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		Table 21 (continued)				
		1929	1930	1931	1932	1933
C. Fuel Oil.						
	Supply			4,719	5,086	5,430
	Imports <u>a/</u>			3,145	3,145	3,145
	Local production <u>b/</u>			1,574	1,941	2,285
	Consumption, total <u>c/</u>			1,697	2,185	2,615
	Civilian consumption <u>c/</u>			124	109	225
	Civilian consumption, in bbl. per capita			0.0019	0.0016	0.0033
	Stocks (1 April) <u>f/</u>			15,940	18,962	21,863
D. Lubricating Oil.						
	Supply			1,150	1,322	1,434
	Imports <u>a/</u>			243	226	154
	Local production <u>b/</u>	988	971	907	1,096	1,280
	Consumption, total <u>c/</u>	1,291	1,258	1,086	1,282	1,416
	Civilian consumption <u>c/</u>			1,005	1,185	1,310
	Civilian consumption, in bbl. per capita			0.0154	0.0179	0.0195
	Stocks, reported <u>f/</u>			146	148	190
	Increase of stocks, reported			2	42	19
	Surplus of supply over consumption			64	40	18
	Stocks, computed <u>e/</u>			146	210	250
E. Aviation Gasoline. <u>g/</u>						
	Production			305	344	488
	Consumption			296	314	387
	Civilian consumption <u>h/</u>			6	6	9
	Stocks			703	712	742

For footnotes see next page.



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1934	1935	1936	1937	1931-34 Average	1935-36 Average
5,238	5,494	5,233		5,118	5,363
2,516	2,516	1,877		2,988	2,196
2,722	2,978	3,356		2,130	3,167
3,197	3,508	4,336		2,423	3,922
492	552	1,191		237	871
0.0072	0.0080	0.0169		0.0035	0.0124
24,678	26,719	28,705	29,612		
1,734	2,039	2,066		1,410	2,052
247	270	551		217.5	405
1,487	1,769	1,515		1,192.5 k/	1,642
1,720	2,029	2,026		1,376 k/	2,027
1,600	1,895	1,884		1,275	1,889
0.0234	0.0273	0.0268	0.0268	0.0190	0.0270
209	223	233	272		
14	10	39			
14	10	40			
268	272	282	332		
459	451	536		399	493
391	428	557		347	492
13	19	22		8	20
843	912	935	914		

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## Footnotes for Table 21

- a/ USSBS, Table 30, for 1931-36; EOC data for 1929-30.
- b/ USSBS, Table 29, for 1931-36; EOC data for 1929-30. Local production of substitute fuel (alcohol, benzol, etc., ), amounting to about one percent.
- c/ USSBS, Table 35, for 1931-36; EOC data for 1929-30. If consumption of the 1932 figure is 5,331,000 bbl. and the 1934 figure is 6,831,000 bbl.,
- d/ USSBS, Table 26.
- e/ Computed from surplus of supply over consumption, with 1931 reported stocks.
- f/ USSBS, Table 8, Appendix.
- g/ USSBS, Tables 34, 35; no imports reported until 1939.
- h/ Civilian per capita consumption ranged from .00009 to .0003.
- i/ Averages for 1930-34: supply, 5,107; imports 2,900; production, 2,207.
- j/ Surpluses of supply over consumption imply slightly lower stocks (877,000).
- k/ Averages for 1930-34: production, 1,148; consumption, 1,352. (000 omitted)



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major refined products includes small quantities of  
at each year.

gasoline is computed from supply and reported stocks,  
raising the 1931-34 average to 5,468,000 bbl.

ocks as base.

(000 omitted).

0 bbl.).

ed).

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RESTRICTEDTable 22. JAPANESE IMPORTS OF PETROLEUM PRODUCTS (VARIOUS SOURCES), 1928-36  
(000,000 barrels)

Source of data a/	Commodity	1928	1929	1930	1931	1932	1933	1934	1935	1936
USSBS	Motor gasoline				2.6	2.9	3.0	3.6	4.0	4.2
EOC	" "		1.9	2.2	2.7	2.9	3.4	4.1	4.3	4.5
ARFTJ	" " b/	1.9	2.4	2.2	2.5	2.8	2.9	3.5	3.7	4.1
JYB	" "		1.9	2.2	2.5	2.8	2.9	3.7	4.1	4.4
JTI	" "		1.8		2.5	2.9	3.1	3.7		
EOC	Kerosene		0.93	0.84	0.87	0.77	0.64	0.90	0.86	0.91
ARFTJ	" c/		<u>g/</u>	<u>g/</u>	0.55	0.40	0.44	0.36	0.55	0.63
JYB	" "				0.40	0.44	0.36	0.66	0.75	0.57
JTI	" "		0.94		0.53	0.69	0.45	0.66		
USSBS	Lube oil				0.24	0.23	0.15	0.25	0.27	0.55
EOC	" "		0.37	0.38	0.35	0.34	0.40	0.40	0.37	0.45
ARFTJ	" " d/	0.14	0.16	0.12	0.12	0.11	0.10	0.16	0.19	0.24
JYB	Machine oil				0.24	0.22	0.15	0.25	0.28	0.40
JTI	Lube oil		0.29		0.23	0.22	0.15	0.25		
USSBS	Diesel fuel				7.3	8.6	8.7	10.7	13.9	12.1
USSBS	Fuel oil				3.1	3.1	3.1	2.5	2.5	1.9
EOC	Diesel & fuel		6.7	6.7	6.1	6.9	8.0	11.3	13.7	13.9
JYB	Heavy oil				6.9	8.2	8.2	5.8	7.8	8.0
JTI	Heavy oil		2.8		4.1	5.3	5.3	5.8		
USSBS	Crude				6.4	9.1	10.2	12.0	12.8	16.0
EOC	" "		4.1	4.9	5.8	7.4	9.1	10.8	15.4	14.1
ARFTJ	Crude & heavy	9.1	10.0	10.2	10.8	13.5	14.6	17.7	21.9	24.4
USSBS	Total refined				13.3	14.9	15.1	17.2	20.6	18.7
EOC	" " e/		9.8	10.2	10.0	10.9	12.5	16.7	19.5	20.2
JYB	" " f/				10.1	11.6	11.6	10.4	13.0	13.4
JTI	" " f/		5.8		7.4	9.1	9.0	10.4		
USSBS	Crude & refined				19.7	24.0	25.3	29.1	33.5	34.7
EOC	" " " e/		13.9	15.1	15.7	18.3	21.5	27.5	34.9	34.3
ARFTJ	" " " "	11.1	12.5	13.0	13.8	16.9	18.0	21.9	26.4	29.3

a/ The abbreviations indicate the following sources:

USSBS Oil in Japan's War, Table 28.

EOC Enemy Oil Committee data.

ARFTJ Annual Return of the Foreign Trade of Japan 1928, pp. 442-444 for 1928; 1930, pp. 290-291 for 1929-30; 1932, pp. 318-320 for 1931-32; 1934, pp. 426-28 for 1933-34; 1936, pp. 841-44 for 1935-36.

JYB Japan Year Book, 1934, for 1929-31; Japan Year Book, 1935, for 1932-34; Far East Year Book, 1941, for 1935-36.

JTI Japanese Trade and Industry, p. 214.

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- b/ "Other mineral oil, specific gravity 0.730-0.8017" for 1930-36;  
"other mineral oil, specific gravity 0.730-0.8762" for 1928-39.
- c/ "Other mineral oil, specific gravity 0.8017-0.8762".
- d/ "Other mineral oil, specific gravity 0.8762-0.9218".
- e/ Aviation gasoline included in 1935 (303,000 barrels) and 1936 (410,000 barrels).
- f/ Small amounts of light oil included (less than 50,000 barrels in any one year).
- g/ Included in gasoline.

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- b/ Chosen Boeki Nempyo (Annual Trade Returns of Korea), Government General of Korea, 1928-36; Taiwan Boeki Nempyo (Annual Trade Returns of Formosa), Government General of Formosa, 1928-36 (both in Japanese).
- c/ Difference between imports as stated in USSBS report (Table 1) and the sums of the foregoing columns. Values are based on the assumption that all unreported imports were crude and heavy oil, since these appear to account for most of the discrepancy between imports as given in the USSBS report and as given in the trade statistics.
- d/ USSBS, Table 1, for 1931-36, trade statistics for 1928-30.



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A PROVISIONAL SURVEY OF JAPAN'S  
MACHINE TOOL REQUIREMENTS IN  
1950

DEPARTMENT OF STATE

INTELLIGENCE RESEARCH REPORT

OCL - 4131

August 26, 1946

A provisional projection of Japan's machine tool requirements in 1950 based on a study of aggregate holdings, and of annual net new supply in the 1930's and during the war period. Consideration is also given to technological improvements in tools and to increased skill in their maintenance.

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FEC-058/5

15 November 1946

FAR EASTERN COMMISSION

LEVEL OF ECONOMIC LIFE IN JAPAN:  
PRELIMINARY STUDY OF JAPANESE  
REQUIREMENTS IN THE MACHINE TOOL INDUSTRY, 1950

Note by the Secretary General

1. The enclosure, a preliminary United States study of estimated Japanese peacetime requirements in the machine tool 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 two copies of the enclosure can be furnished each delegation.

4. The attention of all concerned is invited to the classification of this document which prohibits the dissemination of the information contained therein to unauthorized persons or to the press.

NELSON T. JOHNSON  
Secretary General

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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.

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

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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.

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 (~~imports~~) unless otherwise indicated.

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RESTRICTEDSUMMARY

Average annual net new supply of machine tools in Japan in the period 1933-34 appears to have been approximately 14,500 units. Net imports contributed 2,000 units and domestic production 12,500 units annually. Data for the earlier years are available only for imports, which are estimated to have averaged annually about 730 units in the period from 1930 to 1932. Production, which is estimated to have increased from 10,000 units in 1933 to 15,000 units in 1934, is assumed to have been much lower in the 1930-32 period. Japan used primarily multi-purpose tools in the 1930's.

On the basis of these data, adjusted for population increases, Japan's annual net new supply requirements in 1950 are tentatively projected at 10,000 machine tools of reasonably good quality. This projection takes into consideration technological improvements in machine tools and also allows for much better maintenance of these tools in the future -- factors which should increase output per tool. An annual net new supply of 10,000 tools would maintain an aggregate holding of 175,000 units. Both aggregate holdings and net new supply should include various types of tools in such proportions as to insure a balanced supply.

Annual net new additions to supply may be met by various combinations of domestic production and imports. Assuming the 1930-34 annual average pattern of supply, it may be estimated that approximately 2,000 tools must be imported at a cost of 5 million yen in terms of 1930 prices.

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RESTRICTEDI. INTRODUCTIONA. Definitions and Scope

Machine tools are defined in this report as non-portable, power-driven machines designed to shape metal by the progressive cutting away of stock in the form of chips or shavings or by abrasive action. The definition is also used in the US Strategic Bombing Survey analysis of the Japanese machine tool industry. <sup>1/</sup> Insofar as it is possible to check original sources, the tabular data included in the report apply only to machine tools as defined and do not include such items as roll stands, presses, or forging hammers. Woodworking machine tools are also excluded, although Japanese records from which the data are compiled sometimes included such items in the years prior to 1940.

The report submits first a brief history of the machine tool industry in Japan. This is followed by a discussion of the significance of Japanese machine tool production. Finally, Japanese machine tool requirements in 1950 are estimated on the basis of Japan's machine tool position from 1930 to 1934.

B. Availability and Validity of Sources

The sources of information used for this report require a special note. The basic source used in this survey is the Report on the Japanese Machine Building Industry, prepared by the Capital Equipment and Construction Branch, US Strategic Bombing Survey in 1946, cited hereafter as USSBS. The figures from this report supplemented by other figures as indicated in footnotes, are presented in Table 1. In most cases, the figures given by USSBS are the official Japanese statistics presented by

<sup>1/</sup> USSBS, Report on the Japanese Machine Building Industry, 1946

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the Ministry of Commerce and Industry and the Precision Machinery Control Association.

Inventories of total machine tool holdings prior to 1940 are not available, but for that year and for 1941, the USSBS report gives the actual count inventories of the Ministry of Commerce and Industry. No counts were made in 1942 or 1943. For 1944 and 1945, the Munitions Ministry estimated total holdings from a count of inventories of 50 percent of the total holdings then available.

These fragmentary reports for relatively recent years were supplemented for the purposes of this report by preparing an additive inventory based on the 1940-41 actual counts (Table 2). The figures in the "Difference" column represent the difference between additive totals and actual counts. Part of this difference may be considered depreciation (see Table 2, footnote c). The 1933 holdings appear much too high, as may be seen by comparing them with net supply. In 1933-35 net new supply averaged only 2.8 percent of holdings -- a figure well below the 5 percent required to maintain an inventory, much less to enlarge it. Another indication that this inventory is large is the fact that it would have given Japan a ratio of machine tool to ingot steel of one unit to 8 metric tons in 1933, as compared with a US figure of 1:65 in 1940. In the latter year Japan's ratio had fallen to 1:12. <sup>1/</sup> Many factors are involved in this comparison, but the difference is large enough to indicate that the 1933 holdings (and consequently the 1940 holdings on which they are based) are exaggerated.

<sup>1/</sup> Data on Japanese ingot steel from Japan, Ministry of Commerce and Industry, Seitetsugyo Sanko Shiryo, 1937. Data on US ingot steel from Statistical Abstract of the United States. Data on US machine tool holdings from estimates of the American Machinist.

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In a previous survey 1/ an effort was made to reconcile the 1933 holding figure with the supply. This was done by increasing annual production arbitrarily between 1934 and 1940. 2/ The amount of hidden production was estimated to be in the neighborhood of 14,000 tools and was roughly spread over the period 1933 to 1940 (see Table 3).

Table 3 shows a holding of approximately 240,000 tools to be maintained by a net supply of roughly 12,000 tools in 1933; net supply comes to 4.9 percent of holdings, still low when one considers that the textile and electrical machinery industries were expanding rapidly and absorbing machine tools greatly in excess of the 5 percent of holdings considered essential for normal replacement. Nor does this reduced inventory significantly improve the ratio between machine tools and ingot steel; it shows that Japan had one machine tool for every fourteen tons of ingot steel produced. Furthermore, no allowance for depreciation in the early years was made in Table 3.

1/ Memo entitled Japanese Machine Tool Industry, prepared by Office of Research and Intelligence for the Division of Japanese and Korean Economic Affairs in January 1946.

2/ Such an attempt was reasonable on the following basis: the Industrial and Chemical Machinery Section of the Ministry of Commerce and Industry gives the following inventory figures for "civilian industries": 1938 -- 355,723; 1939 -- 520,075; and 1940 -- 606,550. Thus civilian industries alone show an increase of more than 250,000 tools in two years, whereas the net supply for those years totaled only slightly more than 140,000. This major discrepancy is described by USSBS as due to a change in coverage in the records of the Ministry of Commerce and Industry pertaining to inventory, production, and imports. The ORI survey mentioned says: "The Japanese explain this discrepancy by stating that the outbreak of the China Incident in 1937 (and, presumably the years immediately preceding it) saw feverish preparatory tooling up with small machine tools which never showed up in the production figures but were reflected in the 1939 and subsequent holding figures."

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It is evident, in view of the inadequacies and inaccuracies of the available source material, that nothing more than an approximate idea of the industry's magnitude can be obtained. The estimate of Japan's requirements in terms of holdings and annual net additions to supply for machine tools in 1950, as submitted, is subject to the limitations of the basic data and must be considered with reservations.

## II. JAPANESE MACHINE TOOL POSITION, 1928-44

### A. 1928-32

There are no credible figures available for Japanese production from 1928 to 1932. The only indications of the industry's magnitude and growth during that period are import figures. 1/ Japan imported an average of 280 units annually from the US, slightly more than one-third of the annual average imports for the period. Imports were only 800 units per year from 1928 through 1932 and 730 per year from 1930 to 1932.

### B. 1933-44

1. Production. In 1933, the import figures indicate that demand increased tremendously, and the yearly supply of tools available --- measured by yen value deflated to 1930 prices -- began a rise which continued through 1939. 2/ The increase during the early years was due largely to increased production of poor-quality, non-precision, small tools by a large number of small producers. The number of machine tools produced increased through 1938, when production reached its all-time peak in terms of numbers. In March 1938, the Japanese Government, realizing the

1/ See Table 4.

2/ Principal sources are the Ministry of Commerce and Industry and the Precision Machinery Control Association. See Table 1.

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need for a large-scale, effective capital equipment industry controlled sufficiently to insure the success of rapid industrialization, passed the Machine Tool Industry Act. <sup>1/</sup> This bill provided that machine tool manufacture should be limited to plants capable of the necessary precision and that such plants be given financial incentives to expand. Throughout the period, increased production was accompanied by a steady increase in the deflated value of individual machines produced. More and more emphasis was placed on production of high-precision, good quality tools with a long life expectancy.

2. Imports and Exports. During this period, imports rose swiftly. The biggest increase occurred in 1937, when the units imported numbered almost twice the 1936 imports. The unit value of machines imported (in deflated yen) rose even more swiftly, a result of the government policy of licensing imports of only high-quality precision units. The first drop in imports was a 50 percent reduction in 1940, caused by the difficulty of getting tools from warring Europe, coupled with the American embargoes. The 1941 imports were insignificant, and a few tools brought in from Japanese plants on the continent formed the only imports of the remaining war years.

Japan's machine tool export business has always been inconsequential when compared with imports. Unit exports in 1938-40 were fairly high, but they were restricted to poor-quality items rejected by domestic war industries. <sup>2/</sup> In terms of value, import volume before 1940 was usually more than four

<sup>1/</sup> USSBS.

<sup>2/</sup> Nitschke, R.A., Report on the Japanese Machine Tool Industry, Economic Warfare Section, Department of Justice, April 30, 1943.

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times that of exports; in 1940, enforced curtailment of imports changed the ratio.

C. Significance of Japan's Machine Tool Industry

Certain special features of machine tool production, and of Japanese production in particular, must be considered before estimating future requirements. Primary among these is the fact that machine tools of all types are essential to modern warfare. Without machine tools, manufacturing for war is impossible. Limitation of machine tool aggregate holdings and machine tool production is, therefore, a method of restricting or eliminating any nation's war potential.

On the other hand, an industrialized nation must have both holdings and a minimum new supply of machine tools if it is to maintain a viable civilian economy. The desired mean is that point at which sufficient tools to permit adequate production of civilian consumers' and capital goods are available when the tools are fully utilized, but at which no excess in any type of tool is available for use in war purposes.

These considerations lead to the question of the efficiency and rate of use of machine tools on hand. The Japanese have seldom, if ever, utilized their machine tools to full capacity. Primarily because of the lack of an adequate pool of trained labor, maintenance and repair of tools have lagged far behind production and inventory growth. Especially in the early and middle 1930's, maintenance was notoriously poor: tools were allowed to work for extended periods without thorough inspections or tests; often lubrication was disregarded or made difficult by lack of the necessary high-grade mineral lubricants. In later years, in an effort to extend the life expectancy of the machines, more attention was directed toward training workers in their



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care and maintenance. In the early war years maintenance reached a fairly high level only to decline as skilled machinists and foremen were indiscriminately called into military service. In the future this group of men may be expected to increase tool performance, by better maintenance, to a level far above that of the early 1930's.

The types of tools produced and available are of significance in a discussion of the machine tool industry in Japan. Types may be classified in two ways -- precision or non-precision and single-purpose or multi-purpose. The vast majority of Japan's production and aggregate holding in the early thirties consisted of non-precision, multi-purpose tools. During the war years, however, Japan produced precision tools almost exclusively and gradually increased the proportion of single-purpose tools, although that proportion remained relatively low. Japan's peacetime need for precision tools cannot be gauged simply by the fact that the highest precision is required in machining aero-engines, while the machining of bicycle axles may utilize, but does not require fine tolerance machines. A certain percentage of high-precision tools is essential in a civilian economy. Apart from this basic requirement, there is an advantage in the wider application of such tools, since after certain lengths of service, high-precision units which are no longer able to meet precision demands can be resold to manufacturers who operate within wider tolerances; this "passing-down" of tools is often repeated three or four times. Thus high-precision tools have a long life expectancy, whereas a non-precision unit is useful only as scrap once it loses the low precision it did have.

Multi-purpose tools are units made to handle one process on a varying range of items; work with them is relatively slow and requires highly-

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skilled operators. Single-purpose tools perform one process on a single item at high speeds; their control is more nearly in the push-button category, and they can be handled by unskilled workers. Multi-purpose tools are the natural adjunct of an economy in transition from light industry to heavy industry; single-purpose units are more common in higher industrialization and are basically fit for mass production methods.

In the decade of the 1930's Japan used primarily multi-purpose tools. They were used for many things; those originally installed to produce textile machinery, for example, were capable of manufacturing anti-tank guns. During the war years a shortage of skilled labor in the metal-working industry made it necessary to employ large numbers of untrained personnel. This in turn led to the development of the more easily operated single-purpose tools, the production of which was accelerated in 1943. By 1944, 15 percent of all tools produced were single-purpose machines, 1/ but at the war's end aggregate holdings of general purpose tools completely overshadowed the holdings of single-purpose tools, most of which were built specifically for the production of war material and aircraft.

### III. Estimate of Japanese Machine Tool Requirements in 1950

On the basis of the annual average net supply in 1930 to 1934, adjusted for the increase in population, Japanese machine tool requirements in 1950 may be projected at an annual net new supply of 10,000 prewar tools of reasonably good quality. This estimate is about 4500 units less than a statistical projection made on the basis of average annual net supply in 1933 and 1934. Net supply in the earlier years 1930 to 1932, as indicated by imports, was undoubtedly less than that in the following two years. In addition, technological improvements have occurred in machine tools, and

1/ USSBS.

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Japan's advance in tool maintenance during the war years will result in more efficient use of tools in the future.

An annual net new supply of 10,000 tools would maintain an aggregate holding of about 175,000 units. These units would have to include various types of machine tools in such proportions as to insure a balanced production and holding of each type. The estimates do not allow for large numbers of automatic, single-purpose tools. It is expected that in 1950 Japan will have sufficient multi-purpose tools and that the proportion of single-purpose items will increase as its economy develops subsequent to that year.

It is assumed that the average degree of quality and precision of the estimated 10,000 machine tools would be neither as low as in 1930-34 nor as high as the best precision production of the war years. An annual supply of lower or higher aggregate quality and precision would subject the estimate to upward or downward revision.

The annual supply requirements for 1950 may be met by domestic production exclusively, or by a combination of such production and imports. However, assuming the same pattern of supply as in the 1930-34 period, it may be estimated that approximately 2,000 tools will need to be imported annually to supplement domestic production of roughly 8,000. The annual cost of such imports would be approximately 5 million yen in terms of 1930 prices.

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RESTRICTEDTable 1. JAPANESE MACHINE TOOL IMPORTS, EXPORTS, AND PRODUCTION,  
1933-1944

(In units)

Year	Imports	Exports c/	Net Imports	Production d/	Net New Supply
1933	2,300 a/	380	1,920	6,650	8,570
1934	2,800 a/	740	2,060	10,000	12,060
1935	2,200 a/	1,000	1,200	10,000	11,200
1936	3,248 b/	2,400	848	15,000	15,848
1937	6,324 b/	2,529	3,795	21,888	25,683
1938	7,128 b/	3,155	4,073	67,260	71,333
1939	7,635 b/	5,837	1,998	66,830	68,828
1940	3,800 b/	4,213	- 413	58,088	57,675
1941	I	2,721	-2,721	46,025	43,304
1942	I	1,638	-1,638	50,997	49,359
1943	I	1,094	-1,094	60,134	59,040
1944	I	223	- 223	53,844	53,621

Current Value  
(In ¥ 1,000)

Year	Imports e/	Exports e/	Net Imports	Production f/	Net New Supply
1933	11,339	565	10,774	10,000	20,774
1934	14,485	1,189	13,296	16,000	29,296
1935	9,998	1,941	8,057	18,750	26,807
1936	16,539	4,907	11,632	30,668	42,300
1937	42,512	5,799	36,713	50,199	86,912
1938	91,738	9,571	82,167	204,085	286,252
1939	157,166	23,985	133,181	274,597	407,778
1940	78,500	22,698	55,802	312,979	368,781
1941	I	18,749	-18,749	317,175	298,426
1942	I	13,782	-13,782	428,997	415,215
1943	I	10,970	-10,970	602,913	591,943
1944	I	3,000	-3,000	723,378	720,378

Value in 1930 Prices g/  
(In ¥ 1,000)

Year	Imports	Exports	Net Imports	Production	Net New Supply
1933	5,299	628	4,671	11,111	15,782
1934	6,298	1,278	5,020	17,204	22,224
1935	5,075	2,022	3,053	19,531	22,584
1936	8,029	5,452	2,577	34,076	36,653
1937	20,839	5,917	14,922	51,223	66,145
1938	36,695	8,862	27,833	188,968	216,801
1939	44,905	17,132	27,773	196,141	223,914
1940	2,224	13,120	-10,896	180,913	170,017
1941	I	8,928	-8,928	151,036	142,108
1942	I	5,557	-5,557	172,983	167,426
1943	I	3,809	-3,809	209,345	205,536
1944	I	763	- 763	133,959	133,196

See next page for footnotes

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- I/ = Insignificant.
- a/ Obtained by extrapolation using data after 1935. Arbitrary value of \$ 4,5000 was assigned to imported machines.
- b/ USSBS, Table 5, quoting Ministry of Commerce and Industry.
- c/ Obtained by computing average price per machine produced and dividing into total value of exports.
- d/ For the first four years (1933-36), the figures are estimates which appeared in a memo prepared by the Office of Research and Intelligence: Japanese Machine Tool Industry, January 1946. For the later years, figures have been taken from USSBS, Table 3, quoting Precision Machinery Control Association.
- e/ USSBS, Table 4, quoting Ministry of Commerce and Industry.
- f/ USSBS, Table 4, quoting Ministry of Commerce and Industry on production for 1933-1940 and the Precision Machinery Control Association on production for 1941-1945.
- g/ Values in this paper have been deflated to the 1930 price by means of price indexes. Index figures for 1928-38 were developed from other classes of machinery in which quality and type did not vary as widely but in which the general price trend corresponds closely to that of machine tools. The 1938-45 index was developed from the unit price per machine tool (computed from figures in this table) by allowing legitimate rises of one-third between 1938 and 1941 and one-fifth between 1941 and 1944 in quality of machines. The resulting indexes are as follows:

Year	Imports	Exports and Production
1928	120	119
1929	112	104
1930	100	100
1931	101	78
1932	167	76
1933	214	90
1934	230	93
1935	197	96
1936	206	90
1937	204	98
1938	250	108
1939	350	140
1940	353	173
1941		210
1942		248
1943		288
1944		393
1945		540

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RESTRICTEDTable 2. AGGREGATE MACHINE TOOL HOLDINGS IN JAPAN, 1933-44  
(In units)

Year	Production <u>a/</u>	Net Exports <u>b/</u>	Net New Supply	Difference <u>c/</u>	Bomb Damage <u>d/</u>	Holdings <u>e/</u>
1933	6,650	1,920	8,570			391,255
1934	10,000	2,060	12,060			399,825
1935	10,000	1,200	11,200			411,885
1936	15,000	848	15,848			423,085
1937	21,888	3,795	25,683			448,768
1938	67,260	4,073	71,333			420,101
1939	66,830	1,998	68,828			588,929
1940	58,088	- 413	57,675	- 745		646,604 <u>f/</u>
1941	46,025	-2,721	43,304	-5,410		689,163 <u>f/</u>
1942	50,987	-1,638	49,359	-10,820		733,112
1943	60,134	-1,094	59,040	-16,230	-30,000	781,332
1944	53,844	- 223	53,621			788,723 <u>g/</u>

a/ For the first four years (1933-36), the figures are estimates which appeared in a memo prepared by the Office of Research and Intelligence: Japanese Machine Tool Industry, January 1946. For the later years, figures have been taken from USSBS, Table 3, quoting Precision Machinery Control Association.

b/ Imports minus exports. Negative figures represent net exports (see Table 1.)

c/ These figures represent the difference between an additive aggregate holding and the reported aggregate holding for the years involved. This difference could be considered as depreciation although figures are much too low as compared with the depreciation normally expected. Erroneous figures and inadequate reporting of varying categories probably cause most of the error. Errors in 1942-44 have been prorated between the reported inventories of 1942 and 1944 on a 1/6, 1/3, and 1/2 basis.

d/ USSBS, Japanese estimate of tools destroyed in 1944. Total destruction for 1944 and 1945 amounted to 219,000 machine tools.

e/ Additive inventories except as noted.

f/ Actual inventories reported to USSBS by Industrial and Chemical Machinery Section, Bureau of Industry, Ministry of Commerce and Industry.

g/ USSBS, estimates made by the Ministry of Commerce and Industry on the basis of inventories in 50 percent of civilian industry in that year.

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Table 3. ADJUSTED AGGREGATE MACHINE TOOL HOLDINGS IN JAPAN, 1933-44  
(In units)

Year	Adjusted a/ Production	Approximate b/ Net Exports	Net New Supply	Difference c/	Bomb Damage d/	Holdings e/
1933	10,000	1,900	11,900			242,300
1934	15,000	2,100	17,100			259,400
1935	20,000	1,200	21,200			280,600
1936	35,000	900	35,900			316,500
1937	80,000	3,800	83,800			400,300
1938	89,000	4,100	93,100			493,400
1939	84,000	2,000	86,000			579,400
1940	67,600	- 400	67,200			646,600 f/
1941	46,000	-2,700	43,300			689,900 f/
1942	51,000	-1,600	49,400	-11,000		728,300
1943	60,100	-1,100	59,000	-11,000		776,300
1944	53,800	- 200	53,600	-11,000	-30,000	788,900 g/

a/ Adjusted production figures presented in a memo prepared by the Office of Research and Intelligence: Japanese Machine Tool Industry, January 1946. Figures for 1941 and thereafter as reported by USSBS. See Table 1, footnote d.

b/ Imports minus exports. Negative figures represent net exports. (See Table 1.)

c/ Same difference as reported in Table 2, footnote c, but here divided equally among three years.

d/ USSBS, Japanese estimate of tools destroyed in 1944. Total destruction for 1944 and 1945 amounted to 219,000 machine tools.

e/ Additive inventories except as noted.

f/ Actual inventories reported to USSBS by Industrial and Chemical Machinery Section, Bureau of Industry, Ministry of Commerce and Industry.

g/ USSBS, estimates made by the Ministry of Commerce and Industry on the basis of inventories in 50 percent of civilian industry in that year.

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Table 4. MACHINE TOOL EXPORTS TO JAPAN, 1928-34

Year	<u>United States</u>		<u>Germany a/</u>	
	Units	Value (In \$US 1,000)	Units	Value (In \$US 1,000)
1928	287	456	-	650
1929	383	541	-	1,000
1930	269	504	-	1,400
1931	109	151	-	650
1932	366	776	-	700
1933	688	1,011	-	2,000
1934	1,217	2,118	-	3,000
Average 1928-1932	280	480	520	880
Average 1930-1932	250	480	180	920
Average 1933-1934	950	1,565	1,500	2,500

a/ German exports are given in Reichsmarks in the source, but have been converted to dollars on a rough basis of 4 RM to 1 dollar for the years 1928-32 and on the basis of 3 1/3 RM to 1 dollar in 1933 and 2 1/2 RM to 1 dollar in 1934. Average unit values were calculated from the American statistics and applied to the converted reichsmarks to estimate the average annual number of units exported from Germany to Japan.

Sources: For United States exports, Department of Commerce, Foreign Commerce and Navigation of the United States, volumes 1928-1934.

For German exports, Statistisches Reichsamt fuer das Reich, Statistische Jahrbuch fuer das Deutsche Reich, 1928-1934.

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XEC-058/b

A PROVISIONAL SURVEY OF JAPAN'S MISCELLANEOUS  
MACHINERY REQUIREMENTS IN 1950

DEPARTMENT OF STATE

INTELLIGENCE RESEARCH REPORT

OCL - 4135

September 3, 1946

A provisional survey of Japan's requirements for miscellaneous machinery in 1950 based on a consideration of the annual net new additions to supply of these types of machinery in the period 1928-36. Consideration also is given to possible alternative patterns of supply and to the possibilities of increased exports in the future.

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RESTRICTEDTEC-058/615 November 1946FAR EASTERN COMMISSIONLEVEL OF ECONOMIC LIFE IN JAPAN:  
PRELIMINARY STUDY OF JAPANESE  
REQUIREMENTS IN THE MISCELLANEOUS MACHINERY INDUSTRY, 1950Note by the Secretary General

1. The enclosure, a preliminary United States study of estimated Japanese peacetime requirements in the miscellaneous machinery 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 two copies of the enclosure can be furnished each delegation.

4. The attention of all concerned is invited to the classification of this document which prohibits the dissemination of the information contained therein to unauthorized persons or to the press.

NELSON T. JOHNSON  
Secretary General

FLC-058/6



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FOREWORDRESTRICTED

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.

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



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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 as 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.

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 (imports) unless otherwise indicated.



RESTRICTEDSUMMARY

In terms of 1930 prices, the value of production of miscellaneous machinery in Japan increased five-fold between 1929 and 1936. Average annual output for 1930-34 was 235 million yen, in comparison with 160 million yen in 1929 and 635 million yen in 1935-36. The average annual net import balance of 40 million yen in 1928-29 was reversed in 1932, and a net export balance of over 50 million yen had developed by 1935-36. Net exports averaged about 8 million yen annually for the period 1930-34. According to current prices, a net export balance did not develop until 1933 when terms of trade became increasingly unfavorable to Japan, and for the period 1930-34 there was an average annual net import balance of 9 million yen.

Annual net new additions to supply in terms of 1930 prices rose from 207 million yen in 1929 to 733 million yen in 1936. In per capita terms, the average annual value of net new additions to supply was 3.39 yen in 1930-34, in comparison with 3.25 yen in 1929 and 8.39 yen in 1935-36.

Miscellaneous machinery requirements for domestic use in 1950, provisionally projected on the basis of average annual net new supply per capita in 1930-34, amount to about 268 million yen. Net export requirements, projected on the same basis, amount to about 9 million yen for 1950. These requirements could be met by alternative patterns of supply. Assuming that the pattern for 1930-34 continues, Japan's annual production of miscellaneous machinery would be valued at 277 million yen; its exports would be valued at 45 million yen and its imports at 36 million

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yon. As an alternative, developed capacity would permit Japan to produce all of its domestic requirements and eliminate the need for foreign trade.

Markets for Japanese machinery are undoubtedly large. If Allied policy permits, present Japanese capacity is great enough to produce substantial quantities of machinery for export, thus providing a source of foreign exchange.

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RESTRICTEDI. INTRODUCTIONA. Scope of the Report

Miscellaneous machinery includes many radically different categories: all types of fabricating machinery, auxiliary industrial machinery, agricultural implements and machinery, civil engineering equipment, and textile, printing, chemical, food-processing and mining machinery as well as equipment such as boilers, pumps, blowers, and pneumatic machinery. <sup>1/</sup> The following types of machinery are excluded: machine tools, electrical machinery, engines and turbines, railroad equipment, vehicles of all types, ships, bearings, and optical and precision instruments.

Part II of this report is a survey of the Japanese machinery position in the period from 1928 to 1936. Statistics are presented to show the magnitude of domestic production and its growth during the period. A discussion of imports and exports, with emphasis on the commodity balance of trade, is followed by an analysis of annual net new additions to the Japanese machinery supply.

In part III, annual Japanese requirements are projected to 1950. The basis of this projection is annual average per capita consumption of miscellaneous machinery in the period 1930-34. This projection is followed by a discussion of alternative means of meeting the requirements.

B. Availability and Validity of Sources

The great importance of miscellaneous machinery manufacturing -- as judged by the wide range of industries dependent on it and by the

<sup>1/</sup> Complete listings may be found in Tables 5, 6, and 7. Major Japanese sources invariably include a large item, "All Other Machinery;" such blanket categories are covered by this report.

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possibility of conversion to war industries -- might seem to merit a more detailed analysis with special emphasis on trends within each machinery group. Data necessary to such a study, however, are not available at the present time. This provisional survey is sufficiently full and well founded to provide a general idea of the quantities involved. Because of the heterogeneous nature of the types of machinery covered and, in many cases, because of the lack of adequate unit or weight measurements, quantities have been expressed in terms of yen values deflated to 1930 price levels.

Official Japanese sources used in this report are listed below, along with English equivalents for their titles.

- (1) Ministry of Commerce and Industry, Kojo Tokeihyo (Factory Statistics), 1932 and 1936.
- (2) Department of Finance, Gaikoku Boeki Nempyo (Annual Returns of the Foreign Trade of Japan), 1929-1936.
- (3) Government General of Korea, Chosen Boeki Nempyo (Annual Trade Returns of Korea), 1928-1936.
- (4) Government General of Formosa, Taiwan Boeki Nempyo (Annual Trade Returns of Formosa), 1928-1936.

## II. MISCELLANEOUS MACHINERY POSITION, 1928-36 <sup>1/</sup>

### A. Production

A five-fold increase during the eight years from 1929 to 1936 raised

<sup>1/</sup> There were no blanket categories in the 1928 production figures under the machine industry although they were included in later years. This disparate coverage makes it difficult to compare 1928 data with those of later years. For this reason comments on trends throughout the period have excluded statistics for 1928 production.

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the level of Japanese production from 160 million yen in 1929 to 796 million yen in 1936. <sup>1/</sup> The rise was fairly steady except for a drop of 13 percent in the depression year of 1930. The sharpest increase came in 1936, when production was about 166 percent of the 1935 output. Average annual output in terms of 1930 prices was about 235 million yen in the period from 1930 to 1934 compared with 160 and 635 million yen in the periods 1929 and 1935-36, respectively.

Although an upward trend of production in machine industries is typical in a growing industrial economy, the spectacular rise involved many special factors including the devaluation of the yen, the Manchurian Incident, and government efforts to encourage achievement of sufficiency in machinery manufacture.

<sup>1/</sup> All production figures are taken from Factory Statistics, 1932 and 1936. These volumes report production of firms employing five or more persons for the four main islands of Japan and for Okinawa Prefecture. No production of miscellaneous machinery, however, was reported for Okinawa.

Magnitudes are in yen values stated in terms of 1930 prices. Two price indices have been used, one for imports and the other for exports and production. They were developed by the use of a weighted index. The units used were in kin and the weights, 1930 quantities imported, exported, or produced. Commodities used included textile machinery, valves and cocks, printing machinery, cranes, hydraulic presses, blowers, paper manufacturing machinery and others. The resultant indices were:

Year	Imports	Export and Production
1928	120	119
1929	112	104
1930	100	100
1931	101	78
1932	167	76
1933	214	90
1934	230	93
1935	197	96
1936	206	90

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Of the types of machinery included in this report, textile machinery production is by far largest in volume. The annual value of average textile machinery production was 41 million yen in the period from 1930 to 1934 or almost four times that of boilers, the next largest category (see Table 5 for yearly production figures). The annual value of pumps and of machinery for the chemical industry averaged over 10 million yen each. Agricultural tools and machinery averaged somewhat lower. Blanket categories such as "other machinery" and "other fabricating machinery" comprised a large, and growing, proportion of the total production each year.

In the period 1930-34, the most striking increase in value of production developed in the manufacture of equipment for the chemical industry. A rise of 700 percent occurred in this group, as compared with an overall rise in machinery production of only 170 percent. A large part of the chemical equipment produced was probably for the flourishing rayon yarn industry, which quadrupled its production in the period 1930-34. During the same period, the production of boilers, and equipment for the manufacture of cement and ceramics more than tripled, and the output of textile machinery and mining equipment increased 228 percent and 233 percent, respectively.

#### B. Imports, Exports, and Trade Balances

1. In Terms of 1930 Prices. Japan's foreign trade in machinery changed markedly in the period from 1928 to 1936 (see Table 1 and Tables 6 and 7, appended). Between 1930 and 1931, imports of machinery dropped approximately 26 million yen or 45 percent and the 1929 peak of 74 million yen was never duplicated. The downward trend continued through 1933; recovered



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somewhat in 1935, reaching a second peak of 32 million yen; but fell again in 1936. The depreciation of the yen and the unfavorable terms of trade in the period 1932-36 limited machine imports to the most essential items. Since domestic production of miscellaneous machinery was more than sufficient to fill the demand in those years, emphasis was shifted to other categories of imports.

Table 1. JAPANESE IMPORTS AND EXPORTS OF MISCELLANEOUS MACHINERY, 1928-36 a/

~~Table 1. IMPORTS AND EXPORTS OF JAPAN, 1928-36 a/~~  
(In thousands of yen at 1930 prices)

Year	Imports	Exports	Net Imports	Percentage of Exports to Imports
Annual Average 1928-29	63,196	22,891	40,305	36
1930	57,747	26,676	31,071	46
1931	32,109	26,939	5,107	84
1932	22,392	26,805	-4,413	120
1933	16,074	42,645	-26,568	265
1934	21,718	65,973	-44,255	304
Annual Averages 1930-34	30,008	37,808	-7,800	126
1935-36	28,465	79,245	-50,780	278
1928-36	37,040	43,701	-6,661	118

a/ Sources: Tables 6 and 7 appended.

Average annual import value from 1930 to 1934 was about 30 million yen, one half of which fell within the general category of "other machinery". Textile machinery of all types (4.42 million yen), sewing machines (2.46 million), and boilers (1.73 million), ranked first among the itemized imports.

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The relative movement of the various machinery categories within the general downward trend (a decline of 62 percent between 1930 and 1934) shows a rapid decline for almost all of the small-volume items, such as cranes, blowers, capstans, and printing machinery, whereas import levels were more nearly maintained for large volume imports. In this latter group, "other textile machinery" (knitting machines, finishing machines, textile printing apparatus, etc., as distinct from spinning and weaving machinery) fell off only 33 percent; sewing machines 37 percent; pneumatic tools 39 percent; and boilers 43 percent.

During the period 1930-34, the countries that supplied Japan with miscellaneous machinery were, in order of importance: the United States, Germany, and Great Britain. France, Sweden and Switzerland also supplied significant amounts.

Kwantung Leased Territory, Korea, Formosa, <sup>1/</sup> China, and Manchuria were the principal markets for the machinery export trade, and the export trade to these countries grew even faster than imports declined during the period 1928-36. The average annual value of miscellaneous machinery exports increased from 23 million yen in 1928-29 to 37.8 million in the period 1930-34, and to 79 million in 1935-36. Average annual exports were 44 million yen for the entire period 1928-36. The increase in exports was continuous,

<sup>1/</sup> Japanese foreign trade returns do not report exports to Korea and Formosa, but the statistics of these areas indicate the amounts imported from Japan. These amounts were added to Japanese exports. No allowance was made for relatively small shipping costs or damage en route. Korean and Formosan machine exports to Japan were negligible.

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except for a slight decrease in 1932. In 1933 and 1934 exports increased with greatest rapidity (59 and 55 percent, respectively) and in 1934 reached a value of 66 million yen.

The largest single item included in the 1930-34 average annual export value of 37.8 million yen was spinning and weaving equipment, which averaged 5.9 million yen yearly. Agricultural equipment, most of which was shipped to Korea and Formosa, ranked second with an average value of 3.8 million yen. Pumps and boilers ranked third and fourth in importance. The export value of miscellaneous machinery rose 147 percent from 1930 to 1934; printing machinery exports 267 percent and boilers 233 percent. Export of food processing equipment (including canning machinery) and sewing machines decreased.

Measured in terms of 1930 prices, the commodity balance of trade in machinery was reversed between 1931 and 1932. In the former year, imports still exceeded exports by 5 million yen, whereas in 1932 exports exceeded imports by about the same amount. Over the period 1928 to 1936, the reversal of the import-export position was more striking; average net imports amounted to 40 million yen in 1928-29, but by 1935-36 Japan had achieved an average annual net export balance of 51 million yen.

2. In Terms of Current Prices. In terms of current prices, Japan did not achieve a net export balance in machinery trade until 1933, when exports rose to over 38 million yen and imports dropped to 34 million yen (see Table 2). From 1930 to 1934, average annual import values were almost 9 million yen a year greater than exports, whereas the average annual net export balance for the same period amounted to less than 8 million yen in terms of 1930 prices. Although average annual exports exceeded imports by

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16 million yen, even in terms of current prices, during the period 1935-36, this excess is small in comparison with the average annual net export balance of over 50 million yen, in terms of 1930 prices. The difference results from the changing terms of trade which required Japan to export far more goods than formerly in order to pay for a given volume of imports. Since imports increased rapidly, it is obvious that exports had to increase much more rapidly in order to create the export balance which appeared in later years.

Table 2. JAPANESE IMPORTS AND EXPORTS OF MISCELLANEOUS ACCOUNTS, 1928-36 <sup>a/</sup>  
~~Table 2. IMPORTS AND EXPORTS OF JAPAN, 1928-36 <sup>a/</sup>~~  
(In thousands of yen at current prices)

Year	Imports	Exports	Net Imports
Annual Average 1928-29	72,886	25,300	47,586
1930	57,747	26,676	31,071
1931	32,428	21,013	11,415
1932	37,396	20,372	17,024
1933	34,401	38,380	-3,070
1934	49,949	61,354	-11,405
Annual Averages 1930-34	42,384	33,559	8,825
1935-36	57,211	73,411	-16,200
1928-36	52,456	40,570	11,886

<sup>a/</sup> Sources: Tables 6 and 7 appended to this report.



The ability of Japan to reverse the balance of trade in machinery in spite of unfavorable terms can be explained partly by the nature of the machinery in which it trades. The principal machinery exported was of a type produced comparatively early in an area undergoing industrialization. Thus Japan, long before 1938, had developed the capacity to design and manufacture many of these items efficiently, particularly in the textile field. In this respect, Japan was in an increasingly favorable export position. Other factors tending to favor increased exports were large adjacent markets and the depreciation of the yen. Heavier and more specialized items, such as rolling mill equipment and machine tools, continued to be imported in considerable volume.

C. Annual Net New Additions to Supply in Terms of 1930 Prices

The value of net new supply of machinery made available to the people of Japan increased annually, from 207 million in 1929 to 733 million yen in 1936. This upward trend is shown in Table 3, in terms of both total and of per capita value of the net new supply. The latter set of data which allows for population growth is particularly revealing. Net new supply in 1929 averaged 3.25 yen per capita. In 1932, following the depression years of 1930 and 1931, net new supply nearly regained this peak. Thereafter it increased each year at a greater rate than in the preceding year. Rates of increase over the previous year were 20, 26, 32, and 64 percent in the years 1933, 1934, 1935, and 1936, respectively. During the period 1930-34, average annual per capita net new supply rose slightly above the 1929 figure, but by 1935-36 it was more than two and one-half times as great.



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RESTRICTEDTable 3. NET NEW SUPPLY OF MISCELLANEOUS MACHINERY IN JAPAN,  
1929-1936.

Period	Population a/ (In millions)	Production b/ (In thousands of yen at 1930 prices)	Net Imports b/ (In thousands of yen at 1930 prices)	Total	Net New Supply c/ Per capita (In yen)
1929	63.60	159,013	47,837	206,850	3.25
1930	64.45	137,939	31,071	169,010	2.62
1931	65.37	151,453	5,170	156,623	2.40
1932	66.31	216,069	- 4,413	211,656	3.19
1933	67.29	284,192	-26,568	257,624	3.83
1934	68.29	374,795	-44,255	330,540	4.84
1935	69.40	477,809	-38,059	439,750	6.34
1936	70.31	796,038	-63,501	732,537	10.42
Averages:					
1930-1934	66.34	232,890	- 7,799	225,091	3.39
1935-1936	69.86	636,924	-50,780	586,144	8.39

- a/ For population, official Japanese census data for years 1930 and 1935. Other years estimated by Japan Branch, DRF, July 1946.
- b/ For production, exports, and imports, Tables 5-7 appended to this report.
- c/ Net imports plus production.

Table 3 shows the contributions to annual net new supply made available by production and by net imports. Net imports, which in 1929 accounted for 25 percent of annual net new supply, were of declining importance thereafter, and were non-existent after 1931. Both production and net imports declined in 1930, causing a reduction in net new additions to available supplies for that year. Production, however, recovered substantially in 1931, whereas net imports continued to decline. By 1932 domestic production had increased to such a point that Japan was able to become a larger net exporter each successive year of miscellaneous machinery, and at the same time increase new additions to supply for domestic use.

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An analysis of the trend of net new supply of individual types of machines is difficult because of insufficiently detailed statistics. However, Japan's most important machinery product -- textile machinery -- did not increase in net supply as rapidly as did miscellaneous machinery in general. This situation may have been the result of the importance of textile machinery as an export commodity and the rate at which the Japanese economy was able to use textile machinery in expanding its textile production.

### III. PROVISIONAL PROJECTIONS OF MISCELLANEOUS MACHINERY REQUIREMENTS AND SUPPLY IN 1950

#### A. Requirements

In the period 1930-34, an average population of 66.3 million was supplied annually with miscellaneous machinery worth 225 million yen (in 1930 prices) or a per capita value of ¥3.39. If it is assumed that no significant technological advances have been made that will require changes in the total value of machinery per capita and that the 1930-34 pattern of demand will continue, the value of machinery (in terms of 1930 prices) which will be required domestically in 1950 by an estimated population of 79 million 1/ is projected to be 268 million yen.

As in 1930 to 1934, Japanese requirements for 1950 will include exports of sufficient value to pay for essential imports of food and raw materials. In the period 1930-34, Japan obtained a portion of its foreign exchange by exporting more miscellaneous machinery than was imported. Net exports in this field averaged 7.8 million yen annually from 1930 to 1934. Assuming

1/ Estimated by Japan Branch, DRF, July 1946.

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that the annual per capita net exports of miscellaneous machinery in 1950 will be equal to the average for 1930-34, a net export balance of 9.3 million yen will be required. Total projected requirements would then be valued at approximately 277 million yen in terms of 1930 prices.

In considering the values projected to 1950 in the foregoing paragraphs, it should be kept in mind that they are provisional and subject to change. Net export requirements for working out a balance of payments for Japan and restrictions which may be placed upon other exports or upon domestic production of certain export items will undoubtedly necessitate changes in the figures. Furthermore, domestic requirements may also be altered if further study indicates that allowance should be made for technological changes.

#### B. Supply

1. Assuming the Average 1930-34 Pattern. Japanese requirements for miscellaneous machinery can be met by many combinations of domestic production, imports, and exports. Table 4 presents a projection to 1950 of the 1930-34 average annual pattern of supply.

Table 4. MISCELLANEOUS MACHINERY PATTERN OF SUPPLY IN JAPAN, 1950  
(Annual averages in thousands of yen at 1930 prices)

	1930-34 a/	1950 b/
Imports	30,008	36,000
Exports	37,808	45,000
Net imports	-7,800	-9,000
Production	232,890	277,000
Net new supply	225,090	268,000
Population (in millions)	66.34	79.00
Per capita consumption	¥3.39	¥3.39

a/ For production, imports, and exports, see Tables 5-7 appended to this report.

b/ 1930-34 annual averages projected to 1950 on a per capita basis. Population for 1950 estimated provisionally at 79 million by Japan Branch, DRF.

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An annual production to the value of 277 million yen at 1930 prices would be required in 1950. Although the retained capacity of the machinery industry should be balanced, the fairly high degree of interchangeability in the manufacture of various kinds of machines reduces the problem of balancing.

A 1950 supply pattern for miscellaneous machinery, based on that of 1930-34, also calls for imports of 36 million yen to be balanced against exports valued at 45 million yen, leaving Japan with a net export balance of approximately 9 million yen. During the early years, imports were largely items which could not be produced domestically or which could not be produced in sufficient quantity but, in 1950, such imports could be reduced to a negligible amount. For example, an American mission has reported that all four of the major textile machinery firms can produce or duplicate any type of machine or spare part if a model is furnished and that the large amount of equipment remaining in the hands of the major textile machinery producers today is far in excess of what was needed even in prewar years to satisfy the textile requirements of Japan. 1/ Except for a few special items of great unit value, such as large-size paper making machines, 2/ machinery imports are no longer essential.

Exports must also be considered in the supply picture. In contrast to the specialized machines imported, exports were chiefly basic equipment needed by the overseas market. Spinning and weaving machinery and agricultural equipment were the chief exports in 1930-34 and could potentially become leaders again in 1950. In 1950, Japan will certainly be short of

1/ Departments of State and War, Report of Textile Mission to Japan, March 1946.

2/ Japan Yearbook, 1933.

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foreign exchange and since textile and agricultural machinery could be absorbed readily by the large Far Eastern market, exports of some 45 or 50 million yen annually seem practical.

2. Assuming No Imports. In view of the fact that Japan has developed a capacity to produce practically all of her requirements for miscellaneous machinery, net exports of some 9 million yen could be achieved without any or with only negligible imports. This would necessitate slight alterations in the pattern of production but no over-all change. Former importers of Japanese machinery, especially textile machines, would then be forced to look for another source of supply.

C. Possibilities of Increased Exports

Whether Japan will be permitted to export substantial amounts of miscellaneous machinery will depend upon Allied policy decisions. These decisions will, in turn, be based on a balancing of the economic and security factors involved. However, increased exports are possible from the standpoint of markets, ability to produce, and requirements for foreign exchange.

Future markets in the Far East for Japanese products such as textile machinery and agricultural implements appear to be far larger than they were between 1930 and 1934. In 1936, these and other items included in this report amounted to nearly 90 million yen at 1930 prices. Exports of miscellaneous machinery increased still more in later years, indicating that in the future the market could readily absorb amounts in excess of 100 million yen annually. It is probable that Japan could find a market for any quantity it is permitted to export.

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Japan's present machinery production capacity would probably permit exports in excess of 100 million yen annually. The production of light, intricate machinery such as that used in the manufacture of textiles is also an economically practical industry for Japan, because the major production costs are for labor and capital equipment rather than for raw materials. If exports were restricted to light equipment, the increased requirements for iron and steel would not be significant. Machine tool and ball bearing requirements probably would be somewhat above the average 190-34 level.

If Allied policy were to permit large export of light, specialized machinery, Japan's need for foreign exchange would be greatly alleviated. In addition, badly needed equipment could be supplied more rapidly to Asiatic countries. Balanced against these advantages, is the ever-present threat to security in permitting productive capacity in excess of domestic needs and the possibility that Asia might continue to be dependent upon Japanese industrial production to an undesirable degree.

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Table 5. VALUE OF MISCELLANEOUS MACHINERY PRODUCTION IN J

Categories of Miscellaneous Machinery	1928		1929		1930		1931		Cur- rent Val
	Cur- rent Value	Value in 1930 Prices	Cur- rent Value	Value in 1930 Prices	Cur- rent Value	Value in 1930 Prices	Cur- rent Value	Value in 1930 Prices	
Spinning and weaving machinery	23.8 <sup>b</sup>	19.4	14.5	13.9	10.7	11.2	14.4	13.	
Textile machinery other than spinning and weaving	b/		15.6	15.0	10.5	11.5	14.8	13.	
Pumps	9.8	8.2	8.6	8.3	8.0	6.8	8.8	6.	
Printing machinery including bookbinding equipment and movable type	6.3	5.3	9.8	9.4	7.9	7.8	10.0	8.	
Agricultural tools and machinery	10.4 <sup>c</sup>	8.8	8.6	8.3	6.6	5.4	6.9	7.	
Boilers	5.7	4.7	5.7	5.4	5.2	6.4	8.2	4.	
Cranes	6.8 <sup>d</sup>	5.7	4.1	3.9	5.8	1.8	2.3	2.	
Gas compressors	1.6 <sup>e</sup>	1.3	1.5	1.5	3.2	1.6	2.1	1.	
Valves and cocks	-	-	3.9	3.8	2.2	1.6	2.1	2.	
Paper-making machinery	2.0	1.7	1.4	1.4	1.0	.7	.9	.	
Food processing machinery	3.9	3.3	4.9	4.7	5.9	3.4	4.4	3.	
Winches and conveyors	-	-	3.3	3.1	3.3	2.2	2.8	2.	
Mining and refining equipment	5.2	4.4	3.6	3.4	3.1	2.0	2.6	3.	
Machinery for chemical industry	2.1	1.8	3.9	3.7	2.9	2.6	3.4	4.	
Elevators	d/	-	1.4	1.4	1.8	1.5	1.9	1.	
Machinery for cement and ceramics industry	1.2	1.0	2.8	2.7	1.4	.7	.9	1.	
Civil engineering equipment	c/	-	1.3	1.2	.7	1.0	1.3	.	
Industrial blowers	e/	-	.8	.8	.6	.7	1.0	.	
Hydraulic presses	-	-	.4	.4	.5	.4	.5	.	
Gas tools	.9	.7	.9	.9	.3	.4	.5	.	
Gas producers	.1	.1	.1	.1	1.0	.7	.9	.	
Other fabricating machinery	3.5	2.9	4.3	4.2	3.2	3.7	4.7	5.	
Miscellaneous machinery	-	-	42.7	41.0	32.3	32.1	41.2	48.	
Machinery parts and accessories	-	-	21.4	20.5	20.0	11.7	14.9	29.	
Totals	83.3	69.3	165.5	159.0	138.1	117.9	151.5	164.	

a/ Source: Factory Statistics, 1932 and 1936

b/ All textile machinery was combined under spinning and weaving machinery in 1928.

c/ All civil engineering equipment was included under agricultural tools and machinery in 1928.

d/ Elevators were included under cranes in 1928

e/ Industrial blowers were included under gas compressors in 1928.



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MANUFACTURES MACHINERY PRODUCTION IN JAPAN, 1928-36 (in millions of yen) <sup>a/</sup>

	1930	1931	1932	1933	1934	1935	1936
Value	Cur- Value	Cur- Value	Cur- Value	Cur- Value	Cur- Value	Cur- Value	Cur- Value
in 1930 Prices	Value	Value	Value	Value	Value	Value	Value
	Prices	Prices	Prices	Prices	Prices	Prices	Prices
13.9	10.7	11.2	14.4	13.8	18.2	20.8	23.1
15.0	10.5	11.5	14.8	13.6	17.9	23.4	26.0
8.3	8.0	6.8	8.8	6.5	8.6	9.7	10.7
9.4	7.9	7.8	10.0	8.5	11.1	9.1	10.1
8.3	6.6	5.4	6.9	7.5	9.8	9.8	10.9
5.4	5.2	6.4	8.2	4.4	5.9	11.6	12.8
3.9	5.8	1.8	2.3	2.3	3.0	5.4	6.0
1.5	3.2	1.6	2.1	1.1	1.5	1.7	1.9
3.8	2.2	1.6	2.1	2.4	3.1	3.6	4.0
1.4	1.0	.7	.9	.5	.7	1.6	1.8
4.7	5.9	3.4	4.4	3.6	4.7	5.5	6.1
3.1	3.3	2.2	2.8	2.3	3.0	4.6	5.1
3.4	3.1	2.0	2.6	3.1	4.0	6.2	6.9
3.7	2.9	2.6	3.4	4.9	6.4	14.3	15.9
1.4	1.8	1.5	1.9	1.5	2.0	1.2	1.4
2.7	1.4	.7	.9	1.0	1.4	4.4	4.8
1.2	.7	1.0	1.3	.9	1.2	1.6	1.7
.8	.6	.7	1.0	.8	1.0	1.1	1.3
.4	.5	.4	.5	.7	.9	.8	.9
.9	.3	.4	.5	.7	1.0	1.1	1.2
.1	1.0	.7	.9	.6	.8	1.2	1.3
4.2	3.2	3.7	4.7	5.3	6.9	6.8	7.5
1.0	32.3	32.1	41.2	48.8	64.2	72.1	80.1
0.5	20.0	11.7	14.9	29.5	38.8	38.3	42.5
9.0	138.1	117.9	151.5	164.3	216.1	255.9	284.0

Machinery in 1928.

Tools and machinery in 1928.

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Table 6. VALUE OF MISCELLANEOUS MACHINERY IMPORTS  
(In millions of yen)

Categories of Miscellaneous Machinery	1928		1929		1930		1931		1932	
	Cur- rent Value	Value in 1930 Prices	Cur- rent Value	Value in 1930 Prices	Cur- rent Value	Value in 1930 Prices	Cur- rent Value	Value in 1930 Prices	Cur- rent Value	Value in 1930 Prices
Spinning and weaving machinery	10.9	9.0	15.1	13.5	6.6	3.6	3.5	8.1	4.1	4.1
Textile machinery other than spinning and weaving	.5	.4	.6	.6	1.2	.3	.3	.4	.4	.4
Pumps	1.2	1.0	2.0	1.8	1.9	.7	.7	.4	.4	.4
Printing machinery	1.6	1.3	1.6	1.5	.7	.2	.2	.3	.3	.3
Agricultural tools and machinery	3.0	2.5	2.9	2.5	1.9	1.2	1.2	.8	.8	.8
Boilers	3.3	2.8	2.4	2.1	3.1	2.2	2.2	1.2	1.2	1.2
Cranes	.3	.2	.5	.4	.3	.3	.3	*	*	*
Gas compressors	2.0	1.6	2.6	2.3	2.0	.6	.6	.8	.8	.8
Valves and cocks	.4	.3	.6	.6	.6	.5	.5	.3	.3	.3
Paper making machinery	.4	.3	.3	.3	.1	*	*	*	*	*
Industrial blowers	.6	.5	1.5	1.3	1.4	.5	.5	.2	.2	.2
Hydraulic presses	.3	.3	.1	.1	.2	.1	.1	*	*	*
Sewing machines	5.4	4.5	9.5	8.5	4.1	2.7	2.7	3.3	3.3	3.3
Capstans, winches and the like	.6	.5	1.3	1.2	1.2	.1	.1	*	*	*
Pneumatic tools	1.0	.9	1.0	.9	.5	.3	.3	.3	.3	.3
All other machinery	31.8	26.5	40.5	36.1	31.9	18.8	18.7	21.4	21.4	21.4
Totals	63.3	52.6	82.5	73.7	57.7	32.1	31.9	37.5	37.5	37.5

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

\*indicates amounts less than 500,000 yen.

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VALUE OF MISCELLANEOUS MACHINERY IMPORTS OF JAPAN, 1928-36 <sup>a/</sup>  
(In millions of yen)

Value in 1930 Prices	1930		1931		1932		1933		1934		1935		1936	
	Cur- rent Value	Value in 1930 Prices	Cur- rent Value	Value in 1930 Prices	Cur- rent Value	Value in 1930 Prices	Cur- rent Value	Value in 1930 Prices	Cur- rent Value	Value in 1930 Prices	Cur- rent Value	Value in 1930 Prices	Cur- rent Value	Value in 1930 Prices
13.5	6.6	3.6	3.5	8.1	4.9	3.5	1.7	6.4	2.8	4.8	2.5	2.4	1.2	
.6	1.2	.3	.3	.4	.3	.2	.9	1.8	.8	1.9	1.0	.6	.3	
1.8	1.9	.7	.7	.4	.2	.7	.3	1.0	.4	.7	.4	.8	.4	
1.5	.7	.2	.2	.3	.2	*	*	.2	.1	.5	.3	.4	.2	
2.5	1.9	1.2	1.2	.8	.5	.5	.2	1.0	.4	1.3	.7	1.4	.7	
2.1	3.1	2.2	2.2	1.2	.7	1.8	.8	4.1	1.8	6.1	3.1	3.9	1.9	
.4	.3	.3	.3	*	*	.1	*	*	*	*	*	-	-	
2.3	2.0	.6	.6	.8	.5	.7	.3	1.7	.8	1.1	.5	1.8	.9	
.6	.6	.5	.5	.3	.2	.6	.3	.7	.3	.9	.5	.7	.3	
.3	.1	*	*	*	*	*	*	-	-	.6	.3	.3	.1	
1.3	1.4	.5	.5	.2	.1	.1	.1	.2	.1	.2	.1	.6	.3	
.1	.2	.1	.1	*	*	*	*	.1	*	1.5	.8	*	*	
8.5	4.1	2.7	2.7	3.3	2.0	2.2	1.0	5.9	2.6	6.5	3.3	7.9	3.9	
1.2	1.2	.1	.1	*	*	.1	*	*	*	.1	*	.1	*	
.9	.5	.3	.3	.3	.2	.3	.1	.6	.3	.6	.3	.6	.3	
36.1	31.9	18.8	18.7	21.4	12.8	23.5	11.0	26.1	11.3	35.6	18.0	30.6	14.8	
73.7	57.7	32.1	31.9	37.5	22.6	34.3	16.7	49.8	21.7	62.4	31.8	52.1	25.3	

1928-36



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Table 7. VALUE OF MISCELLANEOUS MACHINERY EXPORTS OF  
(In millions of yen)

Categories of Miscellaneous Machinery	1928		1929		1930		1931		1932		1933
	Cur- rent Value	Value in 1930 Prices	Cur- rent Value	Value in 1930 Prices	Cur- rent Value	Value in 1930 Prices	Cur- rent Value	Value in 1930 Prices	Cur- rent Value	Value in 1930 Prices	Cur- rent Value
Spinning and weaving machinery	3.1	2.6	3.7	3.5	3.9	5.2	6.6	3.7	4.8	4.9	
Pumps	1.3	1.1	1.4	1.4	1.2	1.1	1.3	1.1	1.4	1.8	
Printing machinery	.6	.5	.6	.6	.4	.3	.4	.5	.6	1.0	
Agricultural tools and machinery	2.8	2.4	3.0	2.9	2.5	2.2	2.8	2.5	3.3	4.1	
Boilers	.7	.6	1.0	1.0	1.1	.9	1.2	.6	.8	1.2	
Food processing equipment	.4	.3	.7	.7	.7	.3	.3	.3	.4	.4	
Sewing machines	.6	.5	.9	.8	.6	.3	.4	.3	.3	.3	
Cranes	-	-	-	-	-	-	-	-	-	-	
All other machinery	14.2	11.9	15.6	15.0	16.4	10.8	13.9	11.5	15.1	24.7	2
Totals	23.7	19.9	26.9	25.9	26.8	21.1	26.9	20.5	26.7	38.4	4

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



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RESTRICTEDOF MISCELLANEOUS MACHINERY EXPORTS OF JAPAN, 1928-36 a/  
(In millions of yen)

	1931		1932		1933		1934		1935		1936	
	Cur- rent Value	Value in 1930 Prices	Cur- rent Value	Value in 1930 Prices	Cur- rent Value	Value in 1930 Prices	Cur- rent Value	Value in 1930 Prices	Cur- rent Value	Value in 1930 Prices	Cur- rent Value	Value in 1930 Prices
.9	5.2	6.6	3.7	4.8	4.9	5.4	8.4	9.0	14.7	15.3	17.3	19.2
.2	1.1	1.3	1.1	1.4	1.8	2.0	2.7	2.9	3.3	3.4	4.4	4.8
.4	.3	.4	.5	.6	1.0	1.1	1.2	1.3	1.3	1.3	1.2	1.4
.5	2.2	2.8	2.5	3.3	4.1	4.5	5.9	6.3	8.2	8.5	9.1	10.1
.1	.9	1.2	.6	.8	1.2	1.3	3.3	3.6	2.9	3.0	3.1	3.5
.7	.3	.3	.3	.4	.4	.5	.5	.5	.8	.8	1.7	1.8
.6	.3	.4	.3	.3	.3	.3	.4	.4	1.2	1.3	2.0	2.2
-	-	-	-	-	-	-	-	-	1.1	1.2	1.4	1.6
.4	10.8	13.9	11.5	15.1	24.7	27.5	38.9	41.9	33.5	34.9	39.7	44.1
.8	21.1	26.9	20.5	26.7	38.4	42.6	61.3	65.9	67.0	69.7	79.9	88.7

Japan, 1928-36.



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Table 8. NET NEW ADDITIONS TO ANNUAL SUPPLY OF MISCELLANEOUS M  
(In millions of yen at 1930 prices)

Categories of Miscellaneous Machinery	1928	1929	1930	1931	1932
Spinning and weaving machinery	26.3	23.9	13.5	11.3	18.3
Pumps	8.2	8.7	8.7	8.2	7.4
Printing machinery <sup>a/</sup>	6.1	10.3	8.2	9.7	10.7
Agricultural tools and machinery	8.9	7.9	6.0	5.3	7.1
Boilers	7.0	6.6	7.2	9.2	5.7
Other miscellaneous machinery <sup>b/</sup>	45.8	149.4	125.3	112.8	162.5
Total	102.3	206.8	168.9	156.5	211.7

<sup>a/</sup> Source: Tables 5, 6 and 7 appended.

<sup>b/</sup> Includes bookbinding equipment and movable type.

<sup>c/</sup> Includes cranes, gas compressors, paper-making machinery, textile machinery other than includes valves and cocks and a miscellaneous category of other machinery.

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RESTRICTEDTIONS TO ANNUAL SUPPLY OF MISCELLANEOUS MACHINERY IN JAPAN, 1928-36 <sup>a/</sup>

(In millions of yen at 1930 prices)

1930	1931	1932	1933	1934	1935	1936
13.5	11.3	18.3	19.3	29.6	35.5	39.8
8.7	8.2	7.4	9.1	11.5	12.7	17.4
8.2	9.7	10.7	9.0	9.0	8.9	12.2
6.0	5.3	7.1	6.6	5.9	7.1	8.6
7.2	9.2	5.7	12.4	20.9	36.0	33.7
125.3	112.8	162.5	201.3	253.7	339.5	620.8
168.9	156.5	211.7	257.7	330.6	439.7	732.5

type.  
 ing machinery, textile machinery other than spinning and weaving machinery, and, after 1929,  
 us category of other machinery.



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RESTRICTEDA PROVISIONAL SURVEY OF JAPAN'S IRON AND STEEL  
REQUIREMENTS IN 1950DEPARTMENT OF STATE  
INTELLIGENCE RESEARCH REPORT

OCL 4129

November 1, 1946

A provisional projection of Japan's iron and steel requirements in a typical post-reconstruction year labeled 1950 for convenience, and based on average per capita civilian consumption in the period 1930-34. A survey of Japan's iron and steel position in the period 1928-36 forms the background for this projection. Alternative means of meeting domestic requirements in "1950" are presented.

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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

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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.

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 export and imports in 1950, as yet unrelated to the industry studies, has been issued in Vol. I, Part I of OCI-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



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the industries. It is anticipated that the final projection in certain cases may differ somewhat from any 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 (imports) unless otherwise indicated.

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FEC-058/7RESTRICTEDFEC-058/712 December 1946FAR EASTERN COMMISSIONLEVEL OF ECONOMIC LIFE IN JAPAN: PRELIMINARY STUDY  
OF JAPANESE REQUIREMENTS IN THE IRON AND STEEL  
INDUSTRY, 1950Note by the Secretary General

1. The enclosure, a preliminary United States study of estimated Japanese peacetime requirements in the iron and steel 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 two copies of the enclosure can be furnished each delegation.

NELSON T. JOHNSON  
Secretary General

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by subtracting from the reported totals of domestic scrap the difference between ingot steel consumption and finished steel production. Computed in this manner, annual domestic purchases of scrap amounted to about 570,000 tons in 1928-30; rose gradually from 600,000 tons in 1931 to 1,150,000 tons in 1934 (annual average was 800,000 tons); and rose precipitously in 1935 and 1936 to about 1,500,000 tons annually.

It is impossible to reconcile these conflicting data from the same basic source at the present time, but they are useful as a measure of the general magnitude of domestically purchased scrap in the early 1930's. Considering both sets of data, it would appear that domestically purchased scrap in the period 1930-34 averaged annually between 0.8 and 1 million tons. Since it seems likely that the Japanese would understate rather than overstate domestic supplies, the higher figure of 1 million tons is accepted in this paper. It should be observed, however, that it is possible that the Japanese partly subsidized domestic scrap collections, even in the early 1930's. If this proves to be the case, a downward revision of this estimate may be necessary.

Scrap collections in 1950<sup>1</sup> may be less than or exceed the annual average collection of about 1 million tons in 1931-34 depending

1. It is herein assumed that 1950 is a normal post-war year and that large stocks of scrap resulting from war damage and now available will be drawn upon over a long period. This, of course is somewhat unrealistic to assume, but only by making such an assumption can the effects of an abnormal situation be eliminated.

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upon the balancing of several factors. They will tend to be less than this amount to the degree that the collections during the war were increased by premature or uneconomic scrapping encouraged by subsidies.<sup>1</sup> They will tend to be more than this amount to the degree that the size of the installed base ready for scrapping has increased in the past decade. It is impossible at the present time to resolve these factors quantitatively. It does not, however, seem unreasonable to estimate that the two factors will offset each other and that a maximum of 1 million tons annually of domestically purchased scrap can be made available for steel production.<sup>2</sup>

Further support for this estimate may be found in a very rough analysis of the potential size of the presently installed base ready for scrapping. For this purpose it is assumed that the average life of steel installations and equipment in Japan is thirty years. The amount of steel available for scrapping in any one year is then assumed to be, on the average, equal to that which was installed thirty years previously. Available data indicate that in 1920 Japan consumed domestically about 1.5 million tons of finished steel, a substantially larger consumption than that in earlier years.<sup>3</sup> Some small portion of this consumption may have entered into the construction of equipment for export, but this amount would be more than offset by imports of machinery and of other steel products fabricated beyond the finished steel stage. On

1. For example, the scrap and build program in shipbuilding which was initiated in the early 1930's.
2. This estimate is based on historical data which are assumed not to include scrap iron used in iron castings. An additional amount of scrap iron sufficient for this purpose is assumed to be available in 1950.
3. Seitetsugyo Sanko Shiryo, 1937, page 5.

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this basis, an estimate of 1 million tons available in 1950 would seem to be conservative and to allow an adequate margin for that portion of the installed base which was scrapped prematurely during the war years or which may not be recovered because of complete loss or exorbitant costs of scrapping.

Since the annual additions to the installed base increased from 1920 through the war years, it seems reasonable to believe that annual supplies of domestically purchased scrap may be even larger than the estimate for the next two decades. In the more distant future, annual supplies will be fixed by the size of the annual additions to the installed base that Allied policy will permit.

c. Summary of domestic supply situation. The tentative conclusion drawn in the above paragraphs is that maximum available total annual domestic supplies of ferrous materials in 1950, in terms of ferrous content, will be about 2.75 million tons. This will be made up of 0.85 million tons of iron content to be drawn from domestic ores; 0.9 million tons from self-generated scrap, and 1 million tons from domestically purchased scrap. The estimated annual supplies of scrap are sufficient to give Japan a satisfactory ratio of 50 percent scrap to 50 percent pig iron in the production of ingot steel. Consequently, in estimating imports necessary to make up this deficit, it will be assumed that these imports will consist of pig iron, iron ore, and coking coal in varying quantities.

The alternative patterns of supply suggested will represent two extremes and an average in terms of costs of imports of ferrous material

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into Japan. The first will assume that the maximum pig iron capacity Japan will be allowed to retain will be 2 million tons per year.<sup>1</sup> The second will assume that the minimum pig iron capacity Japan will be permitted will be the amount necessary to smelt its domestic ores. The third assumption represents an average of these two. Obviously, Japan's cost of imports will be minimized under the first alternative.

3. Pattern of Supply Assuming Retention of 2 Million Tons of Pig Iron Capacity. In order to produce ingot steel requirements of 3.6 million tons annually, Japan will need ferrous materials having an iron content of about 4 million tons.<sup>2</sup> An additional 0.6 million tons will be necessary to meet cast iron requirements.<sup>3</sup> Total requirements of ferrous material in terms of ferrous content then will be 4.6 million tons annually.

Domestic supplies will account for 2.75 million tons, but the balance of requirements will need to be met through imports. Assuming available pig capacity to be 2 million tons, imports of ore having an iron content of 1.30 million tons would be needed in addition to domestic ore in order to utilize this capacity fully, and to permit the use in ingot furnaces of 0.15 million tons of iron content in ore form. The remaining

1. In FEC 059/14, dated June 1946, the Far Eastern Commission approved interim reparations removals of pig iron capacity in excess of 2 million tons annually.
2. In the period 1930-34, total scrap and pig iron consumed in steel furnaces averaged about 107 percent of ingot steel output. In addition, small quantities of iron ore, probably averaging in iron content about 4 percent of ingot steel output, were used. See Table 6.
3. Does not include scrap iron necessary for this purpose. See footnote 2, page 22 and footnote 2, page 27.



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0.55 million tons of iron content necessary would be pig iron, scrap iron and steel, or a combination of both. In terms of 1930 price levels, scrap iron and pig iron import costs were approximately equal. Assuming that the cost relationships will be roughly the same in the postwar period, it appears most desirable for Japanese imports to be confined to pig iron rather than to include scrap, for at least two reasons. First, Japan's capacity to utilize scrap will be limited by restrictions on its electric furnace capacity and, second, imports of pig iron would provide a market for pig that may eventually be produced in other countries of the Far East, partly as a result of capacity provided by reparations.<sup>1</sup> Available domestic supplies of scrap will make it possible for Japan to produce ingot steel, using a reasonably satisfactory ratio of 50 percent scrap to 50 percent pig.<sup>2</sup>

In addition to imports of ferrous materials, Japan would need to import higher-grade foreign coal to combine with domestic coal in the production of coke.<sup>3</sup> Imported coal can be combined with domestic coal in a ratio of about 3 to 7 to produce satisfactory coking coal.

1. Exports of pig iron from other countries of the Far East to Japan will, of course, depend upon two factors: (1) the degree of success achieved in building up their iron and steel industries and (2) whether or not there is a surplus above their domestic needs for export.
2. From Japan's point of view, assuming identical import costs, it would be desirable to import more scrap and less pig, since a greater percentage of scrap would reduce the time factor for each furnace charge, add ferro alloys, and so reduce costs of production.
3. The assumption is made that only an insignificant amount of Japanese coal would be satisfactory coking coal. Further study of the Japanese coal situation may require a small downward revision of the estimate of necessary coal imports.

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Assuming that 1.7 tons of coking coal are needed to produce one ton of metallurgical coke and that one ton of metallurgical coke is needed to produce one ton of pig iron, Japan's coal import requirements for the production of 2 million tons of pig iron may be estimated at approximately 1 million tons annually.

On the basis of the above analysis, total annual import costs of ferrous materials and coking coal (in terms of 1930 prices) may be estimated at 50 million yen. This estimate is made as follows:

Iron ore <sup>1</sup>	-	1,800,000 tons @ 9 yen per ton	=	16,200,000 yen
Pig iron	-	550,000 tons @ 39 yen per ton	=	21,400,000 yen
Coking coal	-	1,000,000 tons @ 12.4 yen per ton	=	12,400,000 yen

Total costs = 50,000,000 yen

4. Pattern of Supply Assuming Pig Iron Capacity is Limited to That Required for Processing Domestic Ores. Under this assumption, pig iron capacity would be just adequate for an annual production of 0.7 million tons of pig (9.15 iron content of domestic ore required in ingot furnaces). Imports would then have to consist of larger quantities of pig iron and scrap iron.<sup>2</sup> Assuming that pig iron would be the more desirable import for the reasons stated above, Japan would require 1.85 million tons annually to meet requirements of 4.6 million tons of ferrous material. In terms of 1930 prices of 39 yen per ton, these imports would cost 72.2 million yen.

1. Higher-grade foreign ores probably average 65 percent in ferrous content.
2. Technically, scrap iron imports would be limited to a maximum of about 0.5 million tons. Electric furnace capacity is limited to 0.1 million tons and the other furnace capacity left to Japan will probably require a minimum of 40 percent pig iron for each charge.

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In addition, in order to process 0.7 million tons of domestic ores, 0.35 million tons of coking coal imports would be required. These imports in 1930 prices would cost 4.3 million yen annually. Total import costs under these assumptions would be about 76.5 million yen annually, or 50 percent higher than they would be if Japan were allowed to retain 2 million tons of pig capacity.

5. Pattern of Supply Assuming Pig Iron Capacity of 1.5 Million Tons.

Capacity of this magnitude would be roughly equal to average annual domestic pig iron production in 1930-34 plus an additional amount to allow for estimated increases in population in 1950. It would also represent a capacity about midway between those assumed for the two previous projections.

Under this assumption, Japan would have capacity to process imported ores having an iron content of 0.8 million tons in addition to 0.7 million tons of its domestic ores. The balance of Japan's ferrous metal requirements would need to be met by imports of 1.05 million tons of pig iron or the equivalent in scrap and pig iron. In addition to ferrous material imports, 0.75 million tons of coking coal imports would be needed.

Calculating import costs in terms of 1930 prices, iron ore imports would cost 11 million yen; pig iron imports about 41 million yen; and coal imports 9.3 million yen. Total import costs would then be 61.3 million yen, an amount about midway between the import costs for the two preceding estimates.

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6. Conclusion. It has already been stated that the projections of Japan's iron and steel requirements to 1950 was provisional and that a final projection should consider more fully such factors as technological change and Allied policy decisions. Similarly, the alternative projected patterns of supply are subject to qualifications. Should Japan not be permitted to retain sufficient ingot and/or finished steel capacity to meet its domestic requirements, additional imports of either or both ingot steel and finished steel would be necessary.

In 1930 prices, each ton of imported ingot steel would cost about 64 yen, or over one and one-half times the cost of a ton of pig iron. Each ton of imported finished steel would cost about 110 yen per ton, or nearly three times the cost of a ton of pig iron. Imports of 1 million tons of ingot steel in place of pig iron would incur additional import costs of nearly 25 million yen annually, whereas imports of finished steel of a like magnitude as a substitute for pig iron would raise imports costs by about 70 million yen.

Such imports substituted for imports of iron ore and coking coal would increase costs still more. The import price per ton of ingot steel is about three times the combined cost per ton of iron contained in ore and the coking coal needed to reduce it to pig iron. The import price of finished steel is more than five times greater.

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Table 1. FINISHED STEEL<sup>a</sup>/ POSITION IN JAPAN, 1928-36

Item	Physical Quantities				Apparent Consumption <sup>f</sup>		Current Value		
	Imports <sup>c</sup>	Exports <sup>d</sup>	Net Imports <sup>e</sup>	Production	Total	Per Capita	Imports <sup>c</sup>	Exports	
.....in 1,000 metric tons.....				.....(in kg.)		.....		.....	
1928	825	182	643	1,720	2,363	37.7	106	33	
1929	790	203	587	2,034	2,621	41.2	103	35	
1930	457	237	200	1,921	2,121	32.9	58	37	
1931	266	224	42	1,663	1,705	26.1	30	29	
1932	235	315	- 80	2,113	2,033	30.7	36	41	
1933	410	456	- 46	2,792	2,746	40.8	65	75	
1934	427	620	-193	3,323	3,130	45.8	77	102	
1935	357	721	-364	3,975	3,611	52.0	69	135	
1936	345	987	-642	4,539	3,897	55.4	59	156	
Annual Average									
1928-30	684	207	477	1,892	2,369	37.3	89	35	
1930-34	355	370	- 15	2,362	2,347	35.3	53	57	
1935-36	351	854	-503	4,257	3,754	53.7	64	145	

- a. Includes rolled steel, castings, forgings, and other special steel products. Imports from (Korea and Formosa) also include small quantities of nails, bolts, rails, fishplate, etc. tons in 1928 to 1,000 tons in 1936, exports increased from about 25,000 tons in 1928 to 6 whether or not these items were included in production data.
- b. Current import and export values are reduced to 1930 levels by applying base-year quantities in source. The import index thus computed was as follows: 1928-107; 1929-106; 1930-100; 1936-132. The index for exports was as follows: 1928-110; 1929-109; 1930-100; 1931-77; 1936-132.
- c. Includes imports from both foreign countries and colonies, although imports from colonies are not included in production data.
- d. Includes exports to both foreign and colonial markets.
- e. Imports minus exports. Minus sign indicates net exports.
- f. Production plus net imports. Very little information is available with respect to stockpiling. Statistics (Kojō Tokai-hyō), 1932, indicate that there was no stockpiling in that or the common to produce steel on order rather than in advance of orders leads to the conclusion that it is, therefore, assumed that consumption is equal to annual net addition to supply. For population figures derived from official Japanese census data for 1930 and 1935 were used.

Source: Seitetsugyo Sanko Shiryo, 1937, pp. 95-97 and 114-115 for imports; pp. 107-108 and 114-115 for exports.



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FINISHED STEEL<sup>a/</sup> POSITION IN JAPAN, 1928-36

Year	Apparent Consumption <sup>f/</sup> Per Capita (in kg.)	Current Value			Value in 1930 Prices <sup>b/</sup>		
		Imports <sup>c/</sup>	Exports <sup>d/</sup>	Net Imports <sup>e/</sup>	Imports	Exports	Net Imports
1928	37.7	106	33	73	99	30	69
1929	41.2	103	35	68	97	32	65
1930	32.9	58	37	21	58	37	21
1931	26.1	30	29	1	34	38	- 4
1932	30.7	36	41	- 5	32	49	- 17
1933	40.8	65	75	-10	53	71	- 18
1934	45.8	77	102	-25	59	103	- 44
1935	52.0	69	135	-66	50	130	- 80
1936	55.4	59	156	-97	48	153	-105
1928	37.3	89	35	54	85	33	52
1929	35.3	53	57	- 4	47	59	- 12
1930	53.7	64	145	-81	49	141	- 92

er special steel products. Imports from foreign countries and exports to colonies of nails, bolts, rails, fishplate, etc. Imports of these items declined from 11,000 tons in 1928 to 65,000 tons in 1936. It could not be ascertained production data.

1930 levels by applying base-year quantity weighted price indexes calculated from data available as follows: 1928-107; 1929-106; 1930-100; 1931-88; 1932-114; 1933-123; 1934-130; 1935-138; 1936-110; 1929-109; 1930-100; 1931-77; 1932-83; 1933-106; 1934-99; 1935-104; 1936-102. colonies, although imports from colonies were negligible.

ports. tion is available with respect to stockpiling of finished steel. Data available in Factory there was no stockpiling in that or the preceding years. In addition, the fact that it is advance of orders leads to the conclusion that finished steel was probably not stockpiled. al to annual net addition to supply. For purposes of calculating per capita consumption, census data for 1930 and 1935 were used. and 114-115 for imports; pp. 107-108 and 114-115 for exports; and pp. 20-21 for production.

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RESTRICTEDTable 2. RELATIVE IMPORTANCE OF MAJOR CONSUMERS OF FINISHED STEEL IN JAPAN, 1928-35 a/

<u>Industry</u>	<u>Percentage of Annual Consumption</u>								<u>Annual Averages</u>	
	<u>1928</u>	<u>1929</u>	<u>1930</u>	<u>1931</u>	<u>1932</u>	<u>1933</u>	<u>1934</u>	<u>1935</u>	<u>1928-30</u>	<u>1930-35</u>
Railroads	20.9	14.8	15.6	11.6	10.6	7.9	10.5	8.1	17.1	11.2
Construction	24.8	31.2	38.4	32.7	28.4	27.2	26.0	26.9	31.4	30.6
Shipbuilding	10.2	9.8	7.2	7.4	7.3	10.2	10.8	10.2	9.1	8.6
Machinery	29.5	24.2	19.4	23.0	30.3	37.5	32.9	34.7	24.4	28.6
Oil, gas, and water	1.7	2.5	3.2	3.3	2.8	4.9	2.3	2.6	2.5	3.3
Mining	1.9	1.8	2.2	2.6	1.7	2.4	4.3	2.2	2.0	2.6
Others	11.0	15.7	14.0	19.4	18.9	9.9	13.2	15.3	13.5	15.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

a. These percentages were calculated from reported industry consumption figures, the totals of which ranged from about 70 percent to 110 percent of apparent total consumption of finished steel as estimated in Table 1 of this report. This discrepancy may be due to incomplete reporting in the earlier years and to inaccurate reporting or to changes in stocks for which no data are available in the later years.

Source: Seitetsugyo Sanko Shiryo, 1937, pp. 124-127.

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Table 3. APPARENT CONSUMPTION OF MAJOR FINISHED STEEL PRODUCTS  
IN JAPAN, 1928-36 <sup>a/</sup>  
(In 1,000 metric tons)

<u>Year</u>	<u>Rod and Bar</u>	<u>Sheet</u>	<u>Wire Bar</u>	<u>Rails and Fishplate</u>	<u>Tin Plate</u>	<u>Tube and Pipe</u>	<u>Other</u>	<u>Total</u>
1928	892	665	230	242	86	102	146	2,363
1929	1,067	648	226	275	97	130	178	2,621
1930	781	598	191	278	90	100	83	2,121
1931	642	528	242	96	73	39	85	1,705
1932	784	565	243	204	95	75	67	2,033
1933	1,077	800	324	224	113	85	123	2,746
1934	1,087	959	380	219	146	85	254	3,130
1935	1,282	1,098	457	187	144	115	328	3,611
1936	1,367	1,230	525	213	183	159	220	3,897
Annual Average								
1928-30	913	637	215	265	91	111	136	2,368
1930-34	874	690	276	204	103	78	122	2,347
1935-36	1,324	1,164	491	200	164	137	274	3,754

a. Apparent consumption of each of the major items was calculated from import, export, and production data given in the source. The category "other" is the difference between the sum of the major items listed above and the total apparent consumption.

Source: Seiretsugyo Sanko Shiryo, 1937, pp. 95-97 and 114-115 for imports; pp. 107-108 and 114-115 for exports; and pp. 20-21 for production.

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Table 4. PRODUCTION OF MAJOR FINISHED STEEL PR

(In 1,000 metric tons)

Year	Bars	Shapes	Thin Plate <sup>a</sup>	Thick Plate	Tube and Pipe	Rails and Fishplate	Wire Bar	Tin Plate	C
1928	552	253	101	317	64	213	58	16	
1929	604	256	175	352	78	271	68	18	
1930	484	251	214	334	88	290	122	22	
1931	467	203	252	280	63	110	177	27	
1932	568	254	257	316	96	234	215	34	
1933	774	331	271	476	117	272	285	36	
1934	778	430	325	603	137	368	348	61	
1935	1,015	468	389	713	167	367	412	95	
1936	1,027	555	520	878	189	289	487	139	
Annual Average 1928-30	573	253	163	334	77	258	83	19	
1930-34	614	294	264	402	100	255	229	36	
1935-36	1,021	511	454	796	178	328	450	117	

a. Less than 1 mm.

Source: Seitetsugyo Sanko Shiryo, 1937, pp. 20-21.



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## PRODUCTS IN JAPAN, 1928-36

<u>Other</u>	<u>Total Rolled Steel</u>	<u>Forged Steel</u>	<u>Cast Steel</u>	<u>Special Steel</u>	<u>Grand Total</u>
49	1,623	32	49	16	1,720
26	1,928	38	49	19	2,034
32	1,837	27	39	18	1,921
22	1,601	17	31	14	1,663
37	2,011	32	43	28	2,113
53	2,615	64	63	50	2,792
64	3,114	71	80	58	3,323
108	3,734	72	100	69	3,975
180	4,264	82	117	76	4,539
36	1,796	32	46	17	1,892
42	2,236	42	51	33	2,362
144	3,909	77	108	73	4,257

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Table 5. INGOT STEEL<sup>a</sup>/ POSITION IN JAPAN

Item	Physical Quantities				Apparent Consumption <sup>f</sup>		In
	Imports <sup>c</sup>	Exports <sup>d</sup>	Net Imports <sup>e</sup>	Production	Total	Per Capita	
	.....in 1,000 metric tons.....				(in kg.)		.....
1928	90	neg.	90	1,906	1,996	31.8	
1929	166	neg.	166	2,294	2,460	38.7	
1930	70	neg.	70	2,289	2,359	36.6	
1931	26	neg.	26	1,883	1,909	29.2	
1932	26	neg.	26	2,398	2,424	36.6	
1933	135	neg.	105	3,198	3,313	40.1	
1934	89	5	84	3,844	3,928	57.5	
1935	228	14	214	4,702	4,916	70.8	
1936	242	12	230	5,223	5,453	77.5	
Annual Average							
1928-30	109	neg.	109	2,163	2,272	35.7	
1930-34	63	1	62	2,722	2,784	42.0	
1935-36	235	135	221	4,962	5,183	74.2	

neg. = negligible.

- a. Includes steel for rolling, such as ingots, blooms, billets, and sheet bar.
- b. Value in terms of 1930 prices calculated by applying average price per ton in 1930.
- c. Includes imports from both foreign and colonial sources, although the only report in 1936.
- d. Exports prior to 1934 amounted to less than 1,000 metric tons. All exports were reported; on the basis of price comparisons, however, they appeared to consist of scrap.
- e. Imports minus exports.
- f. Very little information is available with respect to stockpiling of ingot steel. In view of the urgent demand for steel, there was no stockpiling in that or previous years. In view of the urgent demand and slight decline in ratio of ingot steel to finished steel, it appears reasonable to assume that there was no stockpiling. In computing per capita consumption, figures derived from official Japanese statistics are used.

Source: Seitetsugyo Sanke Shiryo, 1937, pp. 95-97 and 114-115 for imports; pp. 10



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JAN, 1928-36

Current Value			Value in 1930 Prices <sup>b/</sup>		
Imports <sup>c/</sup>	Exports <sup>d/</sup>	Net Imports <sup>e/</sup>	Imports	Exports	Net Imports
.....in million yen.....					
7.1	neg.	7.1	5.8	neg.	5.8
12.6	neg.	12.6	10.7	neg.	10.7
4.5	neg.	4.5	4.5	neg.	4.5
1.3	neg.	1.3	1.7	neg.	1.7
1.4	neg.	1.4	1.7	neg.	1.7
7.1	neg.	7.1	6.8	neg.	6.8
7.4	1.2	6.2	5.7	0.7	5.0
18.3	2.4	15.7	14.7	2.1	12.6
18.5	3.2	15.2	15.6	1.8	13.8
8.07	neg.	8.07	7.0	neg.	7.0
4.34	0.24	4.10	4.0	0.1	4.0
18.40	2.95	15.45	15.1	1.9	13.2

1931 to quantity data for each year.  
 forced imports from colonies were 34,000 metric tons from Korea  
 sent to foreign markets. Very small exports to colonies were  
 of pig iron and consequently are not included in the above

1. Factory Statistics (Keijo Tokei-hyo) for 1932 indicates  
 and for steel in Japan during this period and the only  
 to assume that consumption of ingot steel equals net new  
 panese census data for 1930 and 1935 were used.

7 and 114-115 for exports; and pp. 18-19 for production.

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Table 6. FERROUS MATERIALS USED IN PRODUCING STEEL FOR ROLLING  
IN JAPAN, 1928-36  
(In 1,000 metric tons)

Year	Ferrous Materials Used in Ingot Steel					Total	Ratio of Scrap to Pig	Percent of Materials Used to Production
	Ingot Steel	Scrap a/	Pig	Iron b/	Ore			
1928	1,906	1,030	1,042	120	2,192	50:50	115	
1929	2,294	1,183	1,087	115	2,385	52:48	104 c/	
1930	2,289	1,181	1,158	135	2,474	50:50	108	
1931	1,883	1,048	981	80	2,109	52:48	112	
1932	2,398	1,262	1,285	100	2,647	50:50	110	
1933	3,198	1,836	1,550	120	3,506	54:46	110	
1934	3,844	2,426	1,837	135	4,398	57:43	114	
1935	4,702	2,981	2,076	140	5,197	59:41	111	
1936	5,223	3,215	2,358	180	5,753	58:42	110	
Annual Average								
1928-30	2,163	1,131	1,096	123	2,350	51:49	109	
1930-34	2,722	1,551	1,362	114	3,027	53:47	111	
1935-36	4,962	3,098	2,217	160	5,475	58:42	110	

a. For total reported consumption of scrap, see Table 8.

b. In terms of metal content. Metal content estimated to be about 65 percent in 1928-34 and 60 percent in 1935-36. See Table 10.

c. This percentage appears low, probably because of faulty reporting.

Source: Seitetsugyo Sanko Shiryo, 1937.

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Table 7. PIG IRON POSITION IN JAPAN

Item	Physical Quantities				Production	Apparent Consumption <sup>e/</sup> Total; Per Capita	Imp
	Imports <sup>b/</sup>	Exports <sup>c/</sup>	Net Imports <sup>d/</sup>	Production			
.....in 1,000 metric tons.....						(in kg.)	
1928	709	4	705	1,092	1,797	28.7	
1929	792	4	788	1,087	1,875	29.5	
1930	515	5	510	1,162	1,672	25.0	
1931	494	2	492	917	1,409	21.6	
1932	650	2	648	1,011	1,659	25.0	
1933	801	2	799	1,424	2,223	33.0	
1934	778	3	775	1,728	2,503	36.7	
1935	1,073	4	1,069	1,907	2,996	43.2	
1936	1,075	2	1,073	2,008	3,101	44.1	
Annual Average							
1928-30	672	3	669	1,114	1,783	28.0	
1930-34	648	3	645	1,248	1,893	28.5	
1935-36	1,094	3	1,091	1,958	3,049	43.6	

- a. Value in terms of 1930 prices calculated by applying the 1930 unit price to
- b. Imports came largely from Manchuria and British India. Imports from colonial
- c. Exports to Korea and Formosa only. Reported exports may include some ingot
- d. Imports minus exports.
- e. Net imports plus production. Available data in Factory Statistics (Keijo Tok  
iron in 1932 or in the previous years. Unavailability of data relating to t  
of estimating stocks or changes in stocks. It is probable that some additio  
been assumed herein that consumption is equal to net new supply.

Source: Seitotsugyo Sanko Shiryo, 1937, pp. 88-89 and 114-115 for imports; pp.



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N, 1928-36

Current Value			Value in 1930 Prices <sup>2/</sup>		
Imports <sup>b/</sup>	Exports <sup>c/</sup>	Net Imports <sup>d/</sup>	Imports	Exports	Net Imports
.....in million yen.....					
22.0	0.3	31.7	28.3	0.32	27.7
25.0	0.3	34.7	31.0	0.32	30.7
20.0	0.1	17.6	20.0	0.10	19.6
14.0	0.1	15.9	19.0	0.16	18.8
18.0	0.1	17.0	25.0	0.16	24.8
30.0	0.1	29.9	31.0	0.16	30.8
34.0	0.2	33.8	30.0	0.24	29.8
48.0	0.2	47.8	45.0	0.32	42.7
49.0	0.2	48.8	46.0	0.16	45.8
29.0	0.3	28.7	26.3	0.35	26.0
23.2	0.2	23	25.0	0.22	24.0
48.5	0.2	48.3	44.5	0.24	44.0

quantities for each of the other years.

s came only from Korea.

steel but, in any case, are negligible.

(*sei-hyo*), 1932, indicate that there was no stock piling of pig iron. The use of pig iron in iron castings increases the difficulty of iron was made to stocks in 1933 and again in 1935 but it has

114-115 for exports; and p. 3 for production.

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Table 8. SCRAP IRON AND STEEL POSITIONS

Item	Physical Quantities					Production <sup>f/</sup>	Net Now Supply <sup>g/</sup>	Consumption Total <sup>h/</sup>	Per Ton <sup>i/</sup>
	Stocks (1 Apr.) <sup>b/</sup>	Imports <sup>c/</sup>	Exports <sup>d/</sup>	Net Imports <sup>e/</sup>					
.....in 1,000 metric tons.....(in k)									
1928	400	364	10	345	865	1,210	1,060	17.	
1929	550	488	17	471	902	1,463	1,132	17.	
1930	881	480	10	470	991	1,470	1,238	17.	
1931	1,113	206	10	286	1,006	1,382	1,106	16.	
1932	1,380	55	14	545	1,174	1,710	1,302	17.	
1933	1,806	1,013	12	1,001	1,500	2,501	1,706	28.	
1934	2,402	1,413	14	1,300	1,683	3,082	2,538	37.	
1935	3,036	1,602	18	1,674	1,700	3,473	3,122	45.	
1936	3,387	1,407	15	1,482	1,57	3,430	3,337	47.	
Annual									
Average									
1928-30	613	447	17	432	940	1,381	1,146	18.	
1930-34	1,536	754	12	742	1,307	2,010	1,618	24.	
1935-36	3,211	1,505	17	1,578	1,878	3,456	3,220	46.	

- a. Value in terms of 1930 prices calculated by applying average price per ton in 1930 to
- b. Stocks from 1932 to 1936 are from US Strategic Bombing Survey (USSBS), Coal and Metals figures are extrapolated from later data.
- c. Seitotsugyo Sanko Shiryo 1937, pages 86-87.
- d. Seitotsugyo Sanko Shiryo, 1937, pages 107 and 114-115.
- e. Imports minus exports.
- f. For 1928-30, production data are from General Headquarters, Supreme Commander for the East, Op. Cit. For 1931-36, production data are from USSBS, op. cit. Both Association. Small additions have been made to the USSBS figures to allow for insignificant data include both domestically purchased and self-generated scrap.
- g. Production plus net imports.
- h. Seitotsugyo Sanko Shiryo, 1937, page 133. Consumption in the production of pig iron. These data do not include scrap consumed directly in the production of iron castings; furthermore, that scrap utilized for this purpose is not included in reported product
- i. USSBS, op. cit.



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IRON IN JAPAN, 1928-36

Year	Change in Capita Stocks <sup>1/</sup>	Current Value			Value in 1930 Prices <sup>2/</sup>		
		%	d/	Net %	Imports	Exports	Net Imports
g.) (in 1,000 m.t.)		in 1,000,000 yen					
0	+141	13.4	1.0	12.4	12.0	0.00	12.00
8	+331	18.0	1.0	17.0	17.3	0.85	16.45
2	+232	17.3	0.5	16.8	17.3	0.50	16.80
0	+276	7.3	0.4	6.9	10.5	0.50	10.00
6	+417	16.3	0.6	15.7	17.8	0.70	17.10
3	+685	38.6	0.7	37.9	35.0	0.60	35.30
2	+514	65.7	1.4	64.3	50.0	0.70	49.30
0	+351	84.2	1.1	83.1	57.0	0.60	56.40
4	+102	80.0	1.0	79.0	53.0	0.75	52.25
0	+235	16.2	0.8	15.4	15.8	0.75	15.08
4	+481	20.0	0.7	19.3	26.7	0.60	26.10
2	+227	82.55	1.05	81.5	56.45	0.82	55.63

quantity data for each year.

in Japan's War Economy, Vol. I, 1946 (unpublished). Earlier

Allied Powers, Report No. 44, Mineral Resources of Japan Proper, reports were based on estimates supplied by the Japan Iron and Steel significant exports which were not reported in the USSBS study. The

and ingot steel, plus small amounts consumed in "other uses." it is assumed herein that these amounts are relatively small and, iron data.

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Table 2. IRON ORE POSITION IN JAPAN, 1928-1936

Item	Physical Quantities								
	Stocks (1 Apr.)	c/. Imports	d/. Exports	e/. Net Imports	f/. Production	g/. Net New Supply	h/. Consumption Total	i/. Per Capita	Change in Steel
	in 1,000 metric tons of ore						(in kg.) (in 1,000 metric tons)		
1928	250	1,842	--	1,842	158	2,000	1,830	28.2	+170
1929	1,120	2,257	4	2,255	178	2,433	1,703	28.2	+610
1930	1,760	2,262	2	2,260	216	2,506	1,748	30.2	+550
1931	2,318	1,727	5	1,722	208	1,930	1,466	22.4	+460
1932	2,782	1,634	4	1,630	227	1,857	1,653	24.0	+200
1933	2,786	1,770	6	1,773	321	2,094	2,387	35.5	-200
1934	2,603	2,313	6	2,307	432	2,739	2,842	41.6	-100
1935	2,570	3,646	6	3,640	516	4,156	3,551	51.2	+600
1936	3,175	4,022	--	4,022	621	4,643	3,707	52.7	+700
Annual Average									
1928-30	1,277	2,121	2	2,110	194	2,313	1,857	28.2	+450
1930-34	2,508	1,943	5	1,938	287	2,225	2,050	31.3	+160
1935-36	2,804	3,834	3	3,831	568	4,399	3,620	52.0	+770

- a. Average ferrous content of this ore was about 65 percent in the years 1928 to 1934 in production and imports occurred. Iron content of imported ores is reputed to be
- b. Value in terms of 1930 prices calculated by applying average price per ton in 1930
- c. Stockpile figure for 1936 was obtained from US Strategic Bombing Survey, Coal and Iron for earlier years were calculated by relating apparent changes in stocks (net new)
- d. Seitotsugyo Sanke Shiryo, 1937, pages 84 and 114-115. Most foreign imports were from Korea.
- e. Seitotsugyo Sanke Shiryo, 1937 pages 114-115. Only reported exports were negligible
- f. Imports minus exports.
- g. Seitotsugyo Sanke Shiryo, 1937, pages 14-15.
- h. Net imports plus production.
- i. Seitotsugyo Sanke Shiryo, 1937, page 132. Includes reported consumption in pig iron for "other uses."



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Year	Current Value			Value in 1930 Prices b/		
	Imports <sup>c/</sup>	Exports <sup>d/</sup>	Net <sup>e/</sup>	Imports	Exports	Net
	in 1,000,000 yen.....					
0	17.70	--	17.7	16.6	--	16.60
0	21.00	0.08	20.92	20.3	0.10	20.20
3	20.40	0.05	20.35	20.4	0.05	20.35
4	14.00	0.07	13.93	15.5	0.12	15.38
5	13.00	0.07	12.93	14.7	0.10	14.60
3	14.70	0.07	14.63	16.0	0.15	15.85
3	20.00	0.08	20.82	20.8	0.15	20.65
5	35.80	0.10	35.7	32.8	0.15	32.65
6	41.00	--	41.0	36.2	--	36.20
6	17.70	0.04	17.66	16.10	0.05	16.05
6	16.60	0.07	16.53	17.48	0.11	17.37
0	38.40	0.05	38.35	34.50	0.07	34.43

and about 60 percent in 1935 to 1936 when tremendous increases  
much higher than that of domestic ores.  
to quantity data for each year.  
totals in Japan's War Economy, Vol. 1, 1946 (unpublished). Data  
supply minus consumption) to the 1936 figure.  
from China and British India. Imports from colonies came only  
to amounts to Formosa.

on and ingot steel production, plus small amounts consumed

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Table 1.0. CONSUMPTION OF IRON ORE IN JAPAN, 1928-36  
(In 1,000 metric tons)

Year	Total Consumption of Iron Ore	Consumption in Blast Furnaces	Pig Iron Production	Percent of Pig Produced to Ore Consumed	Consumption in Steel Production a/	Percentage of Ore Consumed in Pig Iron Production
					180	90
					175	90
1928	1,830	1,650	1,092	66		90
1929	1,793	1,618	1,087	67		92
1930	1,948	1,749	1,162	66	19	91
1931	1,466	1,349	917	68	117	
1932	1,653	1,500	1,011	67	153	
1933	2,387	2,139	1,424	67	248	
1934	2,842	2,641	1,728	65	201	93
1935	3,551	3,317	1,907	57	234	93
1936	3,707	3,400	2,008	59	307	92
Annual Average						
1928-30	1,857	1,672	1,114	66	185	90
1930-34	2,059	1,876	1,248	67	184	91
1935-36	3,629	3,358	1,958	58	270	93

a. Small amounts of ore included in this column were consumed in "other uses."

Source: Seitetsugyo Sanko Shiryo, 1937.

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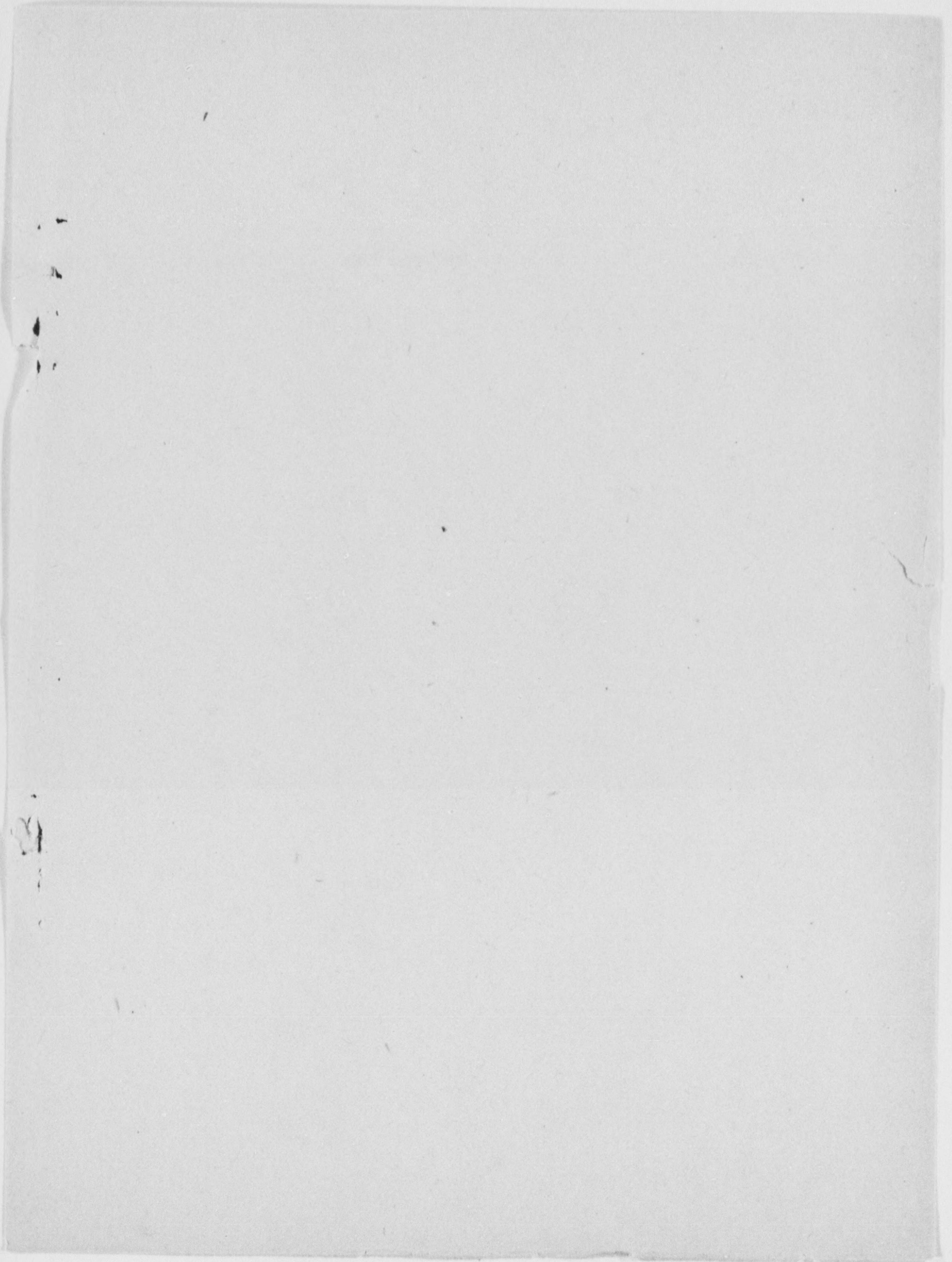
Table 11. JAPANESE NET IMPORTS OF FERROUS MATERIALS, 1928-36

<u>Year</u>	<u>Finished Steel</u>	<u>Ingot Steel</u>	<u>Pig Iron</u>	<u>Scrap Iron</u>	<u>Iron Ore</u>	<u>Total</u>
(in current prices in 1,000,000 yen)						
1928	73.00	7.10	31.70	12.40	17.70	141.90
1929	68.00	12.60	34.70	17.00	20.92	153.22
1930	21.00	4.50	19.60	16.80	20.35	82.25
1931	1.00	1.30	13.90	6.90	13.91	37.01
1932	-5.00	1.40	17.90	15.70	12.93	42.93
1933	-10.00	7.10	29.90	37.90	14.63	79.53
1934	-25.00	6.20	33.80	64.30	20.82	100.12
1935	-66.00	15.70	47.80	83.10	35.70	116.30
1936	-97.00	15.20	48.80	79.90	41.00	87.90
Annual Average						
1928-30	54.00	8.07	28.67	15.40	19.66	125.80
1930-34	-3.60	4.10	23.00	28.30	16.53	68.33
1935-36	-81.50	15.45	48.30	61.50	38.35	102.10
(in 1930 prices in 1,000,000 yen)						
1928	69.00	5.80	27.70	12.00	16.60	121.10
1929	65.00	10.70	30.70	16.45	20.20	143.05
1930	21.00	4.50	19.60	16.80	20.35	82.25
1931	-4.00	1.70	18.80	10.00	15.38	41.88
1932	-17.00	1.70	24.80	19.00	14.60	43.20
1933	-18.00	6.80	30.80	35.30	15.85	106.75
1934	-44.00	5.00	29.80	49.30	20.65	60.75
1935	-80.00	12.60	42.70	59.00	32.65	66.95
1936	-105.00	13.80	45.80	52.25	36.20	43.05
Annual Average						
1928-30	51.67	7.00	26.00	15.08	19.05	118.80
1930-34	-12.40	3.94	24.76	26.10	17.37	59.77
1935-36	-92.50	13.20	44.25	55.62	34.43	55.00

Source: Tables 1-5.

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## SUMMARY

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Average annual consumption of finished steel in Japan in the period 1930-34 was approximately 2.4 million metric tons, or 35.3 kilograms per capita. Consumption in the period 1928-30, was slightly higher (37.3 kilograms per capita) and in the period 1935-36, much higher (53.7 kilograms per capita). The largest consumers of finished steel were the construction and the machinery industries, each accounting for about 30 percent of total consumption; the railroad and shipbuilding industries ranked next in importance each accounting for about 10 percent. Much the largest proportion of steel was consumed in civilian uses; direct military consumption is estimated to have been only about 5 percent of the total. The principal steel products consumed by all users were rod and bar, and sheet steel.

Average annual new supply of finished steel in 1930-34 was largely from domestic production. Although there was external trade in finished steel, average annual tonnage of exports and imports roughly balanced.

Domestic production of finished steel in 1930-34 depended chiefly upon domestic production of ingot steel. Ingot steel production depended, in turn, upon domestic production and imports of pig iron and scrap iron. Domestic pig iron production was sufficient to meet about 65 percent of annual requirements (including those for cast iron). Scrap iron was imported in large

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quantities. These, together with domestic scrap supplies, were sufficient to contribute heavily to stocks during the period. As domestic iron ore is generally low grade, Japan relied heavily on imports of foreign ores. These imports provided over 50 percent of average annual new supply and were large enough to make large contributions to stocks of iron ore.

A review of the costs of imports and the returns from exports of ferrous materials, in terms of current compared to 1930 prices shows that, in the period 1930-34, the terms of trade shifted against Japan. By 1935-36, Japan was placed in the position of having to export twice as much to pay for a given amount of imports as would have been required in 1930. The role of finished steel changed over the period 1930-34 and, whereas net imports had been necessary in 1930, Japan had become a net exporter of finished steel by 1932.

On the basis of the data supplied in the study of the period 1928-36 and assuming the general standard of living obtaining on the average in 1930-34 for an estimated 79 million people in 1950, Japan's finished steel requirements in 1950 are provisionally projected at 2.7 million metric tons. Similarly, cast iron requirements are projected to be 600,000 metric tons.

On the assumptions that Japan will be allowed sufficient finished steel and ingot steel capacity to meet its domestic requirements, that certain limitations on pig iron capacity and



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electric furnace capacity will be imposed, and that Japan will be expected to supply its scrap and iron ore needs domestically insofar as it is economically feasible, several alternative patterns of imports to meet deficiencies in domestic supply are projected to 1950. The most favorable of these patterns from the standpoint of conservation of foreign exchange assumes domestic pig iron capacity of 2 million metric tons. Imports would consist largely of iron ore, sufficient coal for making coke for pig iron production, and about 550,000 tons of pig iron. In terms of 1930 prices, these imports would cost Japan 50 million yen. Assuming a pig iron capacity just sufficient to reduce domestic ores, Japan's import costs would rise to about 75 million yen. An intermediate assumption of 1.5 million tons of pig capacity would incur import costs just over 60 million yen.

If Japan is not allowed sufficient finished steel and ingot steel capacity to satisfy domestic needs, import costs would be substantially increased. Imported ingot steel would cost over one and one-half times more and imported finished steel three times more per ton in 1930 prices than imported pig iron.



I. INTRODUCTIONRESTRICTEDA. Purpose and Scope of the Report

Iron and steel as used in the following report refers to iron for casting purposes; to finished steel which includes rolled steel, castings, forgings and other special steel products; and to the principal ferrous materials -- iron ore, pig iron, scrap iron and steel, and ingot steel -- that enter into the various stages of manufacture of cast iron and finished steel. Excluded from consideration are iron and steel products fabricated beyond the cast iron and finished steel stage of production, and ferro-alloy materials. The former are considered in other reports referred to in the Foreword. Since ferro-alloys are important in the production of alloy steel, Japan, which is deficient in them, will need imports. Import costs, however, are relatively insignificant, averaging annually only 700,000 yen in the period 1930-34, according to Seitetsugyo Sanko Shiryo, 1937.

The purpose of this report is to estimate Japan's peaceful requirements for iron and steel in 1950, which is assumed to be a normal postwar year. The basis for the estimate is provided by Part II of the report, Japan's Iron and Steel Position, 1928-36, which presents fairly detailed statistics on domestic consumption, production, imports, and exports of the principal ferrous materials. In view of the purpose of the report, the order of discussion emphasizes consumption and the proximity of the various ferrous materials to their ultimate end use. The statistical data in the

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text may be supplemented by reference to the appended tables. Sections A to E are concerned with tonnage and contain no discussion of the import costs or the export returns from external trade. Because of their particular relevance to studies of Japan's balance of payments, these trade data are included separately in Section F.

Part III contains a provisional projection of Japan's requirements to 1950. For purposes of this projection, Japan's peaceful requirements for iron and steel have been defined as the amounts necessary to maintain a standard of living substantially equivalent to the average for the period 1930-34. Discussion of these requirements is divided into two sections, (1), Japanese Finished Steel and Cast Iron Requirements, 1950, and (2), Alternative Methods of Supplying Japan's Finished Steel and Cast Iron Requirements, 1950. The first of these sections, assuming a population of 79 million in 1950, projects domestic civilian requirements to that year on the basis of annual average per capita consumption in 1930-34; the second section estimates domestic supplies of ferrous materials and describes several alternative import patterns by which deficiencies in domestic supplies may be supplemented sufficiently to meet requirements.

#### B. Sources

The primary source used in this report is the Seitetsugyo Sanko Shiryo, (Reference Data Concerning the Iron Manufacturing Industry), published by the Japanese Ministry of Commerce and Industry, Bureau of Mines, Tokyo, 1937 (in Japanese). Quantitative

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data appearing in different tables in this source and purporting to represent the same situation, in many cases, do not agree. In choosing among these data, the necessity of using values as well as quantities dictated the selection of tables containing both factors. Consequently, slight discrepancies occur between earlier reports using the same source but concerned primarily with quantities, and this report which is concerned also with values.

Reference is made at several points in the text to data gathered in Japan by the United States Strategic Bombing Survey (USSBS). The as yet unpublished report that was employed as a source is entitled Coal and Metals in Japan's War Economy, Vol. I, 1946.

A third source--General Headquarters, Supreme Commander for the Allied Powers, Report Number 44, Mineral Resources of Japan Proper, 1925-1945, July 5, 1946--is also referred to in the determination of domestic scrap supplies.

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