost of new equipment, traffic needs, and other factors. Statistically, the actual situation is often obscured by differences in the nature and extent of rebuilding. A unit listed as having been built 50 years ago may have been rebuilt so extensively during succeeding years that it has few, if any, of its

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original components. It should be noted that, although the total supply of railroad equipment is now substantially higher than it was during the prewar decade, effective capacity may not be proportionally high. The acceleration of output during the years immediately preceding the Pacific War has left Japan with a large supply of relatively new rolling stock, but heavy wartime usage and inadequate repairs may have resulted in a sizable amount of deferred maintenance. Information is not available on which to base a judgment as to the extent of such deferred maintenance, which will have to be made up in the future. General statements by untrained observers cannot be accepted literally, since the problem is one of comparing the present condition of Japanese equipment with its condition before the war. By some standards, all Japanese railroad equipment would be considered inefficient and below par. Undoubtedly some deferred maintenance exists. The probabilities are, however, that deferred maintenance is not a factor of major importance and that changes in number of units since 1935 do provide an index of changes in capacity.

Therefore, it seems reasonable to base annual needs on an estimate of the average life of the equipment. Typically, 20 years is assumed for locomotives and 25 years for passenger and freight cars; ¹ a normal age-distribution of rolling stock is likewise assumed. Furthermore, for purposes of this study, 1950 is assumed to be a normal post-reconstruction year when Japan will be faced with only normal maintenance problems.

On this basis, Japan would require the capacity necessary to produce 260 locomotives annually (5 percent per year), 870 passenger cars of all types, and 3,200 freight cars (4 percent per year). This level would be

1. These replacement rates approximate efficient replacement standards, but not necessarily current practice, in the United States.

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sufficient for government and private railroads and tramways in Japan, but would leave no capacity for exports. By comparison, production in private plants during 1930-34 averaged 411 locomotives annually, of which 200 were steam or electric, and 2,350 passenger and freight cars; and production in 1936 amounted to 970 locomotives (480 steam or electric) and 6,700 passenger and freight cars.

C. Possibilities for Export, 1950

A substantial market for rolling stock will undoubtedly exist in the Far East in 1950. Japan formerly was a major supplier of rolling stock to the Far East market, especially Manchuria. In 1936, Japanese exports of rolling stock were valued at 30.6 million yen in 1930 prices (see Table 7). No allowance for exports, however, has been made in the projected production levels given above; and, even in the absence of export controls, Japan's replacement needs would preclude exports in any volume.

On the other hand, any of Japan's present rolling stock that is declared to be in excess of its needs may be made available for reparations. Most of this is of 3'6" gauge, the use of which is practically confined to railroads of similar gauge, such as those of Java and New Zealand, or, if minor adjustments are made, the meter-gauge lines of Southeast Asia and the Philippines. Some of the private railroads have the 4'8½" gauge, and small amounts of their rolling stock may also be available for reparations.

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RESTRICTEDTable 1. TRAFFIC VOLUME ON RAILROADS OF JAPAN PROPER, 1928-36^a
(In millions)

Year	Number of Passengers			Metric Tons of Freight		
	State	Private	Tramways	State	Private	Tramways
1928	847.3	366.3	1,872	79.8	25.1	1.9
1929	862.9	415.5	1,818	77.2	26.5	1.7
1930	824.2	428.1	1,682	64.1	23.7	1.7
1931	787.2	420.9	1,577	60.6	22.7	1.4
1932	781.1	427.7	1,467	61.7	22.3	1.4
1933	841.3	462.3	1,505	72.0	24.8	1.5
1934	913.6	499.8	1,571	77.5	26.8	1.9
1935	985.0	532.1	1,608	81.0	28.1	1.7
1936	1,058.6	575.6	1,700	89.3	30.1	1.8
Averages:						
1928-30	844.8	403.3	1,791	73.7	25.1	1.8
1930-34	819.5	447.8	1,560	67.2	24.1	1.6

Year	Passenger-Kilometers		Freight Ton-Kilometers	
	State	Private	State	Private
1928	21,583	2,974	12,770	532
1929	21,346	3,528	12,578	536
1930	19,875	3,583	10,901	464
1931	19,123	3,647	10,601	469
1932	19,002	3,728	10,561	506
1933	20,822	4,051	11,992	533
1934	22,573	4,306	13,347	554
1935	24,173	4,595	14,012	586
1936	26,216	4,893	15,657	673
Averages:				
1928-30	20,935	3,362	12,083	511
1930-34	20,279	3,863	11,480	505

a. Japan, Department of Railways, Annual Report, 1937. Each fiscal year in this and subsequent tables is from April 1 of the given year to March 31 of the succeeding year.

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Table 2. ROLLING STOCK POSITION OF JAPANESE RAILROADS, 1928-1933

	1928	1929	1930	1931	1932	1933
Loccmotives	5,360	5,370	5,333	5,169	5,206	5,129
State Railroads	4,200	4,222	4,189	4,016	4,094	4,064
Steam	4,101	4,122	4,088	3,892	3,953	3,913
Electric	99	100	97	119	131	141
Diesel			4	5	10	10
Private Railroads	941	971	976	997	994	940
Steam	791	811	799	811	809	765
Electric	149	158	176	180	179	171
Gasoline	1	2	1	6	6	4
Tramways	219	177	168	156	118	125
Steam	129	107	90	73	49	49
Electric	24	6	13	6	6	8
Gasoline	66	64	65	77	63	68
Total steam	5,021	5,040	4,977	4,776	4,811	4,727
Total electric	272	264	286	305	316	320
Total gasoline and diesel	67	66	70	88	79	82
Passenger Equipment	21,639	22,495	22,742	21,861	21,283	21,329
State Railroads	11,053	11,355	11,429	10,585	10,182	10,433
Passenger cars	10,077	10,305	10,289	9,352	8,863	8,927
Electric cars	976	1,038	1,128	1,219	1,269	1,375
Gasoline cars		12	12	14	50	131
Private Railroads	3,644	4,077	4,270	4,403	4,478	4,304
Tramways	6,942	7,063	7,043	6,873	6,623	6,592
Freight Cars	78,836	79,716	81,797	78,669	78,451	78,916
State Railroads	65,896	66,515	68,353	65,138	64,923	65,804
Covered	35,228	35,928	36,544	34,835	35,142	35,617
Tank	225	225	230	211	204	208
Open	29,546	30,362	30,676	29,210	28,735	29,180
Special	897	900	903	882	842	799
Private Railroads	10,852	11,226	11,516	11,609	11,558	11,350
Tramways	2,088	1,975	1,928	1,922	1,970	1,762

a. Japan, Department of Railways, Annual Reports, 1929-37.

b. Approximately 200 units deducted from totals as given in Annual Returns (10,958 for 1933) estimated number of service cars, figures for which are not included in totals for the

ROLLING STOCK POSITION OF JAPANESE RAILROADS, 1928-36^a

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1930	1931	1932	1933	1934	1935	1936	Average 1930-34
5,333	5,169	5,206	5,129	5,001	n.a.	5,136	5,169
4,189	4,016	4,094	4,064	3,986	4,124	4,235	4,070
4,088	3,892	3,953	3,913	3,811	n.a.	n.a.	3,931
97	119	131	141	165	"	"	131
4	5	10	10	10	"	"	8
976	997	994	940	897	"	803	931
799	811	809	765	730	"	n.a.	783
176	180	179	171	164	"	"	174
1	6	6	4	3	"	"	4
168	156	118	125	118	"	92	137
90	73	49	49	49	"	n.a.	62
13	6	6	8	7	"	"	8
65	77	63	68	62	"	"	67
4,977	4,776	4,811	4,727	4,590	"	"	4,776
286	305	316	320	336	"	"	313
70	88	79	82	75	"	"	79
22,742	21,861	21,283	21,329	21,527	n.a.	21,397	21,749
11,429	10,585	10,132	10,433	10,551	10,750 ^b	11,000 ^b	10,636
10,289	9,352	8,863	8,927	8,969	n.a.	n.a.	9,280
1,128	1,219	1,269	1,375	1,403	"	"	1,279
12	14	50	131	179	"	"	77
4,270	4,403	4,478	4,304	4,343	"	4,291	4,360
7,043	6,873	6,623	6,592	6,633	"	6,606	6,753
81,797	78,669	78,451	78,916	80,251	n.a.	85,656	79,617
68,353	65,138	64,923	65,804	67,485	69,940	73,184	66,341
36,544	34,835	35,142	35,617	36,224	n.a.	n.a.	35,672
230	211	204	208	220	"	"	215
30,676	29,210	28,735	29,180	30,294	"	"	29,619
903	882	842	799	747	"	"	835
11,516	11,609	11,558	11,350	11,006	"	10,989	11,408
1,928	1,922	1,970	1,762	1,760	"	1,685	1,868

Reports, 1929-37.

Totals as given in Annual Returns (10,958 for 1935, 11,209 for 1936). This represents totals for which are not included in totals for the other years.

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Table 3. PRODUCTION AND AVERAGE UNIT VALUE OF LOCOMOTIVES

	Production (in number of units)			Total	Total Value (In 1,000,000 yen)	Unit Value (In 1,000 yen)	
	Gasoline	Electric	Steam			All Types	Steam
1928	--	--	--	--	--	--	--
1929	78	36	230	344	15.4	45	72
1930	129	41	233	403	11.4	29	40
1931	163	47	109	319	8.0	25	46
1932	240	47	60	347	1.8	14	50
1933	288	32	167	487	8.4	17	38
1934	236	71	192	499	15.7	31	65
1935	345	51	347	743	24.9	33	63
1936	490	56	424	970	31.2	32	62
Averages:							
1929-30	103	39	232	374	13.5		
1930-34	211	48	152	411	9.7		

a. Source: Kojo Tokai-hyo, (Factory Statistics), 1937.

b. Dash indicates that data are not available.

c. 1928-30 average.

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RESTRICTEDPRODUCTION AND AVERAGE UNIT VALUE OF LOCOMOTIVES IN JAPAN PROPER, 1928-1936^a

Total	<u>Total Value</u>	<u>Unit Value</u>		<u>Index of Unit</u>	<u>Fittings</u>	<u>Grand Total</u>
	(In 1,000,000 yen)	(In 1,000 yen) All Types Steam	Value, all types (1930 = 100)	(In 1,000,000 yen)	(In 1,000,000 yen)	(In 1,000,000 yen)
--	--	--	--	--	--	18.9
344	15.4	45	72	155	2.6	18.0
403	11.4	29	40	100	0.3	11.7
319	8.0	25	46	86	0.2	8.2
347	1.8	14	50	48	0.3	5.1
487	8.4	17	38	59	1.3	9.7
499	15.7	31	65	107	1.1	16.8
743	24.9	33	63	114	0.8	25.7
970	31.2	32	62	110	5.4	36.6
374	13.5				--	16.2 ^c
411	9.7				0.6	10.3

Statistics), 1937.
available.

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RESTRICTEDTable 4. PRODUCTION OF PASSENGER AND FREIGHT CARS IN JAPAN PROPER
1928-1936^a

	Quantity ^b (in units)	Value (in 1,000,000 yen)	Unit Value (in yen)	Index (1930=100)	Value of Fittings (in 1,000,000 yen)
1928	5,600	16.9	3,000	125	--
1929	4,000	14.5	3,600	150	0.9
1930	3,830	9.3	2,400	100	1.6
1931	1,510	3.9	2,600	108	0.2
1932	1,120	4.0	3,600	150	0.2
1933	1,470	8.1	5,500	230	0.9
1934	2,800	15.1	5,400	225	2.7
1935	4,800	19.0	4,000	167	3.0
1936	6,500	21.5	3,300	138	10.9
Averages:					
1928-30	4,477	13.6	3,000	--	1.3 ^c
1930-34	2,146	8.1	3,900	--	1.1

a. Source: Kojo Tokai-hyo, (Factory Statistics), 1937. Electric cars not included (see Table 5).

b. Approximation based on average value of units reported separately; possible error very small.

c. 1929-30 average.

Table 5. PRODUCTION OF ELECTRIC CARS IN JAPAN PROPER, 1928-1936^a

	Quantity ^b (in units)	Value (in 1,000,000 yen)	Unit Value (in 1000 yen)	Index (1930=100)	Value of Fittings (in 1,000,000 yen)
1928	845	7.6	9.0	88	b
1929	535	5.9	11.0	108	1.6
1930	355	3.6	10.2	100	3.7
1931	180	2.0	11.2	110	1.5
1932	178	1.3	7.1	70	0.2
1933	129	1.7	12.8	126	0.5
1934	189	1.5	8.1	79	0.3
1935	237	2.8	11.8	116	0.2
1936	199	2.4	12.1	119	2.7
Averages:					
1928-30	578	5.7	10.1	--	2.7 ^c
1930-34	206	2.0	9.9	--	1.2

a. Kojo Tokai-hyo, (Factory Statistics), 1938.

b. Data not available.

c. 1929-30 average.

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Table 6: VALUE OF JAPAN'S IMPORTS AND EXPORTS OF
RAILROAD ROLLING STOCK IN CURRENT PRICES, 1928-36^d
(In 1,000,000 yen)

	Imports			Exports		To
	Passenger and Freight Cars ^b	Locomotives	Total	Passenger ^b and Freight Cars	Locomotives	
1928	2.1	0.9	3.0	1.0 ^c	1.5 ^o	2
1929	1.4	1.1	2.5	0.8 ^c	1.0 ^o	1
1930	0.3	0.5	0.8	1.0 ^c	0.9 ^o	1
1931	0.1	0.1	0.2	0.9 ^c	0.5 ^o	1
1932	0.1	0.1	0.2	0.8 ^c	0.3 ^o	1
1933	0.1	0.2	0.3	3.8 ^c	0.4 ^o	4
1934	0.1	d	0.1	2.5 ^c	8.9	11
1935	0.1	d	0.1	20.4	17.1	31
1936	0.1	d	0.1	19.0	18.5	31
Averages:						
1928-30	1.3	0.8	2.1	0.9 ^c	1.1 ^o	
1930-34	0.1	0.2 ^f	0.3	1.8	2.2	

a. Sources: Japan, Ministry of Finance, Annual Returns of the Foreign Trade of Japan,
Chosen Government-General, Annual Returns of the Trade of Korea, 1928-
Taiwan Government-General, Annual Returns of the Trade of Formosa, 1928-

b. Does not include electric cars.

c. Incomplete; does not include exports to foreign countries.

d. Under 10,000 yen.

e. Incomplete; does not include exports to foreign countries, but includes estimated shipments to Korea.

f. Average 1930-33.

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Table 6: VALUE OF JAPAN'S IMPORTS AND EXPORTS OF
RAILROAD ROLLING STOCK IN CURRENT PRICES, 1928-36^a
(In 1,000,000 yen)

Year	Total	Exports		Total	Net
		Passenger ^b and Freight Cars	Locomotives		
	3.0	1.0 ^c	1.5 ^c	2.5	-0.5
	2.5	0.8 ^c	1.0 ^c	1.8	-0.7
	0.8	1.0 ^c	0.9 ^c	1.9	1.1
	0.2	0.9 ^c	0.5 ^c	1.4	1.2
	0.2	0.8 ^c	0.3 ^c	1.1	0.9
	0.3	3.8 ^c	0.4 ^c	4.2	3.9
	0.1	2.5 ^c	8.9	11.4	11.3
	0.1	20.4	17.1	37.5	37.4
	0.1	19.0	18.5	37.5	37.4
	2.1	0.9 ^c	1.1 ^c	2.1	---
	0.3	1.8	2.2	4.0	3.7

^aFinance, Annual Returns of the Foreign Trade of Japan, 1928-37;

^bGeneral, Annual Returns of the Trade of Korea, 1928-37;

^cGeneral, Annual Returns of the Trade of Formosa, 1928-37.

Exports to foreign countries.

Exports to foreign countries, but includes estimates of very small

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Table 7: VALUE OF JAPAN'S IMPORTS AND EXPORTS OF
RAILROAD ROLLING STOCK, IN 1930 PRICES, 1928-36
(In 1,000,000 yen)

	Imports ^a			Exports	
	Passenger and freight cars ^b	Locomotives	Total	Passenger and freight cars ^b	Locomotive
1928	1.8	0.8	2.6	0.8 ^d	1.0 ^d
1929	1.3	1.0	2.3	0.5 ^d	0.6 ^d
1930	0.3	0.5	0.8	1.0 ^d	0.9 ^d
1931	c	0.1	0.1	0.8 ^d	0.6 ^d
1932	c	c	c	0.5 ^d	0.6 ^d
1933	c	0.1	0.1	1.7 ^d	0.7 ^d
1934	c	c	c	1.1 ^d	8.4
1935	c	c	c	12.2	14.7
1936	c	c	c	13.8	16.8
Averages:					
1928-30	1.1	0.8	1.9	0.8 ^d	0.8 ^d
1930-34	c	c	c	1.0 ^d	2.2 ^d
1935-36	c	c	c	13.0	15.8

- a. 1930 prices based on index used for miscellaneous machinery in this series of papers.
Discrepancies are believed to be small considering the insignificant volume of imports.
- b. Does not include electric cars.
- c. Less than 100,000 yen.
- d. Incomplete; does not include exports to foreign countries.
- e. 1930 prices based on following index: 1928-155; 1929-155; 1930-100; 1931-86; 1932-1935-114; 1936-110.

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Table 7: VALUE OF JAPAN'S IMPORTS AND EXPORTS OF
RAILROAD ROLLING STOCK, IN 1930 PRICES, 1928-36
(In 1,000,000 yen)

es	Total	Exports ^e		Total	Net
		Passenger and freight cars ^b	Locomotives		
	2.6	0.8 ^d	1.0 ^d	1.8	-0.8
	2.3	0.5 ^d	0.6 ^d	1.1	-1.2
	0.8	1.0 ^d	0.9 ^d	1.9	0.9
	0.1	0.8 ^d	0.6 ^d	1.4	1.3
c		0.5 ^d	0.6 ^d	1.1	1.1
	0.1	1.7 ^d	0.7 ^d	2.4	2.3
c		1.1 ^d	8.4	9.5	9.5
c		12.2	14.7	26.9	16.9
c		13.8	16.8	30.6	20.6
	1.9	0.8 ^d	0.8 ^d	1.6	-0.3
c		1.0 ^d	2.2 ^d	3.2	3.2
c		13.0	15.8	28.8	28.8

for miscellaneous machinery in this series of papers (see OCL 4135).
small considering the insignificant volume of imports.

ports to foreign countries.
index: 1928-155; 1929-155; 1930-100; 1931-86; 1932-48; 1933-59; 1934-107;

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RESTRICTEDTable 8. RELATIVE IMPORTANCE OF INDIVIDUAL COMMODITIES CARRIED BY STATE RAILROADS OF JAPAN PROPER, 1934^a

	Percentage of Total Tonnage ^b	Percentage of Total Ton-Kilometers ^c	Average Haul (in km.)
Agricultural products	11.0	17.2	242
Forest products	13.0	16.2	194
Mineral products	51.5	30.2	91
Marine products	2.6	5.5	330
Comestibles	2.0	2.7	210
Beverages, tobacco	1.3	2.2	260
Fertilizers	5.6	7.6	215
Textiles	2.0	2.9	230
Ceramic manufactures	4.5	4.3	150
Miscellaneous manuf.	5.2	8.8	264
Livestock	0.8	1.5	300
Miscellaneous	0.5	0.9	308
Total	100.0	100.0	156

- a. Source: Japan, Department of Railways, Annual Report, 1935. Calendar year used and unclassified tonnage (12 percent of total 1934 tonnage) omitted, hence not comparable with Table 1.
- b. Total classified tonnage: 67.8 million metric tons.
- c. Total classified ton-kilometers: 10,574,000,000.

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RESTRICTEDSUMMARY ESTIMATE OF FOREIGN TRADE BALANCE
OF JAPAN IN "1950"

Intelligence Memorandum

OCL 3436.71A

Prepared By
Division of Research for Far East
Office of Far Eastern Affairs

January 27, 1947

A preliminary estimate of the foreign trade balance of Japan in a normal postwar year, designated as "1950." Domestic consumption in general is based on annual average consumption in the period 1930-34; production is arbitrarily assumed to be limited in certain categories; and particular commodity prices for a normal postwar year are roughly estimated. Possible adjustments in the export-import pattern that might aid in establishing a balance between exports and imports are indicated.

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RESTRICTEDFOREWORD

The attached Summary Estimate of Foreign Trade Balance of Japan in "1950", a provisional United States study, is submitted by the United States Representative for the information of the Far Eastern Commission. The United States Representative wishes to draw attention to the fact that the summary estimate has been formulated on the basis of the assumptions and qualifications indicated in the accompanying notes and does not, either in whole or in part, represent a statement of United States policy. The study is submitted at this time as a trial balance of Japan's foreign trade and payments based on the pattern and level of Japanese industry and trade during the period 1930-34 projected to "1950," but modified in certain important particulars, as noted, by necessarily arbitrary assumptions. It is offered in the hope of indicating the general nature and magnitude of the problems connected with any consideration of the level of economic life required in Japan.

The numerous general and specific assumptions that had to be made in arriving at this summary estimate are set forth in some detail in the notes accompanying the table. It is recognized that certain of these assumptions may introduce possible serious errors into the estimate of the over-all export-import balance. However, the estimate is presented in sufficient detail to permit ready calculation of the effect of changing one or several of the general or specific assumptions. It is considered essential that the various assumptions be submitted to a critical examination, which is already being undertaken. In its present form, the

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estimate is believed to represent, with adequate reservations for all of the uncertainties involved, a reasonable first approximation to Japan's export-import balance in "1950" at the capacity levels assumed in this paper.

In the last section of the notes accompanying the summary estimate, an indication is given of some possible downward adjustments in the living standard of Japan below the level of 1930-34 and their possible effect on the trade balance. As is pointed out in the section referred to, any possible marginal savings in net imports may be required not only to absorb deficiencies until Japanese capacity reaches the projected levels, but also to balance effects of price and market developments different from those assumed, possible inability of the Japanese to utilize their capacity fully at all times, and cyclical depressions with adverse effects on all trade. It must be emphasized that the summary estimate has not been conceived as a rigid and inflexible export-import pattern but as a general indication of the possible means by which Japan can pay for necessary imports in a normal post-reconstruction year.

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SUMMARY ESTIMATE OF FOREIGN TRADE BALANCE OF JAPAN IN "1950"
 (in millions of yen, at assumed rate of two yen per dollar)

A Item	B Imports	C Exports	D Group Imports	E Group Exports	F Group Net ^a
1. <u>Food, beverages, and tobacco</u>			1037	159	-878
a. Rice	342				
b. Wheat, barley, and minor grains	348				
c. Soybeans	143				
d. Sugar	75				
e. Fats, meat, and oil-bearing materials	24				
f. Fish	30	75			
g. Fruits, vegetables, tea, tobacco	75	84			
2. <u>Fertilizers and fodder</u>			125	25	-100
a. Organic fertilizer	43				
b. Inorganic fertilizer	27	25			
c. Fodder	55				
3. <u>Coal and petroleum</u>			87	15	- 72
a. Coal	9	15			
b. Petroleum	78				
4. <u>Metals and minerals</u>			96	72	- 24
a. Iron and steel (including ores)	26				
b. Non-ferrous metals (including light metals)	60				
c. Non-metallic minerals (except coal)	10				
d. Cement		17			
e. Pottery and glass		55			
5. <u>Textiles</u>			610	1196	4586
a. Cotton	512	804			
b. Rayon (including pulp)	22	28			
c. Wool	76	17			
d. Silk		174			
e. Silk tissues		173			

a. Minus sign indicates excess of imports over exports; plus sign indicates excess of exports over imports.

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A Item	B Imports	C Exports	D Group Imports	E Group Exports	F Group Net ^a
6. <u>Lumber and paper pulp</u>			190		-190
a. Lumber	150				
b. Paper pulp	40				
7. <u>Other materials</u>			195	150	- 45
a. Rubber	40	50			
b. Industrial fibers	15				
c. Hides and leather	20				
d. Chemicals, dyes, drugs, and allied materials (includ- ing salt, but excluding fertilizer)	80	100			
e. Miscellaneous materials	40				
8. <u>Manufactured goods</u>			0	365	/365
a. Machinery (including elec- trical equipment)		200			
b. Metal manufactures		100			
c. Clothing		15			
d. All other manufactures		50			
9. <u>Invisible items</u>			0	200	/200
a. Tourists, businessmen, missionaries, etc.		100			
b. Gold and silver		70			
c. Foreign shipping		30			
GRAND TOTALS	2340	2182	2340	2182	-158

a. Minus sign indicates excess of imports over exports; plus sign indicates excess over imports.

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NOTES TO ACCOMPANY TABLE ON
"SUMMARY ESTIMATE OF FOREIGN TRADE BALANCE OF JAPAN IN '1950'"

A. General Assumptions

The estimate presented in the accompanying table is based on assumed conditions in a typical early post-reconstruction year labeled "1950" for convenience. It is assumed that annual per capita consumption of major commodities (except where otherwise noted) will be at the average rate prevailing in the 1930-34 period, total consumption being adjusted for the increase of approximately 19 percent in the population since that time (66.34 million to 79 million). The consumption pattern has been adjusted as specifically indicated herein for certain items, utilizing all reasonable possibilities for effecting a saving in Japanese foreign exchange.

Production is assumed to be limited in certain categories of war-supporting industries and is specified in the notes for all items affected. For certain other industries, notably textiles, allowance is made for capacity increases resulting from reconstruction and rehabilitation. It is assumed that by "1950" available facilities will be operated virtually at capacity rate and that foreign trade will be restored to the degree that import requirements can be obtained in the world market and exports can be sold. Prices for exports and imports are forecast on the basis of a normal peacetime year. In general, 1930 prices were relatively low and present prices are high; the prices used in these estimates represent judgments in individual cases as to the level that will prevail in "1950". Where it has been necessary to use a rate of foreign exchange, that prevailing in 1930 (about 2 yen to one dollar) has been used.

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The estimates presented here include trade with Korea and Formosa, which was not considered as foreign trade in Japanese prewar trade reporting.

B. Specific Assumptions

1. Food, beverages, and tobacco. Over-all consumption of food estimated at 2,270 calories per capita per day. Maximum domestic production of food estimated as approximately equivalent to 1935-36 level of production plus production from an assumed increase of about 5 percent in acreage. Pattern of imports designed to lessen cost by decreasing by 50 percent the imports of rice and sugar that would be required to maintain the average 1930-34 per capita consumption of rice and sugar and by correspondingly increasing the imports of wheat, taking into account differences in caloric value.

a. Rice. Imports of 1,600,000 m.t. Price in "1950" estimated at 60 percent of current price of 357 yen per metric ton (on basis of 2 yen per dollar in "1950"), or 214 yen per metric ton.

b. Wheat, barley, and minor grains. Imports of 3,005,000 m.t. of wheat and barley, of which 700,000 m.t. are necessary to maintain approximately 1930-34 per capita consumption of wheat; 1,780,000 m.t. are to replace 1,600,000 m.t. of rice (see above); and 525,000 m.t. are to replace 445,000 m.t. of sugar (see below). "1950" price estimated at 110 yen per metric ton, which is 75 percent of current price of 147 yen per metric ton (2 yen per dollar in "1950"). Imports of minor grains at 200,000 m.t.; "1950" price estimated at 88 yen per metric ton, which is 80 percent of "1950" estimated wheat price, same relationship as in 1930.

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FEC-058/10RESTRICTEDFEC-058/1024 February 1947FAR EASTERN COMMISSIONLEVEL OF ECONOMIC LIFE IN JAPAN:
SUMMARY ESTIMATE OF FOREIGN TRADE BALANCE OF JAPAN IN 1950Note by the Secretary General

1. The enclosure, a preliminary United States study of the foreign trade balance of Japan in 1950, is submitted to the United States Representative for the information of the Far Eastern Commission, and is referred to COMMITTEE NO. 2: ECONOMIC AND FINANCIAL AFFAIRS.

2. The United States Representative wishes to draw attention to the fact that any conclusions presented in this study have been formulated within the terms of reference indicated in the foreword and do not represent statements of United States policy.

3. Due to the limited number of copies available only five copies of the enclosure can be furnished each delegation.

NELSON T. JOHNSON
Secretary General

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c. Soybeans. Imports of 1,100,000 m.t. to maintain 1930-34 per capita consumption; price 50 percent over 1930.

d. Sugar. Imports approximately one-half of 1930-34 on per capita basis, or 440,000 m.t. Price estimated at 170 yen per metric ton, same as 1930 price of imports from Formosa, which appeared high relative to world prices in that year.

e. Fish. Imports and exports at 1930-34 level, with 50 percent increase in price. Pending decision on this point, no allowance is made for reduction by "1950" of prewar fishing area.

f. Fruits, vegetables, tea, tobacco. Imports and exports at 1930-34 level, with 50 percent increase in price.

2. Fertilizers and fodder

a. Organic fertilizer. Imports of 450,000 m.t. of soybean cake or equivalent (approximately 40 percent of 1930-34 imports, but compensated for by larger applications of inorganic fertilizer and maximum utilization of home produced organic fertilizers). Price 96.3 yen per metric ton, which is 50 percent over 1930 price (corresponding to rise estimated above for soybeans).

b. Inorganic fertilizer. Imports of 1,000,000 tons of phosphate rock at 13.5 yen per metric ton, approximately 65 percent of 1930 price; also imports of 160,000 m.t. of potash salts at 81.4 yen per metric ton, slightly over 70 percent of 1930 price. Exports of ammonium sulfate valued at 25 million yen are assumed possible for purposes of this estimate, although there is good reason to believe that all Japanese production of ammonium sulfate will be required for domestic use.

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c. Fodder. Imports based on average of 1928-36 period, believed to be better base than 1930-34, which showed certain inexplicable irregularities.

3. Coal and petroleum

a. Coal. Imports (coking coal only) of 750,000 m.t.; exports of 1,500,000 m.t. Price in "1950" assumed equal to 1930 price.

b. Petroleum. Civilian requirements estimated at 17.8 million barrels annually on basis of 1930-34 per capita consumption after deducting military uses and additions to stocks. Of 17.8 million barrel total, assumed that 14.4 million barrels will be refined in Japan from 2.0 million barrels of domestic crudes plus imported crudes valued at 40 million yen. Remainder of requirements to be supplied by imports of refined products valued at 38 million yen. "1950" price assumed to be 75 percent of 1930 price.

4. Metals and minerals

a. Iron and steel (including ores). Although civilian domestic requirements of finished steel on the basis of average per capita consumption in 1930-34 are estimated to be 2.7 million m.t., a figure of 2.1 million m.t. of finished steel, all produced in Japan, is assumed in this projected balance of payments. (2.1 million m.t. is about equal to total 1930 consumption before deductions are made for military consumption.) Assumed that total of 2.1 million m.t. will consist of 2.0 million m.t. rolled steel and 0.1 million cast and forged steel.

Ingot production assumed to be 2.75 million m.t., of which 0.1 million m.t. will be used for castings and forgings and remainder to produce

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2.0 million m.t. of rolled steel at 75 percent recovery rate.

Domestic collections of scrap estimated to be 1 million m.t. and "self-generated" scrap 0.69 million m.t. annually. Ferrous content of materials used to produce 2.75 million m.t. of ingot steel estimated to be about 3 million m.t., of which 100,000 tons could be domestic ores used in ingot furnaces for reducing carbon content. The balance of 2.9 million m.t. would consist of about 1.7 million m.t. of available domestic scrap and 1.2 million m.t. of pig. This would mean a technically feasible 58:42 ratio of scrap to pig.

Pig production assumed to be 1.5 million m.t., of which 0.5 million m.t. will be supplied by domestic ores (remaining domestic ore or its equivalent to be used in steel furnaces) and remainder will be made from 1.54 million m.t. of imported "65 percent recovery" ore at 9 yen (1930 price), totaling 14 million yen.

In addition to pig iron required for steel production, requirements of 0.6 million m.t. of pig are estimated for castings (about the 1930-34 level of consumption). Total pig iron requirements would be about 1.8 million m.t., of which 1.5 million m.t. would be domestically produced and 300,000 m.t. imported. At 39 yen per m.t., pig iron imports would cost approximately 12 million yen.

Total import costs for iron and steel on the above basis would be 26 million yen. "1950" prices for all ferrous commodities assumed to be generally equivalent to 1930 prices.

b. Non-ferrous metals, including light metals. Total imports estimated at 60 million yen. Import prices of all non-ferrous metals assumed to be about the same in "1950" as in 1930.

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i. Copper. "1950" requirements, estimated at 80,000 m.t. of refined copper, one-half produced in Japan from domestic ores and the remainder imported. Assumed that as in past imports of ore and blister will be minor and that refined copper will be imported to compensate for domestic deficiencies. Estimated cost 21.5 million yen.

ii. Nickel. No domestic production assumed; imports costing 3.75 million yen based on 1930-34 per capita consumption projected to "1950".

iii. Tin. No domestic production assumed; imports costing 8.0 million yen based on 1930-34 per capita consumption projected to "1950".

iv. Lead. Production from domestic ores maximized at 8,000 m.t. Import requirements 72,000 m.t., all as refined lead, costing 16.0 million yen.

v. Zinc. Maximum economic domestic production 40,000 m.t. Imports of ore equivalent to 21,000 m.t. of metal content, costing 1.5 million yen.

vi. Aluminum. Assuming (1) present stocks of metal suitable for rolling will be exhausted by "1950"; (2) no increased use of aluminum domestically as result of technological change; (3) no domestic production of primary aluminum ingot; (4) imports of aluminum ingot costing 3.75 million yen.

vii. Minor non-ferrous metals. Imports costing 0.5 million yen.

c. Non-metallic minerals other than coal. Crude estimate of import requirements based on 1930-34 level and pattern projected to "1950". Exports of sulfur (which averaged 1.6 million yen annually in 1930-34) assumed to be negligible because of increased requirements over 1930-34 average for sulfur as raw material for production of carbon disulfide and sulfuric acid.

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d. Cement. Assuming production, consumption, and export levels and patterns of 1930-34 projected to "1950", exports valued at 17.0 million yen ("1950" prices assumed to be equal to 1930 prices) should be available.

e. Pottery and glass. Export balance of 55 million yen, of which 17 million yen from glass and the remaining 38 million yen from pottery. ("1950" prices assumed equal to 1930 prices.) (See also separate studies on these two industries, OCL-4131 and OCL-4146.)

5. Textiles

Over-all consumption at 10.25 lbs. per capita as in 1930-34, but with increased consumption of rayon and staple fiber and decreased consumption of cotton and wool as follows:

	<u>Consumption in lbs. per capita</u>	
	Actual 1930-34	Modified, "1950"
Fiber		
Cotton	8.00	5.00
Rayon	0.49	3.80
Wool	1.26	0.95
Silk	<u>0.50</u>	<u>0.50</u>
Total	10.25	10.25

a. Cotton. Based on fluctuations in US cotton export prices over the last 30 years and on the assumption that agricultural prices in general will decline from present levels, "1950" price for cotton is assumed approximately equal to 1930 price (633 yen per m.t.).

In the absence of any conclusive data on estimated prices in the future for cotton goods, it is assumed that the price relationship between raw cotton and cotton goods in "1950" will be about the same as in 1930.

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Capacity of Japanese cotton industry in "1950" estimated at 7 million spindles. At two-shift operation, 808,000 m.t. of raw cotton imports will be required, costing 512 million yen.

At consumption rate of 5 lb. per capita, over-all domestic consumption would be 180,000 m.t. Production of yarn from 7 million spindles at full capacity would be 703,000 m.t., leaving 523,000 m.t. available for export. At 1930 price (1,538 yen per metric ton) exports would yield 804 million yen. It should be noted that estimated exports of tissues are maximized, and it is possible that the "1950" market may not be able to absorb exports of this magnitude.

b. Rayon (and staple fiber). Domestic production in "1950" is assumed to be 150,000 m.t. Per capita consumption of 3.80 lbs. will utilize 136,000 m.t., leaving 14,000 m.t. available for export, of which about 4,000 m.t. assumed to be yarn and 10,000 m.t. tissues.

1930 prices for rayon were extraordinarily high; on basis of price changes since that time, "1950" price is estimated at 50 percent of 1930 level, or 1,133 yen per m.t. for yarn and 2,345 yen per m.t. for tissues. Receipts would then be 4.5 million yen for yarn and 23.5 million yen for tissues, totaling 28 million yen.

Production of 150,000 m.t. of rayon would require 180,000 m.t. of rayon pulp. Assuming domestic production of 80,000 m.t. of pulp, imports of 100,000 m.t. would be required. Estimated cost is 22 million yen. (Cost of imported salt for rayon industry is discussed in section 6,d, chemicals, etc.)

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c. Wool. On basis of estimated woolen yarn capacity of 40,000 m.t. and yarn yield of 55 percent from raw wool, imports of 72,700 m.t. of raw wool would be required. Current wool price is \$535.57 per m.t., or 1,071 yen (at 2 yen per dollar). This price is nearly 25 percent under the 1930 price of 1,405 yen per m.t. It is assumed that 1,071 yen per m.t. will be a reasonable price in "1950" and total imports will cost about 76 million yen.

At per capita consumption of 0.95 lbs. of wool, over-all domestic consumption would be 33,840 m.t. and exports would be 6,160 m.t. At 4,400 sq. yd. of tissue per ton of yarn, 27.1 million square yards would be exported. Assuming 25 percent cut in "1950" tissue prices below 1930 level (same drop as for raw wool), price per 1,000 sq. yd. would be 645 yen and total receipts 17.4 million yen.

d. Silk. Domestic consumption assumed to be 0.5 lb. per capita, or about 18,000 m.t., in "1950". Assumed that 120,000 bales of raw silk (15.84 million lbs.) can be exported at \$5.50 per lb., bringing receipts of 174 million yen (at 2 yen per dollar). Converting dollars to yen at 1:2, this price would be 11 yen per lb., as compared with the 1930 price of 6.4 yen per lb. Present price is \$7.00 per lb., or 14 yen, using the above conversion rate.

e. Silk tissues. In addition to the above exports, it is assumed that 120,000 bales will be used to produce silk tissues for export. Allowing for 25 percent gumming loss, 120,000 bales would produce 95,000,000 sq. yd. for export. Price of tissues in 1930 was 0.86 yen per sq. yd. Present price is \$1.26 or 2.50 yen per sq. yd. (with raw silk at \$7.00 per lb.).

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Assuming a cut-back of 27 percent (equivalent to assumed drop in raw silk price from \$7.00 to \$5.50 per lb.), price of silk tissues would be 1.82 yen per sq. yd. and total receipts 173 million yen. Proceeds of exports of raw silk and silk tissues in "1950" have been maximized. It is assumed that the demand for 120,000 bales of raw silk is fairly inelastic at the estimated "1950" price and that substitution would not readily be made for this amount. The assumption that the market (mostly in the Far East) would absorb 120,000 bales of silk as tissue in "1950" at the assumed price is probably less valid.

6. Lumber and paper pulp

a. Lumber. No allowance for reconstruction, assumed to be in general completed. Assumes imports valued at 150 million yen required to avoid drastic overcutting of Japanese forests. Assumes that "1950" prices will be 50 percent above those in 1930.

b. Paper pulp. Assumes no imports of paper and assumes import requirements of pulp valued at 40 million yen for paper manufacture. (Rayon pulp requirements are listed above under rayon.) Assumes "1950" prices equal to those of 1930.

7. Other materials

a. Rubber. Imports estimated at 60,000 m.t. of crude rubber to permit full utilization of Japanese rubber processing capacity to supply domestic requirements and to produce goods for exports. Price of crude rubber in 1930 was 11.9 cents per lb.; "1950" price estimated at 15 cents per lb. (66 sen per kg.), bringing cost of imports to 39.6 million yen. Equivalent price increase (about 25 percent) assumed in estimating receipts from exported rubber products.

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b. Industrial fibers. Crude estimate based on 1930-34 import requirements projected to "1950" at 1930 prices.

c. Hides and leather. Crude estimate based on 1930-34 import requirements projected to "1950" at 1930 prices.

d. Chemicals, dyes, drugs, and allied materials (including salt, but excluding fertilizers). Japanese trade returns include in these categories many commodities that cannot reasonably be classified under these headings, e.g., rubber. (See above, section 7, a.) Fertilizers are also considered separately in this summary estimate. In addition to deductions for these items, certain relatively minor adjustments have been made, e.g., increased salt imports for chemical industry and deductions for former exports of raw celluloid (celluloid assumed to be exported entirely as finished products in "1950"). Imports and exports are in general estimated on the 1930-34 level and pattern projected to "1950". Imports include salt and certain specialties in chemicals, dyes, drugs, paints, lacquers, and allied materials. Exports include certain materials in the above categories (except salt) and, in addition, iodine, menthol, and considerable quantities of cosmetics, patent medicines, and medical supplies. Net trade balance in these commodities assumed to be approximately similar to that in 1930-34. Applied 1930 prices in general.

Imports of industrial salt will depend to a considerable degree on the levels of caustic soda and soda ash production in Japan. If the Japanese alkali industry produces caustic soda and soda ash for all peaceful needs, including caustic soda for 150,000 m.t. of synthetic fiber production, requirements are estimated at 80,000 m.t. of electrolytic

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caustic soda and 470,000 m.t. of soda ash (part of which will be converted to caustic soda). Total salt requirements for this production would be about 885,000 m.t., costing 14 million yen (at 30 percent over 1930 prices).

e. Miscellaneous materials. Based on requirements in 1930-34 for commodities not elsewhere classified (excluding miscellaneous manufactured goods). Assumes 1930 price level.

8. Manufactured goods

a. Machinery (including electrical equipment). Assumed in "1950" to consist largely of agricultural implements, textile machinery, communications equipment, small motors, light bulbs, bicycles, and miscellaneous machinery, tools, and equipment. Estimated export level based on availability of iron and steel, on reduction of the 1930-34 domestic consumption level, and on an increase in price above 1930 levels.

b. Metal manufactures. Largely pots and pans; electric wire; nails; bolts; screws; cutlery; non-ferrous sheet, plate, and tubes; finished copper, brass, and bronze items; etc. Assumes a cut in domestic consumption below the 1930-34 level and an increase in price over the 1930 levels.

c. Clothing. Based on 1930-34 imports projected to "1950" at 1930 prices.

d. All other manufactures. Manufactures not elsewhere classified, including art goods (except pottery and glass), pearls, celluloid manufactures, toys (except pottery, glass, and rubber), mats, etc. Assumes 1930 price levels.

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Estimated net at 100 million yen. Expenditures abroad by Japanese assumed to be minor in "1950".

b. Gold and silver. Exports estimated at 70 million yen. Possibly somewhat optimistic.

c. Foreign shipping. Net returns to Japan estimated at 30 million yen in "1950". Also possibly somewhat optimistic.

C. Possible Adjustments in the Living Standard and Effect on the Trade Balance

It is recognized that it will be some time, perhaps several years, before Japanese capacity in general can reach the levels assumed as a basis for forecast and before world trade will be so established as to permit this kind of a foreign trade for Japan. During this transitional period it will be necessary to assist the Japanese in maintaining a minimum level of living. It is, of course, urgent that everything possible be done to minimize the extent of outside assistance required. In part this could be done through a proviso that plants to be removed as reparations could be retained so long as their retention is necessary to the purposes of the occupation. In addition, it is believed that the level of living envisaged in this calculation as appropriate to reduce Japan's war potential and make facilities available for reparations may provide some margin to the Japanese people, at least over a limited period.

Assuming some margin exists, it may be useful not only to absorb deficiencies until Japanese capacity reaches the projected level, but also to balance effects of price trends and relationships different from those

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assumed, possible inability of the Japanese to utilize their capacity fully at all times, and cyclical depressions that will affect all trade adversely.

It is impossible to predict accurately how much or how little margin does exist, i.e., how far Japanese imports can be reduced without impinging so severely on the Japanese standard of living as to endanger a democratic political system and cause disease and starvation.

A first margin is provided by the possibility of reducing food consumption. A 5 percent reduction from the 1930-34 per capita level will provide consumption of 2,155 calories per person per day and would reduce net imports of food by 159,000,000 yen. A 10 percent cut, which probably could be maintained for a considerable period of time without adverse effects, would mean an average per capita consumption per day of 2,050 calories, with a saving in the net food imports of 318,000,000 yen.

Perhaps easier would be a reduction in domestic consumption of textile products. If such a reduction were concentrated in cotton and rayon consumption, the items in which cuts can be made most readily, a cut of 10 percent in domestic consumption of textile products to a level of 9.22 pounds per person per year would increase net export proceeds from textiles by 64,000,000 yen. A 25 percent reduction, and even this amount might be maintained for several years without severe hardship, would leave domestic consumption at 7.7 pounds per person per year and increase net textile exports by 156,000,000 yen. Moreover, the ratio of domestic consumption of cotton to rayon can be altered to effect greater savings through decreasing imports of raw cotton and substituting rayon (provided rayon exports remain the same).

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In addition to these margins, a further margin might be available to the Japanese. The foregoing estimates have been based on the assumption that, except as noted in previous footnotes, the pattern of production and consumption in "1950" would be the same as in 1930-34. By varying this pattern in other lines of industry, the Japanese could concentrate on developing industries (such as machinery) for which the most advantageous export markets exist.

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*78C. Frank Turner**78C-058/11*RESTRICTED

A PROVISIONAL SURVEY OF JAPAN'S SHIPPING
AND SHIPBUILDING FACILITY REQUIREMENTS IN 1950

Intelligence Research Report
OCL - 4138


Prepared by
Division of Research for Far East
Office of Far Eastern Affairs

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An analysis of the shipping position of Japan in the period 1928-36; a provisional projection of expected requirements for coastwise transportation and foreign trade in a typical post-reconstruction year labeled 1950 for convenience; estimates of Japan's shipping receipts in 1950 under several assumptions; and a discussion of possible methods of meeting shipping requirements in 1950.

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RESTRICTEDFOREWORD

This study is one of a series of special industry analyses undertaken to determine Japanese production, imports, and exports and civilian consumption of various commodities in the past, and to project the findings into the future in order to determine Japan's peaceful requirements in a typical early post-reconstruction year which has been labeled 1950 for convenience. It must be emphasized that the hypothetical year 1950 referred to in these studies is not identical with the calendar year 1950; it is recognized that certain of the criteria for normality in the Japanese economy will not have been met by the calendar year 1950. For purpose of convenience, however, the population estimated for the calendar year 1950 has been used in the projections.

The historical period included in the studies covers the years from 1928 to 1936 provided sufficient data are available, and later years if the data for the earlier period appear to be inadequate. In general the period 1930-34 has been used as the base for provisional projections of the peaceful needs of the Japanese people in 1950. For many of the industries data for the period 1928-30 are available and are presented, but from an over-all point of view the statistics for 1928-30 are not as satisfactory as those of the period 1930-34 as a basis for projections. Japanese statistical reporting improved after 1928-29; in addition, adjustments for technological change cannot be made on the basis of the inadequate data available for many of the industries in the earlier period. The data for 1935-36 are useful so far as they serve as a check on trends beyond the earlier period.

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Because of the urgent need for even a preliminary survey, each industry analysis is being issued independently as completed. Attention, therefore, is directed to the provisional nature of the individual studies, particularly in regard to the projections of Japanese requirements to 1950. Upon completion of all the provisional surveys, it is planned to reconsider each in the light of the others and to synthesize the projections into an over-all picture of the Japanese economy in 1950.

Similarly, because of the urgent need for a trade balance estimate prior to the completion of the industry analyses, a preliminary set of projections of Japan's exports and imports in 1950, as yet unrelated to the industry studies, has been issued in Vol. I, Part I of OCL-2815, The Place of Foreign Trade in the Japanese Economy. Upon completion of the industry studies, a final step will be to synthesize these studies and the trade balance estimates in order to make such modifications in both the individual industry levels and in the total export and import balance as may be required to meet the peaceful needs of Japan as defined by the Far Eastern Commission.

This synthesis will entail a revision of some of the industry studies and, in certain cases, a choice among several possible projections. Because the appropriate choice cannot be made until each industry can be reexamined with full regard for mutual relationships with other industries and with full regard for the over-all trade balance, several alternative projections are presented for certain of the industries. It is anticipated that the final projection in certain cases may differ somewhat from any of those now provisionally presented.

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Most of the data in these analyses were taken from official and semi-official Japanese sources. Not only have inconsistencies and errors frequently been detected within a single source, but also many data from different sources, presumably reporting on the same subject, are irreconcilable.

All references to Japan in this study, unless otherwise noted, refer only to the four main islands -- Hokkaido, Honshu, Shikoku, and Kyushu -- and immediately adjacent small islands. Similarly, the trade of Japan with Korea and Formosa, as well as with other countries, is classified as external trade unless otherwise indicated.

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