

Ref No 500-a-36

JAPANESE TRADE STUDIES

Special Industry Analysis
No. 36

RAYON FABRICS

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Foreign Economic Administration
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October 1945

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PREFACE

This is one of a series of Special Industry Analyses discussing from a commodity or individual industry point of view the outstanding items entering into the trade of Japan proper with its Empire and with foreign countries. These analyses are a part of a larger project which includes compilations (annotated) of the imports and exports of Japan proper by sources and destinations; surveys of certain of the colonial areas, emphasizing their Empire and foreign trade and postwar problems relating thereto; an over-all study of the trade of Japan proper; and a survey of Japan's shipbuilding industry and shipping services and requirements in the prewar period. In all of the studies Manchuria has been included as an Empire area owing to the political, economic, and military dominance of Japan in that area, especially during the last decade.

Most of the data in these analyses were taken from official and semi-official Japanese sources. Not only have errors and inconsistencies frequently been detected within individual volumes, but many data from different sources supposedly reporting on the same subject are irreconcilable. It is very likely that large shipments of goods reportedly moving to Kwantung from Japan have been in large part merely transshipments destined for Manchuria.

The present report is one of a number which were prepared during 1944 and 1945 for the Foreign Economic Administration by members of the staff of the United States Tariff Commission. Owing to the desire of the Foreign Economic Administration to obtain this material as promptly as possible, the reports were not reviewed by the Tariff Commission. All statements of fact or opinion in these reports are attributable to the individual staff members who prepared them. The reports were originally intended for confidential use of Government agencies, but are now being made public with the consent of the Foreign Economic Administration.

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RAYON FABRICS

Introduction and summary

Rayon weaving, since its beginning in the early twenties has been closely associated with the silk-weaving industry. Silk looms are adaptable for either silk or rayon; weavers therefore shift from one fiber to the other. Most of the weaving of rayon and silk in Japan is done in small family shops, having not more than five looms per establishment. Large modern mills having several hundred looms per establishment are relatively few in number. Although rayon weaving is linked for the most part with silk weaving, it is also conducted in part by mills specializing solely in the production of rayon fabrics. Only fragmentary data are available as to the size of the branch exclusively engaged in rayon weaving. It probably numbered less than 5,000 mills as compared with over 70,000 ¹/ _{mills} in the silk and rayon weaving industry in 1933-37.

The output of broad-woven, all-filament rayon fabrics in Japan is estimated to have exceeded a billion square yards in 1939, valued at 232 million yen. The combined production of narrow all-filament rayon fabrics and specialties, which are not reported in comparable units of quantity, averaged 73 million yen in value. Japan also produced in that year mixtures of filament-rayon yarn and other fibers, valued at 63 million yen. The aggregate value of the output of fabrics of all widths and types woven wholly or in part of filament-rayon yarn was therefore 368 million yen. In addition there were produced spun-rayon fabrics (made from staple fiber yarns) with an estimated value of about 275 million yen. The combined value of the Japanese output of rayon fabrics, woven of both filament and spun-rayon yarns in 1939 was accordingly slightly under 643 million yen.

Of the Japanese production of filament-rayon fabrics, the bulk of the wide goods were exported while the bulk of the narrow goods, mixtures and special fabrics were consumed within Japan proper. Japanese consumption of all types and widths of filament-rayon fabrics, pure and mixed, averaged about 54 percent of the value of the total filament-rayon fabric production in 1933-37 but declined to about 50 percent in 1939. On the other hand, Japan consumed in 1939 (the only year for which a comparison can be made) more than three-fourths of its production of spun-rayon fabrics. Of the combined output of filament-rayon and spun-rayon fabrics in 1939, least 40 percent, by value, was exported and over 60 percent consumed at home.

¹/ See Japanese Trade Study: Special Industry Analysis No. 33. "Silk Fabrics," prepared for Foreign Economic Administration by U. S. Tariff Commission, September 1945.

Japan is the world's largest exporter of rayon fabrics. Exports of filament-rayon fabrics, which are counterparts of silk constructions, were twice as great in value in 1939 as exports of silk fabrics and have exceeded silk fabrics in importance in the export trade since 1932. During 1937-39, total exports of rayon fabrics, both of filament-rayon and spun-rayon, averaged 681 million square yards valued at 214 million yen or about one-fourth of the total value of the combined exports of woven fabrics of silk, rayon, cotton and wool. Rayon fabrics ranked next to cotton fabrics, exports of which averaged 483 million yen during that period or 56 percent of the total exports of the Japanese weaving industries. (See table 6.)

Although cotton cloth predominated in the total fabric export trade to all countries, rayon fabrics predominated in the export trade with Empire areas. In 1937-39, exports to Empire countries of the four principal classes of fabrics (cotton, rayon, silk and wool) averaged 258 million yen or 30 percent of the total exports of these fabrics to all countries. Exports of rayon fabrics to the Empire in this period, averaged almost 100 million yen or 38 percent of the aggregate fabrics shipped to these areas in contrast to cotton fabrics which averaged 73 million yen or 28 percent.

Exports of woven rayon fabrics (including both filament and spun) were valued in 1939 at 248 million yen or more than 3½ times the value of the combined exports of rayon in the fiber or yarn stage of manufacture. ^{1/} Rayon fabrics constituted in that year approximately 5 percent of the total value of exports of all Japanese commodities to Empire and foreign countries.

With the decrease in Japanese markets for raw silk in the postwar period as a result of the encroachment of nylon and other synthetic fibers, Japan will probably become more dependent on exports of rayon fabrics to obtain foreign exchange. The continuance of rayon weaving on a scale equal to or larger than in the prewar period will therefore be important for the rehabilitation of Japan. Rayon fabrics also bulk large in supplying the clothing needs of Japan itself. To the extent that rayon fabrics are substituted for other fabrics for domestic consumption, Japan will conserve the exchange formerly required for the purchase of foreign raw cotton and raw wool. Consumption in Japan of cotton and rayon fabrics for which imported raw materials were used, averaged nearly 600 million yen annually in 1934-37 or about 45 percent of the total consumption of fabrics of cotton, filament rayon, silk, and wool. (See table 1.)

^{1/} Including rayon filament yarn, raw staple fiber and spun-rayon yarn, the combined exports of which totaled 76 million yen. For further information see Japanese Trade Study, Special Industry Analysis No. 30, Rayon Yarn and Staple Fiber, prepared by U. S. Tariff Commission for Foreign Economic Administration, December 1944.

Table 1.- Woven fabrics of cotton, rayon, silk, and wool, pure or mixed:
Summary of production, imports, exports, and apparent consumption;
annual average, 1933-37

Type of fabric	Pro- duction ^{1/}	Imports	Exports	Apparent consumption
	Value (1,000 yen)			
Cotton -----	867,939	3,164	2/ 523,411	347,692
Filament rayon -----	316,677	101	145,577	171,201
Silk -----	623,896	495	2/ 81,079	643,312
Wool -----	285,873	7,670	46,756	246,787
Total -----	2,094,385	11,430	2/ 796,823	3/ 1,302,992
	Percent			
Cotton -----	41.4	27.7	65.7	26.5
Filament rayon -----	15.1	1.0	18.3	13.1
Silk -----	29.8	4.3	10.2	41.5
Wool -----	13.7	67.0	5.8	18.8
Total -----	100.0	100.0	100.0	100.0

^{1/} Includes broad-woven goods (hirshabamono), narrow-woven goods (kashabamono) and special fabrics.

^{2/} In addition, exports to Formosa of cotton tissues and silk tissues not separately segregated amounting to 18,700,000 yen.

^{3/} Consumption less by 18,700,000 yen for exports to Formosa not segregated by class of fiber in fabric.

Source: Production data from Financial and Economic Annual of Japan. Imports and exports from annual and monthly returns of the foreign trade of Japan and Chosen (Korea). Apparent consumption computed.

Description and uses

Fabrics of rayon are of two types: those woven of continuous filament-rayon yarn and those woven of spun-rayon yarn ^{1/} made from staple fiber. The former are used in such constructions as satins, crepes, taffetas, veils, habutae, foulards and broads, etc., most of which are style goods and counterparts of silk; the latter are chiefly utility fabrics in coarse and medium-weight constructions such as shirtings, slottings, muslins, drills, jeans, cordings, serges, twills, sherings, drillings, nut and slub fabrics, flannels, blanketing and tarpaulin materials. Spun-rayon fabrics have a resemblance in texture and appearance to any fabric woven of wool, cotton, and spun-silk yarns. Many spun-rayon fabrics contain blends and mixtures of these fibers.

^{1/} See Special Industry Analysis No. 30 on Rayon Yarn and Staple Fiber.

The bulk of the rayon fabrics are used for wearing apparel and for upholstery, draperies, and other decorative and household purposes. Certain specialized constructions of rayon goods were adopted by the United States during the war for military purposes, particularly gurney and fragmentation bomb parachutes, and presumably were also so used in Japan.

Organization, location, and size of industry

The progress of rayon weaving in Japan is largely a record of transition from silk weaving. With its skilled workers and age-old traditions, the silk industry of Japan was prominently adapted for weaving fabrics of continuous filament-rayon yarn, which in the main are replicas of silk fabric constructions. Filament-rayon yarn may be processed on the same equipment as silk, with only minor adjustments, and requires no new techniques in processing. The well-established silk industry uses silk and filament-rayon yarn interchangeably. Rayon is free from the erratic day-to-day price fluctuations characteristic of silk; its comparative price stability and orderly downward price movement were important factors in its adoption by silk weavers. Moreover, as rayon is cheaper than silk, less working capital is required by the small weaving establishments, most of which have limited financial resources.

Following the introduction of looms especially designed for rayon in the early thirties, the production of filament-rayon fabrics was begun by mills specializing in that branch of weaving. In 1934 some 2,380 mills employing over 44,000 operatives were engaged exclusively in the weaving of rayon. Subsequent data are not available, but it is not unlikely that the rayon weaving industry had approximately doubled in size by the end of the decade.

Fine rayon fabric weaving, like silk weaving, is primarily in the hands of small and medium-sized mills. There has been a marked tendency to establish weaving mills engaging less than 10 employees in order to avoid the factory law which applies to mills with 10 or more operatives. Cheap power enables the small mills to operate automatic looms effectively against the competition of larger mills. Probably less than a dozen rayon weaving companies in Japan are large-size concerns of first rank with regard to loom installations and volume of output. The factories making filament-rayon cloth are located largely in the prefectures of Fukui, Kyoto, Ishikawa, Gumma, and Fuchiji. These areas also lead in silk goods production, and their proficiency in handling silk has been carried over and maintained in rayon piece-goods weaving.

The cotton textile industry in Japan also has adopted rayon as a supplementary raw material, producing not only admixtures of cotton and rayon but also fabrics wholly of filament-rayon and spun-rayon yarn. Since the introduction of staple fiber, the wool manufacturing industry has made extensive use of cut rayon fibers for spinning blended yarns for mixture fabrics.

Raw materials

Prior to World War I imported rayon yarns were used for weaving mixture fabrics for Japanese consumption. Following the expansion of rayon yarn manufacturing in Japan in the late twenties, progress in the weaving of all-rayon fabrics was accelerated by the availability of a large supply of domestic rayon yarn at low cost.

Japan is wholly self-sufficient in raw materials for rayon weaving.^{1/} It was the world's leading producer of rayon yarn and staple fiber in 1936-38. It consumed during the period 1933-37 an average of 182 million pounds of filament-rayon yarn annually, of which 26 million pounds went into the manufacture of fabrics for export. As consumption of rayon by the weaving industries in Japan is relatively small, the balance--96 million pounds--was used primarily in weaving fabrics for use within Japan. In 1939 nearly 200 million pounds of filament rayon were consumed in Japan, of which 73 million pounds went into fabrics for export and 126 million pounds for domestic weaving and knitting. In addition, the consumption of staple fiber for weaving for export in 1939 amounted to 41 million pounds and that for domestic weaving about 222 million pounds.

Summary of production, imports, exports, and domestic consumption.

Quantity data for the rayon fabric output of Japan are incomplete and reported in dissimilar units for imported and domestic goods. Conversions of total production, exports, and consumption can therefore be made only on a value basis covering the period 1930-39 for filament-rayon fabrics and the single year 1939 for spun rayon yarn.

Despite the depression in the thirties an uninterrupted expansion occurred up to 1937 in the total value of the filament-rayon fabrics produced, exported, and consumed within Japan. Production rose steadily, reaching its peak of 272 million yen in 1937, after which it declined substantially. Imports, largely from Korea, have never played an important role, amounting to less than a million yen annually. Exports of filament-rayon fabrics were at their highest value level in 1939 as a result of rising prices rather than increased volume. Consumption, which at its maximum in 1937 amounted to 289 million yen, or about 60 percent of the total output, fell off in value in the two subsequent years. This decline is largely attributable to the operation of the export-link control measures imposed by the Japanese Government on wool and silk imports for yarn manufacture. Under this system the weaving industry was required to export a larger proportion of its output.

The total production of rayon fabrics of both filament-rayon and spun-rayon yarns amounted to about 644 million yen in 1939, the only year in which such data is available. Exports amounted to 248 million yen, or

^{1/} The position of Japan in raw materials for rayon yarn and staple fiber manufacture are discussed in Special Industry Analysis No. 30, Rayon Yarn and Staple Fiber.

38 percent of production. Accordingly, the aggregate combined consumption of these two classes of rayon fabrics averaged over 395 million yen, or 62 percent of the available supply. (See table 2.)

Table 2.- Rayon-rayon fabrics (including mixtures): Summary of production, imports, exports, and apparent consumption, Japan proper, 1930-31 and 1935-39

(In thousands of yen)

Year	Production 1/	Imports 2/	Exports		Total	Apparent consumption
			To Empire	To foreign countries		
Of continuous-filament rayon yarn, pure or mixed						
1930	132,731	3/	8,204	39,489	45,693	77,038
1931	149,951	3/	8,135	59,921	68,056	81,495
1933	189,905	3/	15,152	74,457	89,609	100,296
1934	207,441	3/	24,175	107,216	129,391	118,270
1935	279,668	3/	33,955	116,277	150,232	129,436
1936	384,001	5/	48,070	120,834	174,904	209,312
1937	452,151	291	47,071	130,674	183,745	268,697
Average, 1933-37	316,677	101	33,625	111,892	145,517	171,201
1938	376,102	344	37,688	70,490	161,178	215,268
1939	368,232	738	37,305	69,100	166,405	182,555
Of spun-rayon yarn (single fiber), pure or mixed						
1937	4/	3/	5,119	3,189	8,308	-
1938	4/	3/	23,247	6,366	29,613	-
1939	5/ 175,022	3/	32,622	7/ 29,341	61,772	213,227
Total rayon fabrics						
1937	4/	4/	52,143	139,865	192,008	-
1938	4/	4/	115,938	85,056	200,994	-
1939	643,232	738	109,977	118,251	228,178	395,282

1/ Includes broad-woven fabrics, narrow fabrics (under 30 inches in width) and specialties including kimonos for kimono sashes.
 2/ Not separately reported except as exports from Korea to Japan beginning in 1936.
 3/ Not separately reported; probably negligible or nil.
 4/ Not available.
 5/ Estimated on basis of all available production.
 6/ Exclusive of exports of single fiber (other than bichromic and Avantine) not separately reported.
 7/ Inclusive of exports of spun rayon fabrics to Manchuria and Avantine not separately reported.

Source: Import and export data from U.S. Customs and monthly returns of the foreign trade of Japan and Korea (Korea). Production data from U.S. consular dispatches, reports of American commercial attaches, the Japan Silk Yearbook and the Japan Yearbook. Consumption computed by U. S. Tariff Commission.

Production

Of the combined output of filament-rayon fabrics and spun-rayon fabrics, valued in 1939 at 644 million yen, about 67 percent represented broad woven goods, and 23 percent narrow woven fabrics and specialties. Fabric in chief weight of filament-rayon having mixtures of other fibers averaged about 10 percent. In the category of broad woven goods, which totaled 432 million yen in value, 54 percent consisted of filament-rayon fabrics and 46 percent of spun-rayon goods. (See table 3.)

Table 3.- Japan: Total production of rayon fabrics, 1931-39
(in millions of yen)

Year	All-rayon				Rayon mixtures 2/	Grade Total
	Broad-woven	Narrow woven	Specialties 1/			
	Of filament-rayon yarn (artificial silk)					
1931	70	13	22		18	123
1932	89	13	20		28	150
1933	111	20	18		40	189
1934	154	24	22		57	257
1935	147	39	28		60	280
1936	202	64	35		77	384
1937	270	74	38		90	472
Average, 1933-37	178	44	28		67	317
1938	220	59	32		65	376
1939	232	46	27		62	368
	Of spun rayon yarn (staple fiber)					
1939 2/	200	51	25		4/	270
	Total rayon fabrics					
1939	432	97	52		63	644

Quantity data in terms of meters are available only for broad-woven, all-rayon fabrics. ^{1/} The total estimated output of broad goods made of filament-rayon yarn averaged 641 million meters (701 million square yards) in 1933-37. Production which totaled 987 million meters (1,079 million square yards) in 1937 was then substantially equal to that of broad-woven fabrics wholly of silk. The Japanese output of all-filament rayon broad-woven goods in 1939 probably exceeded that of the United States by a slight margin and may be estimated at between 1.1 and 1.2 billion meters (between 1.2 and 1.3 billion yards). (See table 4.)

Table 4.- Japan: Production of broad-woven goods, wholly of filament-rayon yarn, 1931-39

Year	Quantity			Value		
	Crepes and Figured Fabrics	Other broad goods ^{2/}	Total broad goods ^{3/}	Crepes and Figured Fabrics	Other broad goods	Total broad goods
	(Millions of meters)			(Millions of yen)		
1931 -----	123	113	236	34	36	70
1932 -----	185	164	349	46	43	89
1933 -----	189	208	397	53	58	111
1934 -----	237	175	412	93	61	154
1935 -----	338	210	548	93	54	147
1936 -----	487	376	863	122	86	208
1937 -----	517	470	987	148	122	270
Average, 1933-37 -----	353	288	641	102	76	178
1938 -----	605	520	1,125	^{4/}	^{4/}	220
1939 -----	617	553	1,170	^{4/}	^{4/}	232

^{1/} Including unspecified amount of velvets (probably small).

^{2/} Quantity of "other" broad goods not separately reported. Estimated for 1931-37 by dividing an assumed unit value (equivalent to average for crepes and figured fabrics) into the value of "other." For 1938 and 1939 estimated on assumption - that "other fabrics" constituted 47 percent of the quantity of broad goods and crepes, etc., 53 percent.

^{3/} Partially estimated (see footnote 2).

^{4/} Not available.

Source: Compiled from Oriental Economist, 1938-39; Japan Silk Yearbook and despatches of the United States Commercial Attache at Tokyo.

^{1/} Broad-woven mixtures containing rayon and other fibers are not reported in quantity. Narrow, all-filament rayon fabrics are reported in pieces (tan) which, because of the variable width of the fabrics (ranging from 9 to 27 inches) cannot be satisfactorily converted to a square yardage basis.

Spun-rayon fabrics, the production of which was first reported in 1939, are predominantly of the broad-weave type and consist principally of shirtings, muslins, serges, tenjira cloth, drills, and jeans. The output of these fabrics, together with shirtings, flannels, poplins, and kokura cloth, amounted to 1,000 million meters (1,000 million square yards) valued at 150 million yen. The estimated quantity produced of other undesignated fabrics not reported in units of length probably averaged in that year 140 million meters (154 million square yards).^{1/} The aggregate output of broad-weave goods of spun rayon in 1939 is thus estimated to have been 560 million meters (614 square yards) valued at 200 million yen. (See table 5.)

Exports

Japan is the world's largest exporter of rayon fabrics. Since 1932, exports of rayon fabrics (of filament yarn) have exceeded silk fabrics in importance. In 1939 exports of filament-rayon fabrics were over twice as great as silk piece goods in value and over 4 times as great in quantity. Japan has also been developing an export trade in spun-rayon fabrics, which increased from 6 million yen in 1937 (the first year for which data are available) to 62 million yen in 1939.

Total Japanese exports to all countries of filament-rayon and spun-rayon fabrics combined, which amounted to 192 million yen in 1937, rose to 248 million yen in 1939.

Compared with the value of Japan's total export trade in woven textiles (cotton, rayon, silk, and wool), exports of rayon fabrics, both (filament and spun) constituted 20 percent in 1937, 26 percent in 1938, and 30 percent in 1939. Rayon fabric exports were exceeded only by cotton fabrics which account for more than half of the total value of the exports of Japan's weaving industries. (See table 6.)

^{1/} The output of other fabrics not reported by quantity have been computed on the basis of the average unit value of the 11 specified constructions divided into total value of the "other" fabrics.

Table 5.- Japan: Estimated total production ^{1/} of spun-rayon fabrics (made from staple fiber) classified by widths and types, 1939

Type of fabric	Quantity	Value
	Million meters	Million yen
Broad goods:		
Shirtings -----	112	33
Muslins -----	97	28
Serge -----	38	19
Tenjiku cloth -----	33	11
Drill -----	29	12
Jeans -----	24	8
Miscellaneous cloth for women's and children's apparel -----	23	10
Sheetings -----	17	5
Flannel -----	16	8
Poplin -----	16	7
Kekura cloth -----	15	9
Total specified -----	420	150
Other -----	^{2/} 140	50
Total broad goods -----	560	200
Narrow fabrics:		
Imitation nankeen -----	19	29
Drill -----	2	5
Other -----	^{2/} 9	17
Total narrow fabrics -----	30	51
Special materials:		
Towels and sheets -----	3	10
Blankets, shawls and rugs -----	3	9
Other -----	-	6
Total special materials -----	-	25
Grand total -----	-	276

^{1/} Estimated on basis of monthly production data available for February-December. January was interpolated on assumption production in that month was substantially same as in February.

^{2/} Quantity, not reported, has been estimated by dividing average unit value of total specified narrow fabrics into total value of "other".

Source: Data for 11 month period Feb.-Dec. 1939 compiled from U. S. Consular despatches.

Table 6.- Woven fabrics of cotton, rayon, silk, and wool: Japanese exports to Empire areas and all other countries, 1937-39

Kind of fabric :	To Empire areas ^{1/}			To foreign countries :			Total exports		
	1937 :	1938 :	1939 :	1937 :	1938 :	1939 :	1937 :	1938 :	1939 :
	Value (Million yen)								
Cotton -----	117 :	81 :	20 :	455 :	349 :	341 :	605 :	410 :	414 :
Rayon ^{2/} -----	52 :	116 :	3/135 :	135 :	85 :	4/118 :	192 :	301 :	238 :
Silk -----	14 :	12 :	55 :	59 :	44 :	50 :	33 :	56 :	91 :
Wool -----	29 :	41 :	5/ 52 :	34 :	24 :	6/ 22 :	63 :	67 :	74 :
Silk and cotton ^{7/} :	22 :	22 :	8/ :	- :	- :	- :	12 :	12 :	8/ :
Total -----	234 :	282 :	257 :	732 :	502 :	571 :	965 :	734 :	827 :
	Percent of total								
Cotton -----	50.1 :	28.7 :	7.7 :	66.7 :	64.8 :	61.1 :	62.7 :	54.9 :	50.0 :
Rayon ^{2/} -----	22.3 :	41.1 :	50.7 :	17.1 :	17.0 :	20.7 :	19.9 :	21.6 :	30.0 :
Silk -----	5.9 :	7.9 :	21.6 :	9.8 :	8.7 :	6.1 :	8.6 :	8.4 :	11.1 :
Wool -----	12.5 :	14.5 :	20.2 :	4.7 :	4.7 :	3.9 :	6.6 :	8.3 :	8.9 :
Silk and cotton ^{7/} :	9.2 :	7.8 :	- :	- :	- :	- :	2.2 :	2.8 :	- :
Total -----	100.0 :	100.0 :	100.0 :	100.0 :	100.0 :	100.0 :	100.0 :	100.0 :	100.0 :

^{1/} Korea, Kwantung, and Manchuria. Data for Formosa available separately only for wool fabrics.

^{2/} Including fabrics of filament-rayon yarn and spun rayon (made from staple fiber).

^{3/} For spun-rayon fabrics, includes Korea only as data for Manchuria and Kwantung were not separately reported.

^{4/} For spun-rayon fabrics includes Manchuria and Kwantung.

^{5/} Korea only as data for Manchuria, Kwantung, and Formosa were not separately reported.

^{6/} Includes Manchuria, Kwantung, and Formosa.

^{7/} Imports into Formosa from Japan not segregated as to silk fabrics and cotton fabrics.

^{8/} Not available.

Source: Compiled from annual and monthly foreign trade returns of Japan, Chosen (Korea), and Formosa.

Empire areas absorbed about 58 percent (on the basis of both quantity and value) of the total combined exports of filament-rayon and spun-rayon fabrics in 1938. About half of the exports of filament-rayon fabrics were to the Empire in contrast to 83 percent of the spun-rayon fabrics.

British India was the leading foreign market for filament-rayon fabrics until 1937. (See table 7.) Exports to India declined sharply thereafter, largely as a result of the expansion of rayon weaving in that country. The fall in exchange rates and the 25 percent increase in the Indian tariff on rayon textiles also contributed to the decline. Australia was the second largest market for filament-rayon fabrics. In January 1937 an agreement between Australia and Japan was concluded whereby Japanese rayon piece goods to Australia were placed on a quota basis.

The combined exports of filament-rayon fabrics to the major British-held areas, including British India, Australia, Union of South Africa, and New Zealand, but excluding Hong Kong, amounted to 35 percent of the average annual quantity and 40 percent of the annual average value of the Japanese exports in 1933-37.

Exports of spun-rayon fabrics were principally to Hong Kong and Finland in 1937 and 1938; Australia, British India, and Thailand (Siam) were the only other purchasers of importance. (See table 8.)

Since 1933, crepes have been the largest export item, averaging about 30 percent of the quantity and about 40 percent of the value of the total export trade in filament-rayon fabrics to all countries (except Korea) ^{1/} in 1933-37. Habutae ranked second, averaging slightly less than one-fourth of the quantity and one-fifth of the value in this period. Satins and figured goods, which were of almost equal importance, represented between 10 and 15 percent, respectively, of the total average export trade during these years. In 1939 only crepes exceeded in volume and value the average for 1933-37. (See table 9.)

^{1/} Korean imports from Japan are not segregated by types of warps.

Table 7.- Filament-rayon fabrics (including mixtures): Exports from Japan proper, to Empire areas and principal foreign markets, 1930-39

Year	Empire areas				Foreign countries							
	All countries	Korea	Kwantung	Manchuria	British India	Australia	Netherlands Indies	Philippine Islands	Hong Kong	Uruguay	Iraq	All other
1930	43,637	8,704	527	437	10,526	175	7,767	5,028	4,052	22	4/	8,599
1931	45,693	5,982	215	7	16,528	589	7,970	2,055	1,241	41	4/	10,265
1932	68,456	7,918	599	18	22,552	2,896	13,642	1,599	126	40	4/	19,066
Average, 1930-32	52,595	7,534	447	47	16,535	1,220	9,793	3,094	1,140	34	-	14,711
1933	89,609	12,230	2,371	591	17,651	9,333	14,970	907	437	925	4/	30,374
1934	129,591	15,907	7,532	736	22,432	16,937	13,068	1,996	930	3,088	2,583	43,632
1935	150,232	21,972	11,158	825	22,455	22,306	12,684	4,951	4,239	3,909	4,180	41,577
1936	174,902	25,734	21,694	862	26,221	18,415	11,533	8,074	7,509	5,107	3,923	45,352
1937	183,745	28,885	15,612	2,574	32,466	16,967	11,490	5,500	7,673	3,663	5,906	53,359
Average, 1933-37	145,577	20,946	11,553	1,106	24,263	16,692	12,769	4,410	4,158	3,458	3,314	44,848
1938	151,178	45,416	20,241	1,027	14,527	17,303	7,202	2,086	4,150	1,217	2,261	34,634
1939	186,405	49,027	25,304	2,495	19,581	18,375	9,410	692	4,595	684	4/	37,728
1935	503,303	79,110	26,544	1,822	75,142	65,801	49,987	13,740	12,893	17,534	15,203	140,550
1936	621,905	94,358	56,930	2,439	92,081	58,091	51,555	35,443	26,987	23,348	16,191	165,091
1937	596,650	113,721	39,334	7,166	94,894	42,344	66,780	25,303	27,253	13,466	22,126	166,481
Average, 1935-37	574,666	95,729	40,635	3,733	87,359	55,402	49,441	29,689	22,378	16,116	17,830	157,374
1938	516,943	173,821	49,553	4,401	34,448	40,657	26,688	10,610	8,704	4,707	8,663	107,691
1939	408,779	98,828	32,012	3,376	49,843	44,038	32,051	2,541	9,323	2,546	4/	104,239

1/ Exclusive of spun-rayon fabric (staple-fiber fabrics) in 1937-39.
 2/ Includes Ceylon prior to 1934, and Burma prior to 1936.
 3/ Not separately classified prior to 1930.
 4/ Not shown separately.
 5/ Quantity not available prior to 1935.

Source: Compiled from annual and monthly returns of foreign trade of Japan and Korea.

Table 5.- Japan-rayon fabrics (staple fiber): Exports from Japan proper to Empire areas and principal foreign markets, 1937-39

Year	Empire areas				Foreign countries						
	Korea	Kwantung	Manchuria	Hong Kong	Finland	Australia	Malaya	Thailand	All other	(by subtraction)	
	Value (1,000 yen)										
1937	1,456	2,748	935	530	510	349	756	219	1,505		
1938	12,035	8,722	11,432	445	300	190	87	136	5,408		
1939	32,622										
	Quantity (1,000 square yards)										
1937	4,259	6,213	2,039	1,490	1,539	770	633	612	3,434		
1938	30,404	19,407	25,422	1,189	942	590	211	457	12,429		
1939	58,097										

1/ Not available prior to 1937.

2/ Not reported.

Source: Compiled from annual and monthly returns of the foreign trade of Japan and Korea.

Table 9.- Japan: Exports of filament-rayon fabrics (including mixtures), classified by types, 1930-39

Year	To areas except Korea								To Korea ^{4/}	Total (to all areas) ^{3/}
	Crepes and Kabouri	Habutae ^{1/}	Figured goods	Satins	Voiles	Taffetas and poplins	All other fabrics ^{2/}	Grand total ^{3/}		
	Quantity (million square yards--partially estimated)									
1930 ^{5/}	3	5	6/	11	6/	11	57	87	6/	86
1931	4	45	6/	18	6/	14	62	143	6/	143
1932	10	89	6/	32	6/	24	93	248	6/	248
Average, 1930-32	6	46	-	20	-	16	71	159	-	159
1933	37	68	6/	44	6/	20	78	247	6/	247
1934	91	51	50	59	49	6	48	354	6/	354
1935	124	80	76	64	42	10	28	424	79	503
1936	186	143	66	56	30	9	37	527	94	621
1937	177	124	45	47	27	4	41	485	114	599
Average, 1933-37	127	93	47	54	30	10	46	407	57	464
1938	147	64	55	21	16	2	32	337	180	517
1939	130	69	42	23	17	3	26	310	99	409
	Value (million yen)									
1930 ^{5/}	1	2	6/	4	6/	5	23	35	9	44
1931	2	11	6/	6	6/	4	17	40	6	46
1932	4	19	6/	9	6/	6	22	60	8	68
Average, 1930-32	2	11	-	6	-	5	21	45	8	53
1933	19	16	6/	13	6/	6	23	77	12	89
1934	41	13	16	17	11	2	13	113	16	129
1935	51	19	22	16	8	3	9	128	22	150
1936	67	32	19	13	5	2	11	149	26	175
1937	75	31	15	14	5	1	14	155	29	184
Average, 1933-37	51	22	14	15	6	3	14	125	21	146
1938	57	16	21	7	3	1	11	116	45	161
1939	64	21	26	8	4	1	13	137	49	186

^{1/} Quantity for years 1930-34, estimated from data reported by weight, assuming 8 sq. yds. per kin or 6.047 sq. yds. per pound.

^{2/} Includes checked and striped weaves, twills, nashiji weaves, and other goods. Quantity units not reported before 1935 have been estimated for 1930-34 on basis of average annual unit values of principal specified fabrics.

^{3/} Partially estimated for years 1930-34.

^{4/} Not classified by types for Korea.

^{5/} Not reported separately before 1930.

^{6/} Not separately reported.

Sources: Compiled from annual and monthly returns of the foreign trade of Japan and Korea, except for estimates as noted.

Consumption

The consumption of broad-woven, pure filament-rayon fabrics in Japan amounted to about one-third of the total quantity estimated to have been available annually in 1933-37. It thereafter increased to about two-thirds of the total in 1939. On the value basis, however, the domestic consumption in both periods was less than 20 percent of the total supply, thus indicating the lower quality of the goods for home use.

Consumption of broad-woven, all-spun rayon fabrics in 1939 (the only year for which production data are available for his estimation) probably amounted to over 40 percent of the total supply on a quantity basis, and about 70 percent on a value basis. Of the total combined supply of broad-woven fabrics, both filament and spun rayon, which in 1939 is estimated to have amounted to nearly 1.9 billion yards, probably close to three-fourths were consumed by the Japanese people.

The aggregate consumption in 1939 of all types of filament and spun-rayon fabric, including wide and narrow, pure and mixed, may be estimated at approximately 400 million yen, or over 90 percent of the value of the total supply. (See table 10.)

Table 10.- Comparison of production, exports, and apparent consumption, in Japan proper, of filament rayon fabrics, spun-rayon fabrics and total rayon fabrics, 1939

Type of fabric	Production	Exports	apparent consumption	Ratio of exports to supply	ratio of consumption to supply
	Quantity (Million square yards)			Percent	Percent
Broad-woven (pure):					
Filament-rayon	1/ 1,280	2/ 407	873	34.0	68.0
Spun-rayon	1/ 612	2/ 107	505	17.5	33.5
Total, broad goods:	1,892	514	1,378	27.3	71.7
	Value (Million yen)				
Broad-woven (pure):					
Filament-rayon	3/ 232	186	59	80.2	72.8
Spun-rayon	3/ 200	52	148	26.0	79.9
Total, broad goods:	432	238	187	55.7	76.6
	Value (Million yen) 4/				
Total, all widths including specialties and mixtures:					
Filament-rayon	1/ 463	186	277	60.5	61.5
Spun-rayon	2/ 276	67	209	23.5	76.5
Grand total	739	253	486	34.0	66.0

1/ Partly estimated. Converted from metric as given in table 1 and 2 on basis of 1.0936 yards per meter. Broad fabrics assumed to average 36 inches in width.

2/ Exports assumed to be almost entirely fabrics of pure rayon (family 4) in broad widths.

3/ Partly estimated.

4/ Only value can be shown as the total production of all widths specialties is not available in comparable units of quantity.

Source: Adapted from data in Tables 4 and 5.