RESTRICTED

CIVIL AFFAIRS HANDBOOK

Taiwan (Formosa) — Economic Supplement

OPNAV 50E-13

OFFICE OF THE CHIEF OF NAVAL OPERATIONS

NAVY DEPARTMENT

1 JUNE 1944

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3. Unclassified. OPNAV 50E–3 (FM 27–5). United States Army and Navy *Manual of Military Government and Civil Affairs.* 22 December 1943.

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CIVIL AFFAIRS HANDBOOK

Taiwan (Formosa) — Economic Supplement

OPNAV 50E-13

Prepared by
Far Eastern Unit
Bureau of Foreign and Domestic Commerce
Department of Commerce
for
Occupied Areas Section
Chief of Naval Operations

OFFICE OF THE CHIEF OF NAVAL OPERATIONS
NAVY DEPARTMENT
1 JUNE 1944

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LETTER OF PROMULGATION

Office of the Chief of Naval Operations,
Navy Department.

Washington 25, D. C.
1 June 1944

CIVIL AFFAIRS HANDBOOK
TAIWAN (Formosa)—Economic Supplement

OPNAV 50E–13

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Vice Admiral, U. S. Navy,
Vice Chief of Naval Operations.

PREFACE

In this review of the economy of Taiwan (Formosa), agriculture, power projects, mining, finance, industry, and transportation are reviewed, with special attention to Taiwan's geography and strategic position, its foreign trade, and its economic structure. Occupation and immediate postwar problems of population, markets for rice and sugar, health problems, and industrialization are most clearly evident from a survey of the economic conditions existing prior to the outbreak of war, together with the changes which war has brought.

An attempt has been made to include recent developments, insofar as they have been reported in broadcasts, have appeared in Japanese publications, or have become known through other sources. Evaluation of some of these is tentative, however, particularly where information has been fragmentary. Consular reports from the files of the Far Eastern Unit, Bureau of Foreign and Domestic Commerce, have furnished the bulk of information with regard to specific phases of the economy. Publications of the Government-General of Taiwan (Formosa), and of the Imperial Japanese Government, have been consulted, and special books such as the *Sugar Yearbook* (in Japanese) have been useful. Additional information has been obtained from reports prepared in the Far Eastern Unit and in other Government agencies, publications of private agencies such as the Institute of Pacific Relations, and the research unit of the Chief of Naval Operations, Occupied Areas Section.

References to specific sources are included at appropriate points throughout the text. Maps have been included to facilitate location of towns, transport facilities, and geographical features. Romanization of names of places in Taiwan has varied considerably; that utilized in the present text and map is the accepted Hepburn Romanization (Romaji) of the Japanese names. The glossary in the appendix indicates the Romazi spelling, a new style adopted officially by the Japanese in 1937, and differing only in certain syllables from Romaji. Other common names for places, and locations of places not included on the map, are also listed.

Frontispiece. Formosan-Chinese boy astride a water-buffalo in the paddy fields.

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FOREWORD

Taiwan's primary use in Japan's southward expansion was as a base for naval and air communications, and for the concentration of military power. Its effectiveness in this role has been strengthened during the war by extension of transport facilities, improvement of harbors, building of airfields, and expansion of industries to supply additional materials for its own defense.

ECONOMY BASED ON RICE AND SUGAR. Rice and sugar account for over half of the total value of production on Taiwan, and constitute over 70 percent of the value of all exports. In the past most of the sugar has been exported to Japan, but a little sugar and half of the rice crop are consumed locally. Sweet potatoes are also a staple foodstuff, and, like sugar, are a source of industrial alcohol. Bananas and other fruits are of some importance, while Formosan tea and camphor are well-known in world markets. Pork is the chief meat consumed, with an annual slaughter of over 1,000,000 hogs in normal years.

Self-sufficiency of the island in basic foodstuffs for its six million people is apparent. Small farms of 1 to 3 acres are cultivated by the Formosan-Chinese (who form over 90 percent of the population) with crude plows and harrows drawn by water buffaloes. Over a third of them are tenant farmers, while another third, owning some land, are forced to increase the size of their farms by leasing additional land. A few work on the plantations of the sugar companies, but most sugar cane is produced by small farmers under contract to these companies.

Concentration of control of industries is in contrast to these small farms, with their primitive methods. Almost all sugar and alcohol, constituting half of the value of industrial production, is the product of 51 modern mills, of which 47 were owned in 1940 by five large Japanese companies. Most of the mining is done by several large Japanese companies. Electric power is nearly all furnished by two semi-official companies. Other industrial plants recently established on the island are owned by subsidiaries of Japan's large family concerns, such as Mitsui and Mitsubishi.

OPERATIONS OF THE GOVERNMENT-GENERAL. Investments and operations of the Government-General are also large, including the main railways, communications, operations in the chief forest areas, and the designated monopolies of alcoholic beverages, tobacco, camphor, salt, and opium. Chiefly because of revenue from these, the Government-General has had no financial difficulty, dispensing with a Tokyo subsidy as early as 1905. Control exercised by the Government-General extends far beyond its own investments, even to the management of activities and policies of private industry and agriculture.

Both public and private investments will present, in any period of occupation and in the postwar settlement, problems of management and operation, of transfer of ownership, and of control. The problem of personnel and efficient management will be in the forefront especially for such essential facilities as railways, where even operating personnel have been Japanese. The extensive government investments will pose special problems. Other difficulties are created, furthermore, by the joint ownership of companies by the Government-General and by private Japanese concerns. Form and agency of control—whether by Government, small concerns, a monopoly company, or other means—is important particularly from the viewpoint of the Formosan-Chinese, who now receive few benefits from investments which are profitable to the Japanese.

Somewhat over 300,000 Japanese (including all family members) on the island have been entrepreneurs, managers, and skilled workmen for these and other industrial establishments. If they return to Japan in the postwar period, the island will be left with a shortage of technical skills. Further more, about 150,000 aborigines present a special administrative problem in the government.

INDUSTRIALIZATION. Beginning about 1937, Japan accelerated industrialization, chiefly for establishment of wartime aluminum, chemical, iron, and other plants. Prerequisite was completion of electric power plants utilizing water power, Taiwan's most important non-agricultural natural resource. The Jitsugetsutan power plants were completed in 1934 and 1937. Other power plants have now been completed to bring installed power capacity of the island to about 350,000 to 400,000 kilowatts.

Difficulties are encountered in industrialization because of the paucity of natural resources (coal deposits are the largest mineral resource, and some gold, copper, and petroleum are found); because of shortage of labor, particularly skilled labor; and because capital, except for the accumulations of the sugar and some other companies, is also scarce. Transport facilities are not fully adequate, because of the obvious lack of connections to the east coast, and more important, because light rails, grades and curves, and small freight cars limit traffic on main-line west-coast railroads. Even on the west coast the few main roads are generally of gravel. Secondary roads are often in poor condition and without bridges. During the war important and extensive additions probably have been made to road facilities, and conditions are no doubt much improved.

TRADE PROBLEMS. Taiwan has had a large per capita trade. Half of the total gross value of production on the island has been exported in the past. On the other hand, textiles, textile raw materials, petroleum, metals,

vehicles, machinery, fertilizer, cement, and other products have been imported and, without further industrialization, must continue to be brought in. To pay for these Taiwan can continue to export sugar and rice, with lesser quantities of fruits, camphor, tea, and some other products. Java's lower costs may mean competition for Taiwan's sugar exports, unless China replaces Japan as a market, free of duty, for 1,000,000 tons of sugar a year. Problems of the legal framework, tariff, and other trade legislation under which Taiwan will operate are part of the larger problem of the new commercial relationships of China.

Essential relief and rehabilitation requirements on Taiwan may be relatively small, provided production is not too seriously disrupted through the period of hostilities. Most important immediately, probably, will be measures for improvement of public health and sanitary conditions. In the longer view, such measures, together with education, will be continuing requisites for development of Taiwan's economy.

I.

INTRODUCTION: DEVELOPMENT OF TAIWAN'S ECONOMY

Taiwan's annexation to Japan in 1895 was followed by a period of pacification of the island, establishment of a new administration, and the beginning of economic activities which laid foundations for the island's development under Japanese control. China had been forced to cede Taiwan to Japan by the Treaty of Shimonoseki, but transfer of authority was not effected on the island at the time. The people of Taiwan were in revolt, and a "republic"—short-lived, however—had been proclaimed. The Japanese themselves officially acknowledge that seven years were needed to suppress resistance before satisfactory civil control could be assured.

Establishment of the Government-General included economic developments designed to provide a basis for economic progress. The island's economy had been quite primitive before its annexation to Japan. Difficulties of inefficient administration combined with lawlessness to prevent realization of the possibilities of its agricultural resources, which are good in comparison with many other areas in the Far East.

During the first few years of its control, therefore, Japan made investments in the island, and developed facilities necessary for increased productivity. Railways were essential, but prior to Japan's acquisition of the island there was only a light railway from Keelung to Shinchiku. The trunk line from Keelung to Takao was completed in 1908; other extensions were added thereafter. Roads, prior to 1895, had been built chiefly by wealthy individuals on the island to serve their own community interests. These were increased from 6,734 kilometers (4,200 miles) in 1899 to 11,543 kilometers (7,200 miles) by 1909. Postal and other communication facilities were established by the Government-General, as were a number of small electric power plants, the first being a steam power plant built at Taihoku in 1903.

Such developments required investments in Taiwan, and the finances of the island also required assistance. Until 1904 it received subsidies from the Tokyo Government. Partly because of this financial need, and partly because of the social problem involved, the Government monopolies of opium (1897) and of salt and camphor (1899) were established. To provide for a system of currency on the island, and to finance development of its resources, the Bank of Taiwan was established in 1899.

With these facilities, a basis was laid for expansion of agricultural production and trade. Exports exceeded imports in 1909, and have done so ever since, exports constituting nearly one-half of the total value of production on the island. Agricultural experiment increased crop yields per acre. The sugar industry was developed, modern mills replacing the primitive mills to establish Taiwan as Japan's chief source of sugar. In 1902 there was only one modern sugar mill; before 1930 there were 45 such mills, and sugar production had reached 800,000 short tons per year. Dissatisfied with the yield and quality of Taiwan rice, the Japanese introduced a new kind of rice (*horai* rice) after 1922, which was acceptable to Japanese consumers and which had a higher yield per acre. By 1935 *horai* rice constituted half of Taiwan's rice crop. The Japanese also introduced pineapple canning, and developed the industry so that the island became the world's third producer of pineapples, after Hawaii and Malaya.

Although most of the rice of the island is still produced on the small farms of Formosan-Chinese peasants, large Japanese interests have come to dominate the rest of the economy. Five large Japanese companies produce 95 percent of the sugar; the Taiwan Electric Power Company produces all but one or two percent of the electric power; Mitsui Gomei Kaisha has large tea plantations and tea factories; and the Taiwan Mining Company is important in copper, gold, and oil. Additionally, the Government-General operates the transportation and communication facilities, and the monopolies (alcoholic beverages, tobacco, salt, camphor, and opium), and exercises a control which pervades the entire economy.

The Japanese had not been unmindful of the value of Taiwan as a base for southward expansion, for as early as 1897 they had referred to it as "*Tonan no seki*," or "the stone aiming at the south." Their preoccupation with the Russo-Japanese war, their participation in the First World War on the side of the Allies, the earthquake of 1923, and the financial crisis of 1927 were factors contributing to postponement of this development. Beginning about 1930 attention was given both to the use of Taiwan as a base for southward expansion and to partial industrialization of the island. Materials were drawn from the "southern regions" (as the Japanese referred to them) and exports were sent to Southeast Asia, the Netherlands Indies, and the other territories in that area. Thus the faculties of Taihoku Imperial University, established in 1928, made particular study of problems in those regions; the Kanan Bank in Taiwan made loans to Japanese entrepreneurs in those areas; and trade with them increased.

Power plants and additional port and transportation facilities were necessary for establishment of industrial plants in Taiwan. The Jitsugetsutan power plants, for which plans had been made for some time and preliminary work begun, were carried forward after obtaining a loan in the United States in 1931. The first plant was completed in 1934 and the second in 1937. The natural

harbors of Keelung and Takao were developed with artificial basins and breakwaters, and plans were made for other (artificial) harbors at Karenko and Gosei.

In 1936-37 this industrialization and expansion into the "southern regions" was accelerated. The Taiwan Development Company, which was established in 1936, numbers among its subsidiaries companies operating in those areas. The Bank of Taiwan offered liberal financial support to Japanese interests in South China and the South Seas. Within the island, metal, fertilizer, pulp, alcohol, and other plants were established, of which the most important are the aluminum plants of the Japan Aluminum Company.

These industrial developments, particularly in strategic areas, have no doubt been carried forward during the war. The industrial program at Takao, especially, which was in the "paddy-field stage" in 1939, is being carried through. Roads and ports in strategic areas also may be expected to have been improved and military installations, of course, also enlarged.

Taiwan's own resources are not adequate for heavy industrialization (mineral deposits, for example, are not extensive), but the island is self-sufficient in basic foodstuffs. Although density of population is high, the area produces a substantial surplus of rice, sugar, and other foodstuffs for export. The industrial plants, being wartime concerns established for Japanese purposes, are not in general essential to life on the island, and their possible destruction during hostilities would not create serious problems. Thus Taiwan's economic problems may be those of personnel supply, export markets, and the supply of certain essential imports—such as textiles and fertilizers—and problems of economic ownership and control.

II.

ECONOMIC CONTROL AND OWNERSHIP

1. GENERAL. Sizable investments of the (Japanese) Government-General and of a few large Japanese companies dominate the main branches of Taiwan's economy. Landholdings of five Japanese sugar companies, equaling ten percent of all arable land, contrast with the 1-acre to 3-acre farms of 3,000,000 or more Formosan-Chinese, many of whom are tenant farmers. In commerce also, agencies of Mitsui, Mitsubishi (Iwasaki), and others of the large family concerns which dominate Japan's economic life handle a large volume of trade, although Formosan-Chinese capital represents a higher percentage of the total in this field than in any other. It is in industry and mining that private Japanese investment is highest, being probably well over 90 percent of the total. Government investments are monopolies in many fields such as transportation and communications, and the designated monopolies of opium, camphor, salt, tobacco, and alcoholic beverages. Government control of the economy extends much further than ownership, so that (to quote a report of 1935) "The economic life of the island is largely controlled by the Taiwan Government-General, which is permitted a great degree of latitude by the Japanese central government, so long as its policies are integrated with those established for the entire Empire."

2. FARM POPULATION AND OWNERSHIP. Land ownership presents a great contrast in economic control. Complete statistics for size of landholdings are not available for recent years, but 1930 figures indicated that over 60 percent of the landowners possessed less than 2½ acres each. On the other hand, about 6 percent of them held about half of the total cultivated area (nearly 900,000 acres for about 23,000 landowners, or an average of 37 acres each). (See Table 36.) In 1940 it was reported that the Taiwan Sugar Manufacturing Company alone owned over 100,000 acres of land, and the other four large sugar companies together owned roughly another 100,000 acres.

For this reason, and because of the sizable number of tenant farmers, it is not very meaningful to speak of an "average-sized" farm in Taiwan. Statistics of 1938 indicated that the average of arable land per farm household was approximately 5 acres, or about twice as much as cultivated by the average farm household in Japan Proper. The typical farm must have been much smaller because of the large landholdings of the sugar companies and of a few landlords. Figures for 1930 indicated that more than half of the farmers tilled less than 2.4 acres, and that more than three-fourths of them tilled less than 4.8 acres. (See Table 37.) Of the total farm population, reported to be 2,896,387 persons, 1,068,978 were tenants, 955,577 were owner-tenants (owning some land and leasing some), and only 871,842 owned all the land they cultivated. (*Taiwan's Arable Land, Land Values, Farm Population, and Agricultural Production in 1938*, Gerald Warner, American Consul, Taihoku, January 24, 1940.) Owner-farmers thus constituted 30.68 percent of the total, tenant farmers 37.38 percent, and owner-tenants, 31.94 percent. Thus more than one-third of the farmers were tenants and another 30 percent did not own sufficient land to live on, being forced to rent some land. Even so, of course, proportion of landowners was higher than in other outlying parts of the Japanese Empire, comparing fairly well with Japan Proper, and the proportion was relatively constant in the preceding decade, at about 29-31 percent. In Korea in 1938 only one farmer in five owned all the land he cultivated, with some shift evident to the tenant class. Over half of the Korean farmers were tenants, and another 30 percent owner-tenants.

Smallness of Formosan-Chinese landholdings is also indicated by the extent to which these farmers are concentrated in Tainan and Taichu Provinces, and by the fact that farm owners are relatively much more numerous in those provinces. In those two provinces are over half of the farm households, and an even higher percentage of the farm owners. Tainan Province is a sugar-producing area, and sugar land is usually planted by small owner-farmers, or by the companies themselves with hired labor.

Table 1. Farm Population in Taiwan.
December 31, 1938

Province	Owners	Owner-Tenants	Tenants	Total
HOUSEHOLDS				
Taihoku	13,764	14,564	18,230	46,558
Shinchiku	10,942	12,575	26,794	50,311
Taichu	27,655	29,765	44,605	102,025
Tainan	46,123	49,840	33,682	129,645
Takao	16,689	24,568	29,811	71,068
Taito	3,718	1,162	2,102	6,982
Karenko	4,322	2,330	3,434	10,086
Pescadores	7,017	816	17	7,850
Totals	130,230	135,620	158,675	424,525
INDIVIDUALS				
Taihoku	94,720	116,202	134,184	345,106
Shinchiku	87,420	108,179	214,889	410,488
Taichu	194,156	213,155	300,405	707,716
Tainan	297,691	332,439	208,501	838,631
Takao	102,701	158,546	180,063	441,310
Taito	28,394	9,900	12,438	50,732
Karenko	29,454	12,765	18,384	60,603
Pescadores	37,306	4,391	114	41,811
Totals	871,842	955,577	1,068,978	2,896,397

Source: *Taiwan's Arable Land, Land Values, Farm Population, and Agricultural Production in 1938*, Gerald Warner, American consul, Taihoku, January 24, 1940.

3. COMMERCE. Although less so than in other fields, Japanese investments are also important in commerce. Active in import and export of most commodities are *Mitsui Bussan Kaisha* and *Mitsubishi Shoji Kaisha*, with agencies also being maintained by *Asano Bussan Kaisha* and *Okura & Co. Mitsui Bussan Kaisha* was the first to open an agency in Taiwan after its annexation to Japan. It is active in the export of rice, tea, camphor, coal, and lumber, and in the import of bean-oil cake, ammonium sulphate, machinery, etc., and deals in gunny bags, cement, and other commodities.

The following table indicates the percentages of Japanese investment in various phases of Taiwan's economy. The weighted average was 78.4 percent.

Table 2. Japanese Investments in Taiwan, 1929.

Category of Enterprise	*Percentage of Japanese Investment to Total*
Industry	90.7
Mining	71.6
Fishing	65.1
Communications	55.1
Agriculture	47.2
Commerce	44.5

Source: K. Takahashi, *Gendai Taiwan Keizairon*, 1937, p. 436.

Small trading companies, for example rice merchants, are frequently Formosan-Chinese, and these perhaps account for the lower percentage of Japanese investment in commerce.

4. JAPANESE ECONOMIC CONTROL OF INDUSTRY AND MINING. Japanese investments in industry and mining are more extensive than in agriculture and commerce. In the sugar industry predominance of five Japanese corporations is particularly striking. Sugar companies, moreover, extend their activities into many other fields including alcohol production, railways, pulp production, and others. The electric power industry is dominated by two semi-official Japanese corporations. In mining, where corporate capital was reported to be 44,000,000 yen in 1939, 30,000,000 yen represented capital of the Taiwan Mining Company, subsidiary of the Japan Mining Company (Nissan interests), and another 7,000,000 yen represented capital of the Keelung Coal Mining Company, a Mitsui subsidiary. The following table, although not showing division between Japanese and Formosan-Chinese interests, indicates the volume of private corporate capital in Taiwan in 1939.

Table 3. Private Corporate Capital in Taiwan, 1939.

(in 000's of yen)

Industry (chiefly sugar companies)	191,536
Trade	64,056
Mining	43,995
Agriculture	43,627
Communications	10,976
Marine Products and Fisheries	2,994
Total	357,184

Source: *Dainippon teikoku nenkan*, 1939.

Examination of the paid-up capitalization of the chief companies indicates that capitalization of the sugar industry was nearly 170,000,000 yen in that year (not including substantial reserves, and eliminating the Dai Nippon Sugar Manufacturing Company which has its head office in Japan Proper). Total capital of Japanese companies was at least 320,000,000 yen.

It was not possible to secure figures for all of the Japanese companies in Taiwan, but the major ones are included. East Taiwan Electric Power Co. was not included because it was established in late 1939. From 1929 to 1939 the Japanese increased their percentage of ownership by establishment of a number of large companies in a partial industrialization of the island. A list of the chief Japanese companies, with their capitalization, is given in Table 38.

This indicates an increase of the Japanese share to more than 90 percent of the total. While proprietorships and partnerships (which would be to a greater extent Formosan-Chinese) are not included, it is not unreasonable that Japanese investments during the decade from 1929 to 1939 increased from 78 percent to 90 percent of the total. In Korea in 1938 the share of Korean capital in the total there was only 11 percent.

5. JAPANESE INVESTMENTS IN TAIWAN. Besides the private Japanese capital in Taiwan, the public debt and most industrial bonds (which are held in Japan), must be considered, together with the investments of the Government-General. No official figures have been given for the latter, but from 1899 to 1937 a total of 163,159,262 yen was expended for construction, improvements, and repairs to the railroads. (*Railway, Bus, Truck, and Pushcar Transportation in Taiwan in the Fiscal Year 1937*, Gerald Warner, American Consul, Taihoku, April 26, 1939.) To this must be added investments in the monopolies and communications, so that perhaps 250,000,000 yen to 275,000,000 yen may represent present invested capital. Imperial Household investments in Taiwan include 40,000 shares in the Taiwan Sugar Manufacturing Company and (as of 1929) 7,566 shares (about 750,000 yen) in The Bank of Taiwan. Such investments complicate ownership problems in Taiwan. It is difficult to draw a line between public and private investments because many companies have been established with capital supplied by the Government-General, the large Japanese concerns, and other interests.

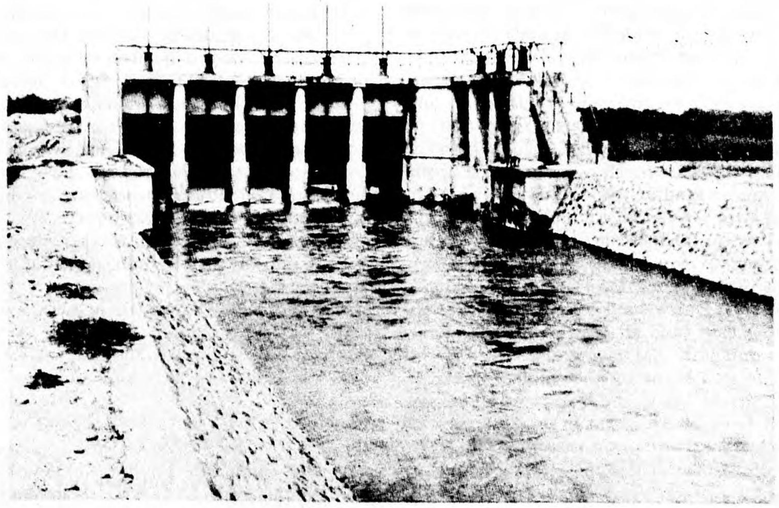
Table 4. Japanese Investments in Taiwan, 1939.

(in yen)

Industrial investments	325,000,000
Public debt of Taiwan	125,000,000
Industrial bonds	80,000,000
Government enterprises	250,000,000
Total	780,000,000

Japanese investments in Taiwan before the outbreak of war may thus be estimated very tentatively at more than three-quarters of a billion yen. There was a debit balance (import balance) in trade with Japan only during the first 13 years of Japanese administration of the island. The total of the net debit (import) balances during these years was only slightly over 30,000,000 yen. Since that time Japan has been able to build up its large investments in Taiwan in spite of the fact that

南北幹線導水路　　嘉南大圳



桃園圳　　幹線一號ホイサ取入口

Illus. 1. Irrigation ditch in the Kanan system, and sluice-gates in the Toen irrigation system.

the island exported much more to Japan than it imported from Japan. It is an example of a colony which has paid handsomely, and Japan has been able to build up its investments there through reinvestment of surpluses. Rates of profit of the great Japanese corporations have been about 30 percent, whereas their dividends have been only about 10 percent.

6. ECONOMIC CONTROL BY THE GOVERNMENT-GENERAL. Economic control by the Government-General extends far beyond its investments in the monopolies and transportation and communication facilities. It has endeavored to develop the agricultural economy to supplement Japan's own economy. Particular efforts were made until recently to increase production of sugar and rice, but in recent years emphasis was shifted somewhat to agricultural diversification and crops of special wartime importance.

Irrigation facilities present one aspect of Japanese control over agriculture. Although sometimes inadequate in the dry season, and damaged when in the rainy seasons the rivers flow in torrents to the sea, establishment and maintenance of such facilities have been a prime concern of the Government. At present the majority of the wet fields are under a system of artificial irrigation, but some still depend upon the weather. In 1937 it was reported that irrigation was provided for 142,500 *ko* (342,000 acres) by government irrigation works; for 259,000 *ko* (621,600 acres) by irrigation works constructed by irrigation associations; and for 132,000 *ko* (316,800 acres) by private ditches. The reservoir of Kanan, south of Kagi, about halfway between *Kag*i and Tai*nan* (hence its name), may be cited as an example of this work. This Kanan reservoir is among the largest in the world, with a capacity estimated at 5,500,000,000 cubic feet. It was completed in 1930 after 11 years, at a cost of 54,000,000 yen, of which half was obtained from the Government. It supplies more than 350,000 acres of land with water. (Shiroshi Nasu, *Aspects of Japanese Agriculture*, and *Present Day Nippon*, 1931. See also *Irrigation in Taiwan*, Gerald Warner, American Consul, Taihoku, September 21, 1938.) In its district (constituting about one-sixth of the arable land of the island) a three-year crop rotation system (rice, sugar cane, and mixed crops) was instituted, and competition for land between rice and sugar cane was controlled through regulation of the distribution of water for irrigation.

The policy of taxing rice land more than twice as heavily as upland fields (and all land planted to sugar was classified as upland fields) meant that most of the burden of taxation was borne by the small Formosan-Chinese farmers, or shifted to the tenant farmers. In this connection it is of interest that over 60 percent of the paddy fields were cultivated by tenants in 1939, in contrast to only 48 percent of the upland fields. (Nasu, *Aspects of Japanese Agriculture.*)

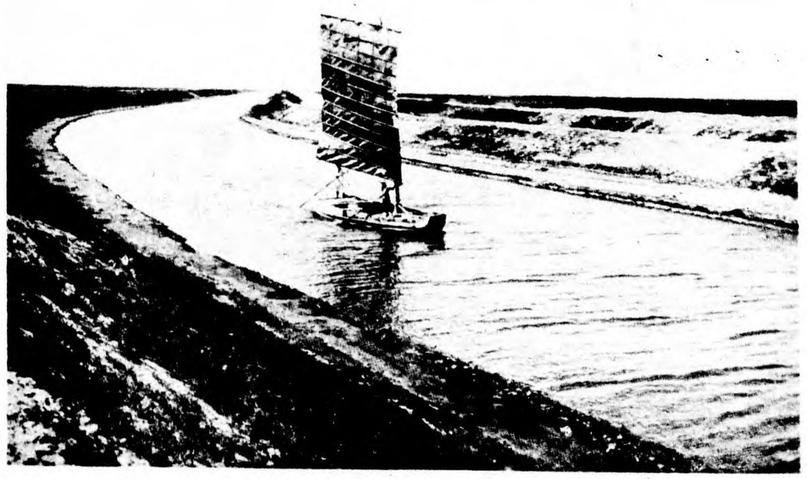
A third Japanese control over agriculture lay in the control of price policies. As noted, the sugar companies contracted with the farmers for sugar cane at prices as low as possible without driving the farmers to turn to rice or some other crop. Sugar cane could not easily be sold elsewhere by the farmers, for they had no means of transportation except small junks, and even if they had, sugar cane spoils too easily for this to be very practicable. With rice, on the other hand, the possibility of smuggling to China was a very definite limitation upon the level to which prices could be forced down. The establishment of the Japan Rice Company in 1939 strengthened the Government's control over this commodity.

Control of the Government over industry and the Japanese companies is no less extensive than over agriculture. Government encouragement and assistance led to amalgamation of the pineapple canning concerns; the Government assigned areas to the large sugar companies; control over the tea industry was exercised through the tea inspection office. Sugar companies awaited the Government's permission before declaring extra dividends—emphasizing the fact that the control exercised is not mere regulatory supervision of prices and quality, but more extensive direct financial control, appointment of officials, and partial management by the Government of quasi-private monopolies.

7. FOREIGN INVESTMENTS IN TAIWAN. Investments by any other country than Japan were negligible before the war. Two American firms had offices there for the purchase and export of tea. The Standard-Vacuum Oil Company maintained a branch in Taihoku. There was also, of course, the loan of $22,800,000 in connection with the Jitsugetsutan power project. The only foreign interest in mining was *Tokki Gomei Kaisha*, a fairly large sulphur producer, owned by a British national. In 1941 he was forced to transfer his property to Japanese interests. It is thus evident that Japan has kept foreign investments out of Taiwan even more completely than in the case of Korea. In the latter colony a number of mines, among them the large Unsan and Taiyudo gold mines, were foreign-owned, and the Corn Products Refining Company was a fairly important American investment. The island of Taiwan does not have sufficient natural resources to be a very attractive field for foreign investments, except for agricultural processing companies; while the position of the Japanese sugar companies and Government control have been further deterrents. A sugar export market may be difficult to maintain in the postwar period in view of lower costs in such areas as Java, although if Taiwan is within the Chinese customs tariff, this may offset Java's advantage. The problem of the sugar mills and their control is of central importance to Taiwan's economy.

8. OWNERSHIP PROBLEMS. Extensive investments in Taiwan by the Japanese Government-General and by Japanese companies present difficult problems of ownership in the postwar period. Numerous cases in which capital for a company has been supplied jointly by the Government-General and by private interests present an additional complication, both for forces of occupation which may desire to use such property, and for

日出道隧頭山烏　　圳大南嘉



路水排溪水鹽　　圳大南嘉

Illus. 2. Uzanto duct through which water flows into the Kanan irrigation reservoir; and embankments confining the tidal salt waters in the lower reaches of the Kanan irrigation system.

transfer of such properties. Replacement of Japanese managers and technicians will be an additional problem, while the form of control over these investments will be of special interest to Formosan-Chinese businessmen, for benefits to them may be small, should such a transfer merely perpetuate a monopolistic control by non-Formosans.

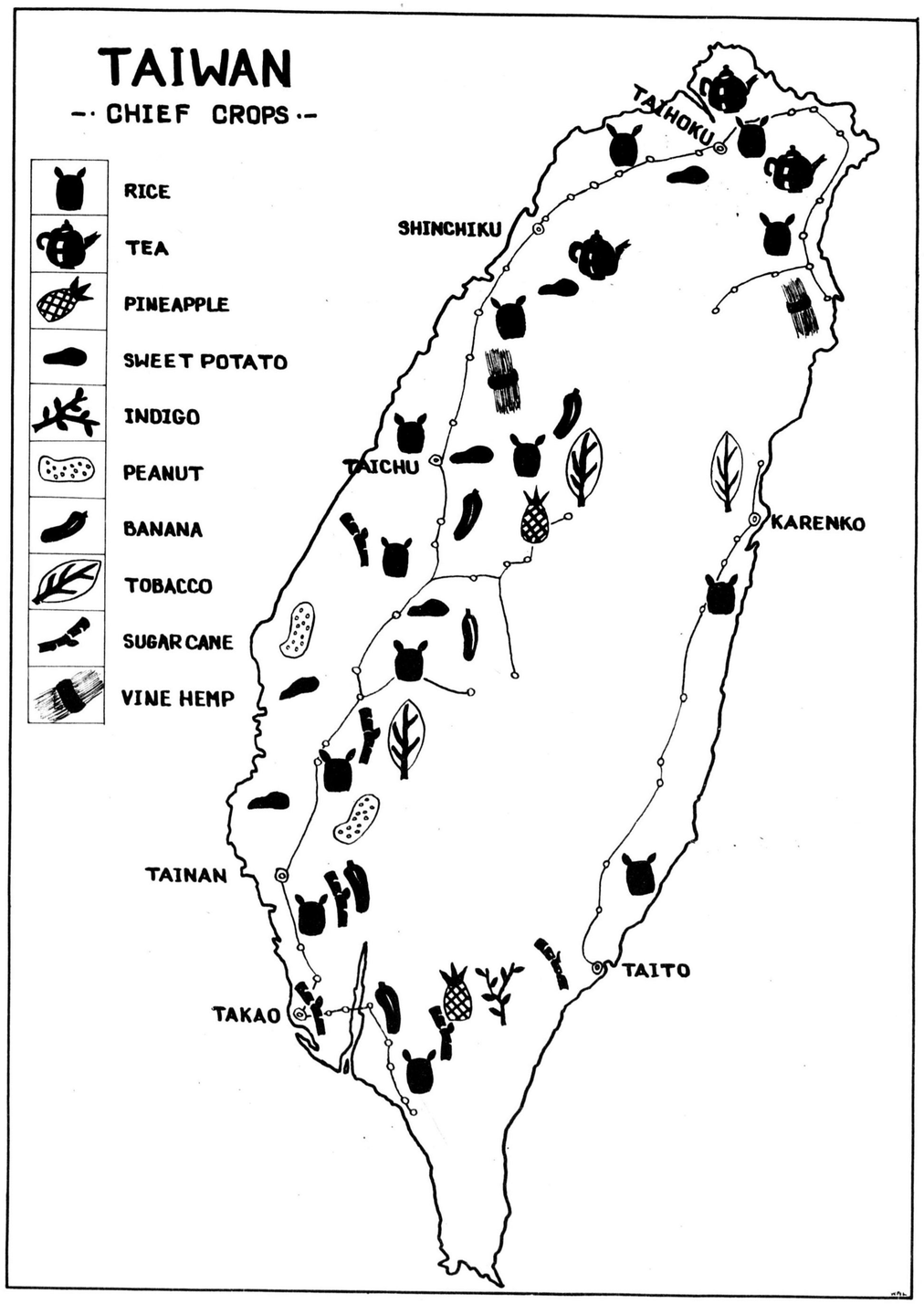


FIGURE 1

III.

AGRICULTURE AND FISHING

1. RELATIVE IMPORTANCE OF AGRICULTURE. Taiwan's economy is mainly agricultural. In 1937 the total value of farm products (403,000,000 yen) was about half of the total value of all production, and although the increased industrialization begun in that year has no doubt made some change, it cannot have fundamentally altered the economy. Importance of agriculture may be seen from the following figures for recent years:

Table 5. Value of Production, 1934-1938.
(in 1,000 yen)

	1934	*1935*	*1936*	*1937*	*1938*
Agriculture (including livestock raising) -------	285,598	352,684	378,277	402,947	460,171
Forestry --------	12,667	12,731	15,147	16,664	19,330
Fishing Catch ---	11,452	13,640	14,934	14,513	15,608
Marine Products--	2,291	2,293	2,500	2,324	2,359
Mining ---------	19,470	22,839	28,727	not given	not given
Manufacturing Industry ------	234,149	293,431	296,984	374,931	379,900
Totals ------	565,627	697,618	736,569	811,379*	877,368*

* Not including mining. Another source gives the value of mining output in 1937 as 36,200,000 yen.

Source: *Far East Year Book*, 1941

The above data, moreover, understate the importance of agriculture because the sugar mills, with an output valued at over 200,000,000 yen annually, are included in manufacturing industry. If the value of the output of such mills were classed as agricultural, it would be apparent that three-fourths of the output of the island is directly dependent upon agriculture.

Just prior to the outbreak of war, according to the annual estimates, slightly over half of the population, or nearly 3,000,000 people, were classified as "agricultural population." (Shiroshi Nasu, *Aspects of Japanese Agriculture*, New York, Institute of Pacific Relations, 1941; and *Taiwan's Arable Land, Land Values, Farm Population, and Agricultural Production in 1938*, Gerald Warner, American Consul, Taihoku, January 24, 1940.) These estimates are again believed to be an understatement because, in 1930, census data showed two-thirds of the population to be engaged in agriculture and forestry. (Even two-thirds is not as great a percentage as in Korea, where over 70 percent of the people were engaged in agriculture.) It is possible that the classification "agricultural population" includes only those living on farms, and excludes those in towns and large villages, the majority of whom are, however, engaged in agriculture or a closely related activity.

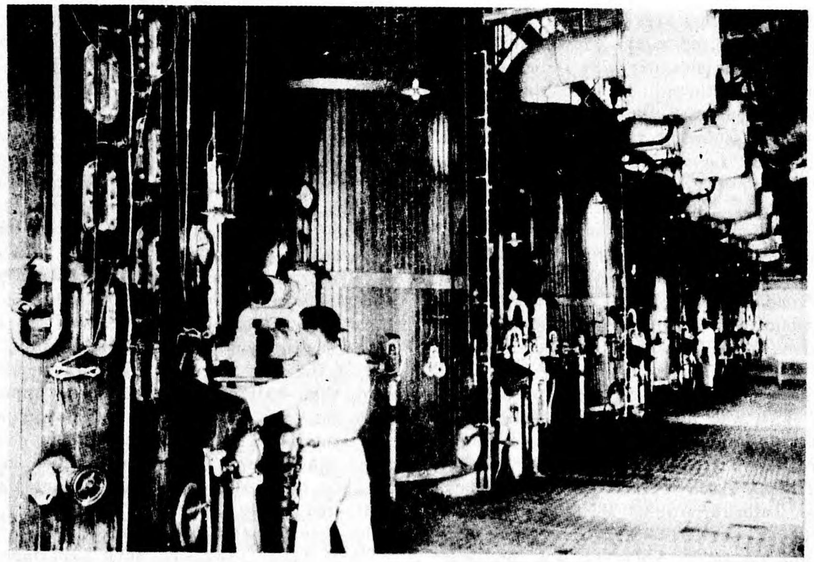
Table 6. Percentage of Farm Population by Provinces, Dec. 31, 1938.

Province or District	*Total Population*	*Farm Population*	*Percentage of Farm Population to Total*
Taihoku --------	1,124,721	345,106	30.7
Karenko -------	129,728	60,603	46.7
Shinchiku ------	781,075	410,488	52.6
Takao ---------	821,723	441,310	53.7
Taichu ---------	1,281,816	707,716	55.2
Tainan ---------	1,456,818	838,631	57.6
Pescadores -----	69,208	41,811	60.4
Taito ----------	81,840	50,732	62.0
	5,746,959	2,896,397	50.4

Source: *Taiwan's Arable Land, Land Values, Farm Population, and Agricultural Production in 1938*, Gerald Warner, American Consul, Taihoku, January 24, 1940.

2. CULTIVATED AREA. Out of a total area of 8,889,101 acres, cultivated land was estimated at the end of 1938 to be 2,119,930 acres. (*Taiwan's Arable Land, Land Values, Farm Population, and Agricultural Production in 1938*, Gerald Warner, American Consul, Taihoku, January 24, 1940.) Of this, 1,301,972 acres were wet fields, and 817,958 acres dry fields. Cultivated land thus comprised 23.85 percent of the total area of the island, and 43.31 percent of the total area of the plains. About 800,000 acres of this were used for two crops. Statistics relating to the area of cultivated land indicate that it has more than doubled since 1900, but, as in Korea, this is not all actual increase, for statistics in early years did not include all the land actually cultivated. Cultivated land area probably cannot be greatly increased—not by more than 170,000 acres, to judge from an earlier official investigation. A careful estimate by the Formosan Government in 1924 indicated 170,000 *ko* (407,490 acres) still available for cultivation. Subtracting from this the increase in cultivated land from 1924 to 1938, about 100,000 *ko* (from 785,000 *ko* to 885,000 *ko*), the amount still available for cultivation in 1938 may be estimated at about 70,000 *ko*, or 168,000 acres. The ratio of land ultilization (ratio of land under cultivation to the total area of land considered fit for cultivation), which is well over 90 percent, was higher than in Korea and Japan Proper. It is probable, however, that the area of land under cultivation has decreased during the war, arable land probably being requisitioned for construction of airfields, highways, barracks, and other defense installations.

3. PRODUCTIVITY AND VALUE OF LAND. The island is self-sufficient in basic foodstuffs, and has a substantial surplus thereof for export. The value of product per *tan* (1 *tan* equals about one-quarter acre) was over 30 yen in 1934, as high as in some areas in Japan Proper, and higher than the 20 yen per *tan* value of production in Korea. (Shiroshi Nasu, *Aspects of Japanese Agriculture*, p. 127.) This ratio of productivity, half as high again as in Korea, has been approximately maintained. In part this results from the raising of



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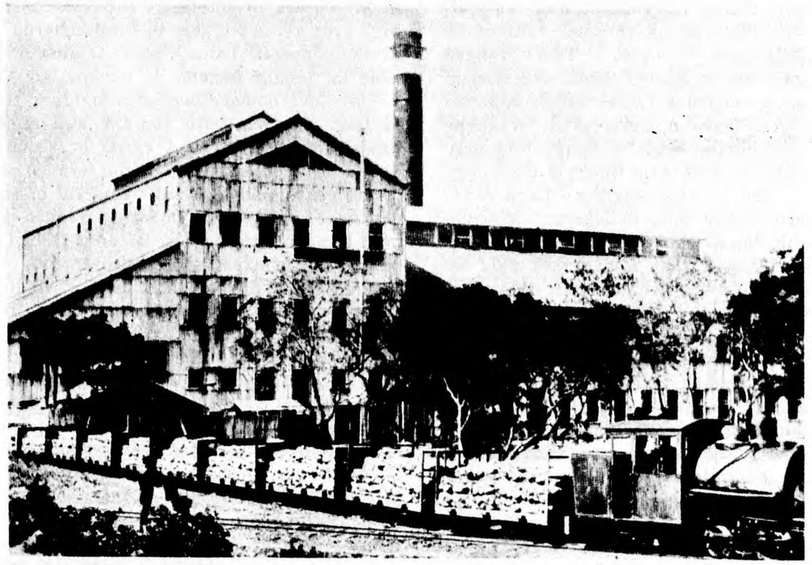

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Illus. 3. Modern sugar-refining equipment and mill.

two crops of rice a year, and in part from the profitable raising of sugar cane. Soils in Taiwan are quite different from those in Japan Proper and Korea, being almost all alluvial with large areas of sandy soil. Apparently they are well suited to the growing of sugar cane. Fairly high crop yields per acre indicate satisfactory soil conditions, although in some places there are alkali accumulations. A discussion of soils in Taiwan, with a map showing their distribution, is given in Shiroshi Nasu, *Land Utilization in Japan*, Institute of Pacific Relations, Tokyo, 1929, p. 65 and frontispiece. Professor Nasu stresses the difference between soils in Taiwan and those in Japan Proper and Korea. Soils in Korea, according to his map, are almost all diluvial and sedentary; this is true of much soil in Japan Proper, but of almost none in Taiwan. Loamy soils predominate in Korea, with small areas of clay soil; whereas on Taiwan sandy soil is most common, with clay soil next.

Land values have been high, and prior to the war were increasing. This was in part due to the relative scarcity of land. Ordinary grade wet fields brought 2,800 yen per *ko*, and dry fields nearly 1,000 yen per *ko* in 1938. (*Taiwan Land Values*, Gerald Warner, American Consul, Taihoku, August 13, 1938.) An investigation in 1936-37 showed that the value of land per *ko* ranged from 728 yen to 8,600 yen, and the value of the harvest correspondingly from 163 yen to 1,094 yen. Those farmers who were tenants paid rents (in kind) of from 40 to 60 percent of their crops (generally between 45 and 50 percent). This was sufficient to enable landowners to make profits of 7 to 8 percent after deducting expenses and taxes. (*Taiwan's Arable Land, Land Values, Farm Population, and Agricultural Production in 1938*, Gerald Warner, American Consul, Taihoku, January 24, 1940.) Taxes ranged from 1 to 2 yen per *tan* on upland fields, and from 3 to 4¾ yen per *tan* on wet fields (1 *tan* equals approximately ¼ acre). (In Taiwan, fields used for sugar cane are classified as upland fields, although they may in fact be wet fields. It is obvious that the tax policy of the Government has favored sugar.) Land taxation was thus much higher than in Korea, but somewhat lower than in Japan Proper. However, an investigation in 1936 showed that total taxes paid by farmers in Taiwan were much greater than those paid by farmers in Japan Proper.

4. LAND OWNERSHIP AND TENANCY PROBLEMS. Both the system of land ownership and tenancy, and the rights and duties connected therewith, were extremely complicated at the time of Japanese annexation of Taiwan in 1895. Enterprising individuals had cleared land (driving away the aborigines), and in many cases others cultivated this land, paying fees for the right to do so. They could then sub-let to tenants, who in turn paid rent. Landholders with insufficient land could, and still do, rent additional land, becoming both landowners and tenant farmers. Investment of village and other funds in land also creates complications, as does the question of rights in natural and artificial water courses.

One of the first tasks undertaken by the Japanese was the regulation and registry of land titles. The land survey made during the years 1900 to 1909 provided an orderly record of land ownership, and incidentally an increase in tax revenue. The area of cultivated land appeared much larger than before—for many lands had not been recorded, and taxes had not been paid on them. That the problems of land ownership have not been completely solved is shown, however, by the fact that litigation over property rights is still a major preoccupation of the courts in Taiwan.

Though not outwardly too apparent, there are considerable contrasts in wealth among the Formosan-Chinese, as well as between them and the Japanese. Although in general, wealth of the Japanese is greater, and standards of living higher, there are some wealthy Formosan-Chinese families, almost all of whom derive their influence from land ownership. At the other end of the scale are the tenant farmers who cultivate more than half of the land. It is important to note that these tenant farmers probably produce much more than half of all crops. Statistics of 1938 indicated that upland fields were divided in approximate equality between owners and tenants, while tenants cultivated about 60 percent of the wet fields—which produce much more per acre.

These tenant farmers have experienced difficulties because contracts were often for one year only (or, where longer, were sometimes broken by the landlords), because contracts were oral, and because a cash deposit was required, amounting to about one-half of the rent, at the time of the making of the contract. Necessity of such deposits frequently led to borrowing at high rates of interest. Interest on such debts, the high crop rents payable to the landlords, and the high price of land in Taiwan make it difficult if not impossible for tenant farmers to become landowners.

The Government-General recognized the importance of land reforms, both for tax and registration purposes, and to remove a cause of social unrest. Its policy included extension of the term of tenancy to five or six years, and automatic renewal of contract unless denounced within six months; reduction of rent by mutual agreement in case of crop failures; bearing of part or all of expense of improvements on land by the landowner; and compensation for voiding of a contract before its expiration date. It permitted voiding of a contract in case of arrears, and required approval of landowners for transfer of land by tenants, or for changes affecting the productivity of the land. Arbitration committees were established to settle disputes. By 1938-39 it was reported that three-fourths of all land leased was leased under written contract.

5. CHIEF CROPS. Most important crops are rice, sugar cane, and potatoes. Rice takes first place and accounts for over half of the total value of agricultural production. It is grown chiefly in wet fields in the northern part of the island. The southern part, on the whole, produces sugar cane, sweet potatoes, and tropical fruits (oranges, bananas, and pineapples). Tea plantations

in the foothills of the north are the source of Taiwan's leading export to foreign countries. Peanuts, tobacco, ramie, hemp, jute, cotton, and a number of vegetables are other products of some importance. The Japanese have recently encouraged such crops as castor beans, which are needed in wartime. Rice and sugar are, however, by far the most important, together constituting 70 percent of the total value of agricultural production, and equalling as exports the combined value of all imports into the island. Sweet potatoes are the only other agricultural product with a value greater than one or two percent of the total value of agricultural output. Almost all of this total value is the product of the west coast plain, a quarter of the island's agricultural goods coming from Taichu Province and a quarter from Tainan Province, with 15 percent from Takao Province, and a little more and a little less than this, respectively, from Shinchiku and Taihoku Provinces.

a. *Taihoku to Takao—rice, tea, sugar, fruits along the mainline railroad.* Proceeding southwest on the main railroad line from Taihoku, one sees blue-trousered peasants working in the fields. Their water buffalo, similar to the carabao of the Philippines, draw crude plows and harrows to prepare the paddy fields. These creatures tread all day through the muck and water, doing work which neither horses nor cattle could stand. In many places rows of bamboos, or other trees, serve as windbreaks to protect fields from the heavy gales which blow in from the Straits.

Near Shinchiku, about 40 miles from Taihoku, some sugar cane begins to appear among the paddy fields, although the main sugar and pineapple-producing areas begin farther south, near Shoka. In the vicinity of Shinchiku "ponkan" oranges are grown. (Principal varieties of oranges grown on Taiwan are known as "ponkan," "tankan," "buntan," and "zabon." "Ponkan" and "tankan" are sweet oranges, the former ripening during November-December in the north, the latter during March in the south. Both "buntan" and "zabon" somewhat resemble our grapefruit. The former ripens in September in south and central Taiwan; the latter some time from January to April.) Farther south the plain around Taichu is devoted to both rice and sugar; and the areas around Taichu and Shinchiku are also centers of sweet potato, hemp, and ramie cultivation.

Taiwan is bisected by the Tropic of Cancer, hence it lies partly in the temperate and partly in the tropic zone. The line is crossed a few miles south of Kagi. At Kagi one is in the main sugar and pineapple area. Instead of water buffalo and the crude plows of the rice farmers of the northern part of the island, lands of some of the large sugar companies are worked with motorized equipment, including tractors. Near Tainan, the plain, although still devoted to cane fields and rice, has smaller patches of sweet and Irish potatoes, castor beans, and truck gardens. The main sugar and pineapple area continues south somewhat beyond the mouth of the Shimotamsui River; and still farther south there is a rice area around Fuko.

On the east coast there are rice fields around Taito, and the valley strip between Karenko and Taito is partially cultivated, at least along the railroad. Other areas in these districts, however, together with the southern part of Taihoku Province and the interior and south tip of Takao Province, constitute undeveloped land.

b. *Special agricultural problems.* Agriculture in Taiwan encounters important difficulties in rainfall, storms and insects, and in dependence upon artificial fertilizers. The northern part of the island receives a heavy and fairly steady rainfall, but the southern part suffers in winter from long dry spells. The problem of diverting water and storing it to form a steady supply has not been solved in all areas, and some land, dependent upon the weather for irrigation, produces only one crop annually. Additional irrigation projects might make it possible to convert much of this land into two-crop wet fields. The Shimotamsui Riparian Project is a large-scale system of embankments, reclamation work, and irrigation, designed to control the flood waters of the Shimotamsui River in Takao Province and to impound and distribute evenly the seasonal overflow in a region which has very little rainfall from November until April and sometimes suffers from drought.

Especially during the typhoon season, from July through September, Taiwan is subjected to violent storms. Heavy winds and beating rains often convert valley acreage into temporarily useless land, and cause landslides in the foothills. Reports have often been made of crops of which a good percentage was ruined by such storms. Insect pests also cause considerable damage, being one of the chief causes of the failure of attempts to raise cotton.

Agriculture has come to be dependent in part upon artificial fertilizers, although they still play a much smaller part in Japan Proper. Prior to 1939 little artificial fertilizer was produced in Taiwan, but sizable amounts were imported, including nearly 200,000 tons of ammonium sulphate annually. Much of the increase in yield per acre under Japanese management has been due to experiment with and improvement of fertilizers. Since 1940 shortage of fertilizers has been a contributing factor in lowering yields.

c. *Statistics of production and crop areas.* The following table indicates production of crops in 1938, as reported by the Bureau of Productive Industry of the Taiwan Government-General. Rice accounted for over half of the total value of agricultural production, sugar cane for a sixth, and sweet potatoes for a sixteenth. Minor crops have been included in this table for completeness, because statistics on such crops are often difficult to obtain. Included also is livestock, of which hogs are most important, over 1,000,000 being slaughtered annually in normal years. Crops in 1944 may be smaller than those of 1938, for it is probable that farm land has been used for military installations, and that

farm labor has been conscripted. Fertilizer has been short, and with an increase in Japanese military forces on the island the normal export surplus is probably smaller than in pre-war years.

Table 7. Agricultural Production in Taiwan in 1938.

Crops	*Area in Ko**	*Area in Acres*	*Quantity*	*Value in Yen*	*Percentage of Total Value*
Ordinary crops:					
Rice	644,793	1,545,569	9,816,899 koku†	237,895,355	51.693
Sweet potatoes	138,733	332,543	1,726,188 m.tons	29,545,288	6.42
Sugar cane used as a chewing sweet	1,580	3,787	93,478 m.tons	1,210,145	0.263
Soybeans	6,447	15,453	30,849 koku	709,636	0.154
Other beans	10,477	25,113	40,466 koku	731,425	0.159
Sweet corn	1,664	3,989	14,968 koku	283,783	0.062
Millet	5,758	13,802	21,515 koku	260,595	0.057
Wheat	1,122	2,689	10,342 koku	204,267	0.044
Barley	771	1,848	5,284 koku	57,149	0.012
Buckwheat	31	74	63 koku	722	0.000
Totals	811,376	1,944,867		270,898,365	
Special crops:					
Sugar cane (for refining)	134,208	321,697	9,060,660 m.tons	78,193,492	16.991
Tea (crude)	45,752	109,668	71,392 m.tons	9,179,285	1.995
Peanuts	32,050	76,824	556,244 koku	3,922,554	0.852
Tobacco	1,706	4,089	2,896 m.tons	2,600,265	0.565
Jute	8,623	20,669	14,047 m.tons	2,525,102	0.549
Cassava	6,753	16,187	88,511 m.tons	1,203,273	0.262
Ramie	1,628	3,902	776 m.tons	516,457	0.112
Sesame	3,045	7,299	10,974 koku	360,870	0.078
Sisal hemp	1,431	3,430	793 m.tons	360,021	0.078
Castor beans	5,965	14,298	1,645 m.tons	324,014	0.070
Cotton	4,880	11,697	1,090 m.tons	313,825	0.068
Jasmine and other perfume flowers for tea	280	671	714 m.tons	262,806	0.057
Rushes (*Shichito*)	384	920	923 m.tons	107,826	0.024
Coffee	428	1,026	46 m.tons	52,467	0.011
Rapeseed	438	1,050	1,446 koku	35,414	0.008
Rushes (*Taiko*)	14	34	72 m.tons	19,855	0.004
Arrowroot	49	117	451 m.tons	7,697	0.002
Totals	247,634	593,578		99,985,223	
Nursery Plants	85,253	204,351		34,398,013	7.474
Fruits:					
Bananas	21,485	51,500	201,651 m.tons	9,956,603	2.164
Pineapples	9,903	23,737	116,133,501 pieces	3,973,139	0.863
Oranges and other citrus fruits	4,723	11,321	36,209 m.tons	3,008,425	0.610
Longans	2,858	6,851	14,118 m.tons	797,500	0.163
Damson plums	989	2,371	6,446 m.tons	288,697	0.063
Pomegranates	1,134	2,718	5,294 m.tons	219,712	0.048
Betelnuts	536	1,285	2,620 m.tons	148,242	0.032
Persimmons	420	1,007	2,886 m.tons	124,496	0.027
Peaches	246	590	1,480 m.tons	112,497	0.024
Mangos	598	1,433	1,173 m.tons	101,358	0.022
Papayas	178	427	2,168 m.tons	76,499	0.017
Renmu (or rembu)	136	326	1,185 m.tons	60,115	0.013
Loquats	98	235	437 m.tons	26,971	0.006
Grapes	22	53	71 m.tons	15,657	0.003
Totals	43,326	103,854		18,909,911	
Vegetables:					
Daikon (radish)	8,045	19,284	76,616 m.tons	2,002,883	0.435
Cabbage	2,664	6,386	39,847 m.tons	1,362,163	0.296
Formosa rape	3,499	8,387	50,504 m.tons	1,309,853	0.285
Garlic	1,856	4,449	17,063 m.tons	1,028,003	0.223
Taro	2,027	4,859	15,647 m.tons	1,024,539	0.223
Onions	1,893	4,538	16,633 m.tons	849,871	0.185
Melons	1,770	4,243	17,086 m.tons	732,878	0.159
Snake gourds	2,102	5,038	22,239 m.tons	670,551	0.146
Celery	1,156	2,771	15,669 m.tons	651,489	0.141
Rape	1,345	3,224	15,771 m.tons	611,701	0.133
Cucumbers	935	2,241	10,351 m.tons	576,770	0.125
Peas	2,956	7,086	7,607 m.tons	542,841	0.118
Egg plants	1,234	2,958	11,321 m.tons	516,426	0.112
Leek	945	2,265	9,359 m.tons	458,204	0.100
Ginger	1,048	2,512	7,640 m.tons	424,783	0.092
String beans	1,526	3,658	8,645 m.tons	407,831	0.089
Cabbage lettuce	1,010	2,421	13,167 m.tons	311,605	0.068
Gourd-melons	715	1,714	9,190 m.tons	273,185	0.059
Pumpkins	896	2,148	8,945 m.tons	268,274	0.058
White potatoes	115	276	1,021 m.tons	69,094	0.015
Others	4,170	9,995	37,733 m.tons	1,596,058	0.347
Totals	41,907	100,453		15,689,002	
Silk worm cocoons			1,191 koku	41,493	0.009
Livestock and products:					
Hogs (butchery)			1,199,017 head	40,150,838	8.724
Chickens			7,094,698 head	7,393,818	1.607
Buffalo‡			20,232 head	1,875,335	0.407
Ducks			2,022,535 head	1,700,842	0.370
Raw hides			607,251 pieces	1,380,049	0.300
Milk			537,154 gallons	851,178	0.185
Geese			394,191 head	572,505	0.124
Cattle‡			3,789 head	338,602	0.074
Honey			126 m.tons	94,743	0.020
Other animals (sheep, turkeys, goats, deer, etc.)			56,764 head	531,413	0.116
				54,889,323	
				§494,811,330	107.464§

* 1 ko equals 2.397 acres.
† 1 koku equals 5.119 bushels.
‡ Presumable number slaughtered.
§ Total value of the items is as given, although the total given in the source was 460,212,557 yen; 460,000,000 yen was the official value of agricultural production for the year 1938. Percentages are also given as in the source, although, as will be noted, they add, in good Japanese fashion, to 107.464 percent.

Source: Bureau of Productive Industries, Taiwan Government-General. *Taiwan's Arable Land, Land Values, Farm Population, and Agricultural Production in 1938*, Gerald Warner, American Consul, Taihoku, January 24, 1940.

6. RICE. The climate is well suited to rice cultivation, especially in the western district. Two crops are harvested each year, which is not usual in Japan Proper, nor in Korea. Nor is it usual to have two rice crops a year in Thailand, Burma, or Indochina, although it is done in some areas in Indochina, especially in Tonkin. Harvest time for the first crop is June-July, and for the second, October-November. Rice is a cash crop, and accounts for more than half of the gross value of agricultural production. There are two main kinds of rice in Taiwan—*zairai* or ordinary rice, and *horai* or improved rice, the latter constituting in 1938 over half of the total output. Figures for 1934 and 1938 may indicate the relative proportions of the main types of rice in Taiwan:

Type	*1934*	*1938*
Horai	4,286,000 koku (22,000,000 bu.)	27,000,000 bu.
Ordinary	3,500,000 koku (18,000,000 bu.)	18,500,000 bu.
Glutinous	948,000 koku (4,000,000 bu.)	3,500,000 bu.
Upland rice	359,000 koku (1,800,000 bu.)	1,350,000 bu.
Totals	9,093,000 koku (45,800,000 bu.)	50,350,000 bu.

(See Shiroshi Nasu, *Aspects of Japanese Agriculture*, p. 126, and *Annual Review of Commerce and Industry*, 1938, first section.) It may be of interest that ordinary

varieties still constitute about half of Taiwan's rice, while in Korea 75 to 80 percent of the rice now consists of improved Japanese varieties. Most of the *horai* rice, as well as most of the small production of glutinous rice, was normally exported to Japan. But little ordinary rice was exported, for it is considered by the Japanese to be of greatly inferior quality.

a. *Production.* Rice crops showed little variation from year to year until 1940, when a shortage of fertilizers and other factors caused a considerable decline in production. Rice and sugar have been competitive crops, for it is possible to plant either in many areas of the island. Area of rice land was given as 1,301,972 acres in 1938. Of this 795,341 acres were reported as 2-crop rice land, and 24,330 acres and 482,300 acres as 1-crop rice land used for the first and second crops respectively. Because of the competition between rice and sugar cane, and also because of rotation with other crops, there is variation from year to year in the acreage devoted to given crops. Farmers were disposed, however, to plant rice rather than sugar cane, in part because their families preferred rice to other possible cereal foods, and in part because it can be stored, whereas sugar cane cannot.

Two interesting questions cannot be definitely answered because of the lack of adequate data. One is the extent to which the development of cultivation of *horai* rice (which was not cultivated in Taiwan prior to 1922) has been due to greater returns; the other is the relative returns of rice and sugar cane. *Horai* rice has a greater yield per acre, but on the other hand its cost of production per acre is also higher, and it requires use of commercial fertilizers which the farmer must purchase. Except in case of great need in Japan, rice for sale there must be *horai* rice, and need for cash income is a factor encouraging planting of this rice without regard to relative profitableness.

The following figures for rice and sugar for 1938 (taken from Table 7 above) must be used with caution as a basis for inference:

	Area Planted (ko)	*Value of Crop (in yen)*	*Value per Ko (in yen)*
Rice	644,793	237,895,355	369
Sugar	134,208	78,193,492	583

Costs of production are higher for sugar than for rice, and other factors would have to be excluded before conclusions could be drawn concerning the net profits to the farmers from each crop. Before governmental control of rice prices and sales became so strict, rice farmers probably had somewhat more independence than a farmer growing sugar cane and faced by the monopolistic position of the sugar mill in his vicinity.

Because of this tendency, and because of a desire to foster the sugar industry, the Government gave assistance to sugar-cane cultivation, sometimes through control of irrigation facilities or through lower taxation of land utilized for sugar cane. This situation has changed somewhat; 1943 reports indicate that Japan, now having under its control areas which have large surpluses of sugar, is decreasing sugar production in Taiwan in favor of rice.

Rice crops averaged a little over 9,000,000 *koku* until 1940, as may be seen from the table below. In 1938, a particularly good year, the rice crop exceeded 50,000,000 bushels. Taiwan's rice crop is given by some sources as 90,000,000 bushels of rough rice. This is not, however, inconsistent with the above figure of 50,000,000 bushels of brown rice. Japanese rice statistics are given in terms of brown rice—that is, rice which has been husked but not polished. A *koku* of brown rice is equivalent to 5.119 bushels; but enough rough rice (unhusked rice) to make a *koku* of brown rice would be the equivalent of about 9.0944 bushels. The United States Department of Agriculture, since it quotes rice figures in terms of rough rice, uses the latter figure for conversion of *koku* to bushels. Care must also be exercised in converting rice crops to measures of weight. A bushel of rough rice weighs 45 pounds, but a bushel of brown rice would weigh about 63 pounds, and a *koku* of brown rice, therefore, about 322.4 pounds.

Recent crops have been somewhat lower, partly because of bad weather, but also because of general shortages of fertilizer and labor, inevitable in wartime. This is one of the reasons for considerable imports into Japan from Indochina, Thailand, and other parts of the Far East beginning in 1940. The very poor crops in Korea in 1939 and again in 1942 also contributed to making this necessary.

Table 8. Rice Production in Taiwan.
(in 1,000 *koku**)

Year	*1st crop*	*2nd crop*	*Total*
1934	4,510	4,577	9,087
1935	4,328	4,793	9,121
1936	4,739	4,819	9,558
1937	4,412	4,821	9,233
1938	4,886	4,931	9,817
1939	4,031	5,120	9,151
1940	4,224	3,678	7,902
1941	4,201	4,209	8,410
1942	----	----	8,000†
1943	3,820	----	----

* A *koku* equals 5.119 bushels of brown rice.
† Estimated. The actual figure may be somewhat higher than this, for Japanese broadcasts stated that the crop was about the same as in 1941.

Source: To 1941, from official figures of the Taiwan Government-General. 1942, estimated. 1943, broadcast reports.

b. *Exports and consumption.* Taiwan, like Korea, each year exports half of its rice crop to Japan. In Taiwan the 45 to 50 million bushels produced provide about 23,000,000 bushels for domestic consumption by a little less than 6,000,000 people (nearly 4 bushels per capita). In Korea the crops, which ranged from about 75 to 125 million bushels, provided on the average 60 to 70 million bushels for domestic consumption by 24,000,000 people (somewhat over 2½ bushels per capita). Rice in Korea was therefore supplemented by barley and millet, and in Taiwan to some extent by sweet potatoes. Taiwan's exports provided about 6 percent of Japan's rice requirements, and Korea's, about 12 percent. Together the two colonies approximately satisfied Japan's 20 percent rice deficiency.

Reliable figures on exports and consumption are difficult to secure, and the fact that the year's first rice crop is usually consumed the same year, while the second crop is consumed the following year, complicates statistics. The following table, therefore, is to be regarded only as a general approximation. Though exports have declined somewhat recently, they are still much higher than fifteen or twenty years ago, when Taiwan supplied only about 4 or 5 million bushels, one or two percent of Japan's needs.

Table 9. Exports and consumption of rice.
(in 1,000 *koku*)

Year	Exports	Consumption
1934	5,045	4,270
1935	4,491	4,201
1936	4,787	4,634
1937	4,481	4,590
1938	4,800	4,832
1939	4,001	5,093

Until 1938, exports other than those to Japan were negligible. After the China "Incident," however, sizable exports of Taiwan rice were made to China, for use by the Japanese troops there. Japanese broadcasts in the spring of 1943 reported that a steamship service was being established to carry Taiwan rice (and coal) to Canton. If this is *horai* rice, or the type normally exported to Japan, it is presumably for the use of Japanese troops in that area, for the Chinese population could be supplied with rice from Indochina.

c. *Government plans.* Before the war, the Government-General encouraged the farmers to plant sugar cane instead of rice. Subsidies and lower tax rates were given, and coercion was sometimes used, through shutting off the supply of water for paddy fields. In 1938 the Bureau of Productive Industries of Taiwan announced a ten-year plan for expansion of production of crops. A main objective was greater diversification in the agriculture of the island, and special attention was to be devoted to sugar cane, cotton, castor beans, sweet potatoes, jute, and ramie, as well as to rice. Areas under rice were to be kept at a fairly constant level, to increase by only 10 percent by 1948. In recent years the rice yield has remained about 13.5 *koku* per *ko*—about 28.8 bushels of brown rice per acre, or, in terms of rough rice, 51.2 bushels per acre. (See *Annual Reviews of Commerce and Industry*, Taiwan.)

Table 10. Rice Yield Per Acre in Some Countries of the Far East.
(in bushels of rough rice per acre)*

Country	1930-31 to 1934-35 Average	1935-36	1936-37	1937-38	1938-39
Japan Proper	70.4	66.6	77.9	76.6	75.9
China	49.8	51.0	52.2	N.A.	N.A.
Formosa	46.6	49.5	51.6	51.1	57.8
Korea	38.2	39.2	45.6†	60.7†	54.0†
Thailand	32.7	31.8	30.3	30.9	28.9
Java and Madura	29.5	30.7	30.3	31.3	30.2
Burma	28.1	30.6	29.1	27.4	31.9
Philippine Islands	22.6	18.0	23.3	23.9	24.2
French Indochina	20.8	22.0	22.2	22.4	23.5

* For Japanese Empire areas, statistics above may be converted at 9.0944 bushels per *koku*.
† There are some reasons for doubting the considerable increase in rice yields in the Japanese Empire in 1936-37 and succeeding years, especially in Korea.

Source: *Agricultural Statistics*, 1941, United States Department of Agriculture.

Rice yield per acre is much higher in Taiwan than in such countries as Burma and Indochina. It is of interest that Japan Proper, Korea, and Taiwan, together, have about the same rice acreage as French Indochina, but they produce about three times as much rice. The fact that Indochina's population, being about equal to that of Korea, is less than one-fourth that of Japan, Korea, and Taiwan together suggests, however, that rice output *per person engaged in its cultivation* may well be higher in Indochina than in the Japanese Empire.

Wartime rice prices in Japan Proper and Korea have risen by more than 50 percent above their 1939 level; and, although the situation in Taiwan is not clear, exports to Japan have been encouraged. Taiwan shipments not only put less strain on transportation facilities than those from Indochina or Thailand, but also Taiwan rice is much preferred in Japan.

Under a bill to control imports of Taiwan rice, passed by the 74th Session of the Japanese Diet, and effective October 1, 1939, such shipments were placed entirely in the hands of the Government-General. The same bill established a special account for this export of rice, and with a revolving fund of 5,000,000 yen (which could be increased to 25,000,000 yen), the Government planned to encourage further the development of other phases of agriculture. Japanese broadcasts of December, 1943, stated that this legislation was superseded by a Taiwan Food Control Ordinance, under which exports of other staple foodstuffs were also placed under the jurisdiction of the Government-General.

The new legislation provided for a Taiwan Foodstuffs Control Corporation, with a capital of 8,000,000 yen, half to be subscribed by the Government, for control of distribution of foodstuffs within the island. Other agencies were to be merged into this corporation. (F. C. C. *Daily Report of Radio Broadcasts*, December 27, 1943.) This of course simply reorganizes distribution controls which have been in effect for some time.

Controls on the consumption of foodstuffs have also been in effect. After December, 1939, consumers were permitted to buy only 70 percent of their rice purchases in polished rice. (*Annual Review of Commerce and Industry*, 1939, first section.) These and other controls have been strengthened, and it is likely that the order requiring the use of unpolished rice, applied in Japan in 1943, was also extended to Taiwan.

7. OTHER GRAINS. There is some production of other grains in Taiwan, but it is not of much importance. Corn is grown in scattered areas, and millet in the Pescadores, Taito District, and Shinchiku Province; a little wheat is found, chiefly in Taichu Province; barley, principally in Tainan Province; and buckwheat in Taito Province. Indian millet is grown in the Pescadores. Production of these grains in 1938 was as follows:

Table 11. Minor Grains in Taiwan, 1938.

Crop	Production in Bushels	Area in Acres
Corn (maize)	76,622	3,991
Indian millet	60,988	8,557
Wheat	52,941	2,689
Millet	49,148	5,245
Barley	27,049	1,850
Buckwheat	322	74

Source: *Minor Grains in Taiwan*, 1940, Gerald Warner, American Consul, Taihoku, December 2, 1940.

8. SWEET POTATOES. Students in Taihoku sometimes called their island the "sweet potato," in reference to its shape rather than to one of its chief crops. Sweet potatoes are produced almost everywhere on the island, and all during the year. Tainan, Taichu, and Takao Provinces are the chief producing areas, with the main center around Kagi in Tainan Province. They are used both as human food and as fodder for cattle. Dried potatoes are shipped to Japan to be used in the making of alcohol and starch. Production of alcohol is the main reason for Japan's desire to increase this crop. A plant, with a capacity of 1,429,614 gallons annually, was set up at Kagi to manufacture butyl alcohol from them.

Most of the sweet potato crop is consumed on the island, and there has been a considerable increase in the past twenty years. In 1938 the crop amounted to 1,726,188 metric tons; ten years earlier it was 1,292,882 metric tons, and fifteen years earlier (1923) it was only 970,971 tons. Of the crop of 1,769,985 metric tons in 1937, exports amounted to only 65,466 metric tons. Although some was used for fodder and some for alcohol, so that per capita consumption was less than the 670 pounds indicated by these figures, sweet potatoes are a significant item in the Taiwan diet. By way of comparison, per capita consumption of rice is about 260 pounds annually.

9. SUGAR.

a. *General.* Normally Taiwan has supplied nearly 90 percent of the sugar requirements of the Japanese Empire. Sugar is the most important export crop. For the five years 1933-1937 it averaged 43 percent of the total value of exports, and 46 percent of the total value of exports to Japan (and other parts of the Japanese Empire). In 1938-39 a record sugar production amounted to 1,563,500 short tons. The area planted to sugar cane that year was about 360,000 acres, twenty percent greater than the average of the preceding four years. Slips are planted during the months from June to November. The cane is harvested and ground about 18 months later, from November through May. Figures in the following table are for sugar years, beginning November 1:

Table 12. Sugar Production in Taiwan.
(in 1,000,000 pounds)

1931-32	2,181	1936-37	2.221
1932-33	1,397	1937-38	2,182
1933-34	1,426	1938-39	3,127
1934-35	2,129	1939-40	2,497
1935-36	1,989	1940-41*	1,771

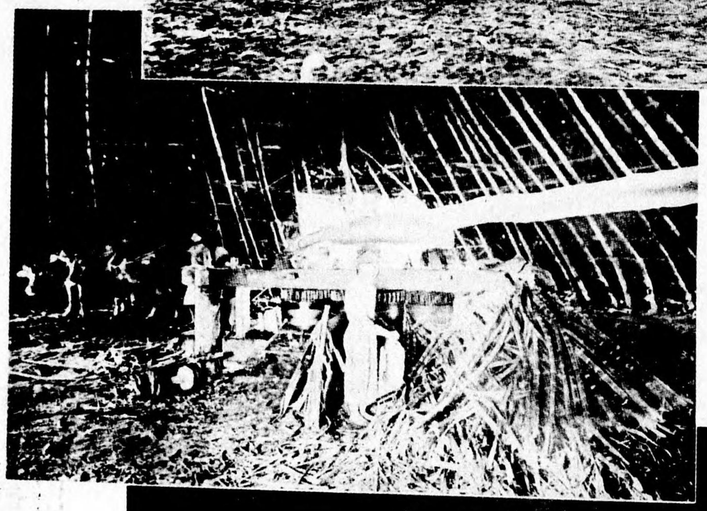
* Estimated.

A broadcast report stated that the 1942-43 sugar production in the island amounted to 2,347 million pounds. In spite of Taiwan's large sugar production, local consumers found difficulty in buying it as early as the end of 1939. Shops sold it in packages of ½ *kin* or 1 *kin* (a *kin* equals 1.32 pounds) to a person. Although Taiwan had supplied some (but not large) amounts of sugar to China in preceding years, in 1939 it supplied 43 percent of China's recorded sugar imports of 236,290 metric tons. In 1940 it supplied 28 percent of 174,952 metric tons. *(Chinese Maritime Customs Returns.)*

b. *Sugar mills.* Most of Taiwan's sugar output is the product of modern mills, of which there were 51 in 1939 owned by nine Japanese companies. Showa Sugar Manufacturing Company merged with Dai Nippon Sugar Manufacturing Company in 1940, so that by that year 47 of the 51 mills were owned by 5 companies. Most of these mills are in Tainan, Taichu, and Takao Provinces, with only four in Shinchiku Province, three in Taihoku Province, and two each in Karenko and Taito Districts. About 85½ percent of the annual production is crude or centrifugal sugar, 12 percent is plantation white, and 2½ percent is native brown. (*Annual Review of Commerce and Industry*, 1938, first section.) Plantation white and native brown sugar were chiefly consumed in Taiwan. The centrifugal sugar was formerly either used in the crude state by companies in Japan, or further processed in some 15 refineries there. Recent reports have indicated, however, that all remaining refineries in Japan have been closed, refining facilities in Taiwan having been so improved that sugar is processed locally. No doubt a much larger percentage is now used for producing alcohol. Some, according to recent reports, is going to Indochina, the quota for export to that country having been set at 3,000 tons.

Importance of the sugar mills is increased by the facilities for producing industrial alcohol. Beginning in 1937, these facilities were enlarged so that more alcohol might be available for production of explosives, and so that alcohol might be mixed with gasoline as fuel. The five leading companies, Dai Nippon, Taiwan, Meiji, Ensuiko, and Teikoku were required by the Government to use all molasses for alcohol production and to install equipment for distillation. Shipments of alcohol to Japan rose from 163,709 *koku* (about 7,850,000 gallons) in 1936, to 336,778 *koku* (about 16,150,000 gallons) in 1939. (*Sugar Year Book*, published by Japan Sugar Institute, Tokyo, 1940.) At the same time, it may be noted, shipments to Korea declined from 4,329 *koku* (206,277 gallons) to 720 *koku* (34,308 gallons). Plans formulated in 1937 call for

舊式製糖の外觀



甘蔗の壓搾

蔗汁の煮詰

Illus. 4. Primitive Formosan-Chinese sugar farming, showing canepile, ox-drawn crushing mill, and open-vat reducing process.

甘蔗品種の變遷

ヒユウスプラウに依る整地

種收の蔗甘

Illus. 5. Modern cane planting, a stand of cane and Formosan-Chinese labor in the fields of a Japanese sugar corporation.

production in Taiwan in 1943 and following years of 28,600,000 gallons of absolute alcohol. In 1939 production of absolute alcohol amounted to 6,286,000 gallons, while combined output of dry (absolute) and wet alcohol amounted to 16,770,000 gallons.

In the Appendix are details of the principal sugar mills, many of which are important producers of alcohol. Presumably the bulk of the alcohol produced by these sugar mills is promptly shipped to Japan. Although shortage of shipping facilities has crowded all warehouses for rice and sugar, this would probably not be true for alcohol, which is more difficult to store and more urgently needed.

c. *Sugar companies.* By 1940 five Japanese corporations produced more than 90 percent of Taiwan's sugar, and most of the five extended their activities into complementary lines, such as the production of alcohol, pulp, and other products, and to minor development of transportation facilities. Most of the companies own and operate narrow-gauge railway and pushcar facilities, some of which are open to the public.

Table 68 indicates the size, ownership, and other pertinent data for the chief sugar companies, with figures for sugar production in 1938-39. Present production is probably less, both because of wartime difficulties, and because 1938-39 was a record sugar year. Output and exports are probably divided approximately on the basis of pre-war production: Dai Nippon 34 percent, Taiwan 23 percent, Meiji 23 percent, Ensuiko 14 percent, and others 6 percent. Dai Nippon's share is larger because of its absorption of the Teikoku and Showa Sugar companies.

d. *Sugar cane.* The sugar cane crop in recent years has usually been above 8,000,000 short tons, although in some years it has dropped below 6,000,000 tons. In 1938-39 it reached nearly 13,000,000 short tons, while the next year it was only 9,292,200 tons. Sugar cane constitutes about one-sixth of the total value of agricultural production. Formerly Hawaiian varieties were planted, but now all varieties of cane are Javanese. These have been reported more suitable for Taiwan, as they have a higher sugar content. About one-sixth of the total cane-producing area is reportedly planted by the sugar companies themselves, with hired labor. The rest is planted by cane farmers, some of whom own their own land, while others are tenants. Consular figures indicated that in January, 1938, of 128,718 *ko* (309,000 acres) planted to sugar cane, 23,230 *ko* (55,750 acres) were planted by the companies on their own land. (*Sugar Planting for the 1938-39 Season,* Gerald Warner, American Consul, Taihoku, March 9, 1938.)

The territory from which each central may purchase cane is delimited, and the central was formerly obliged to purchase all cane grown in that district, while the basic price for sugar cane was fixed by agreement among the members of the Japan Sugar Association. It might be anticipated from the position of the large sugar companies that they would attempt to contract for sugar cane at prices which would give them the greatest profits, since prices were not controlled by the Government. Self-interest of the sugar companies, which tended to depress sugar cane prices, was limited, however, by the other crops to which farmers might turn, notably rice; and sugar cane prices thus depended to some extent upon rice prices. Prices for the 1940-41 sugar cane crop, planted in 1939-40, were to be fixed under the Taiwan Sugar Industry Ordinance.

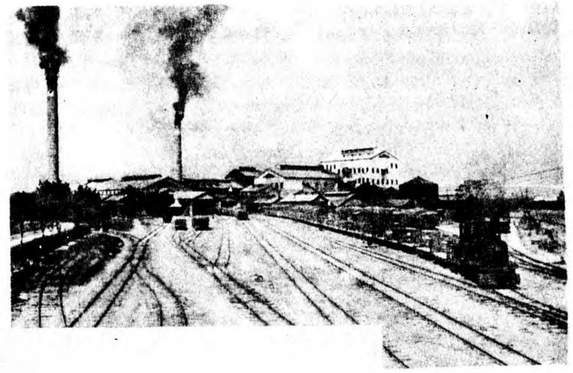
The position of these large sugar companies in Taiwan is a good example of what is known in economic theory as an oligopoly, in which, although no one company has a monopoly position, the field consists of a small number of large companies, and competition is very much limited. Vis-à-vis the farmers in its district, each sugar mill held a monopsonistic position, a term used in economic theory to denote only one buyer, for it was the only buyer for the sugar cane produced by these farmers. Its position was limited as noted by the alternative uses to which the farmers could turn their land, but since contracts were made before planting, and since growing of sugar cane takes about 18 months, farmers could not, during that period, change their economic decisions, nor benefit from a rise in the export price of sugar.

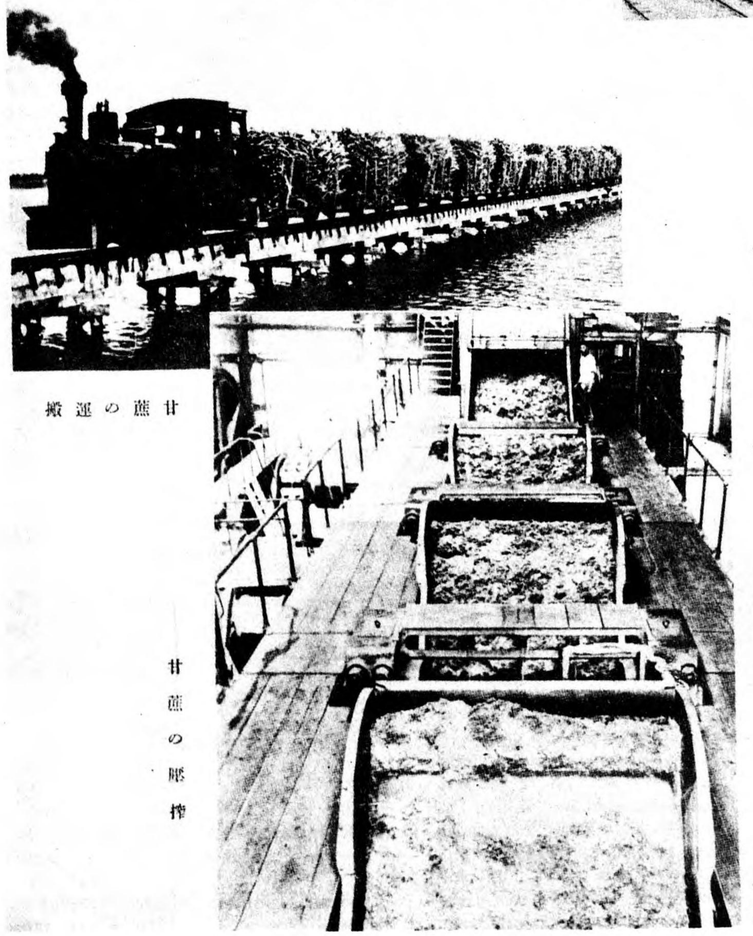
Planting of sugar cane was formerly encouraged by Government policy. One indication of this is classification of sugar cane fields as "upland fields" for purposes of taxation, with considerably lower rates than such fields would have paid if devoted to rice. Further, the sugar industry in the island was protected by an import duty on foreign sugar entering Japan. This duty was as follows in 1939: for sugar under No. 11 Dutch standard, 3.37 yen per 100 *kin,* including the special duty imposed by the Luxury Tariff Law; under No. 22 Dutch standard, 3.95 yen per 100 *kin;* other sugar, 5.30 yen per 100 *kin.* Duty thus ranged from 56 to 88 yen per metric ton. Control of irrigation facilities by large companies, such as the Kanan Irrigation Works Corporation, likewise facilitated encouragement of a desired crop.

Under the impetus of a wartime economy, a Taiwan Sugar Industry Ordinance of October 3, 1939, provided for licensing of sugar manufacturers by the Government-General. It also provided that sugar cane was to be used for the manufacturing of sugar except with special authorization, and that acreage, prices, and periods for crushing cane were to be subject to control by the Government. (*Promulgation of Ordinance to Control Taiwan's Sugar Industry,* John K. Emmerson, American Vice Consul, Taihoku, October 5, 1939.)

10. TEA. Tea is an old crop, and one of Taiwan's principal exports. Until 1938, when it was supplanted by sugar, it was the island's leading export to foreign countries. (Large sugar exports were made in 1938 and succeeding years to China, Manchuria, and the Kwantung Leased Territory.) It is largely a hillside plantation culture in Taihoku and Shinchiku Provinces, and is now almost entirely in Japanese hands. The total area of tea plantations is about 110,000 acres.

新式製糖工場





搬運の蔗甘

甘蔗の壓搾

Illus. 6. A modern Japanese sugar mill, plantation railroad, and sugarcane pulp conveyor.

The tea season continues from May to December. No tea is picked during the first four months of the year.

Oolong—a partially fermented tea usually classified by the trade as among the "green" teas—is favored in the United States (as well as elsewhere). Exports in 1938 exclusive of shipments to Japan amounted to 2,451 metric tons (5,400,000 pounds). The United States imported from 5,000,000 to 7,000,000 pounds of Taiwan Oolong tea in the years prior to the war, compared to less than 2,000,000 pounds of black tea from the island. Oolong tea has long been known as a special product of Taiwan, although black tea has been more popular in recent years. Taiwan's black tea, usually considered of inferior quality, is salable for blending especially in times of high tea prices in other areas.

Exports of *Pouchong*, or wrapped tea (also exclusive of shipments to Japan) amounted to 2,987 metric tons (6,585,000 pounds), chiefly to Manchuria and North China. This tea is similar to Oolong, but is flavored with fragrant flowers (usually jasmine or gardenia) during the curing process. For black tea the drying process is delayed to permit of oxygenation or fermentation of the leaves. The quality of this tea in Taiwan has recently been improved and exports in the years 1937-1939 amounted to about 11,000,000 pounds annually, of which 2,000,000 pounds went to Japan. A very little true green tea (dried rapidly without time to ferment) is also produced.

Total tea production in 1938 amounted to 12,171 metric tons, of which about half was black, one-fourth Pouchong, a little less than one-fourth Oolong, and the small remainder, green. This tea was produced in a number of factories, chiefly in Shinchiku Province, where the Taiwan Kocha (Black Tea) Company, for example, had eight modern factories. Prior to August, 1939, traders found it especially profitable to ship tea to Manchuria and China, as prices paid for tea within the yen-bloc were much higher than world prices. The Government, wishing to obtain foreign exchange, however, limited such exports at that time. The Tea Association collected 10 to 15 yen per picul for exports to yen-bloc areas in order to give bounties on shipments elsewhere. Tea exports are probably still being made from time to time even outside of Greater East Asia.

11. FRUITS.

a. *Bananas* are grown on many parts of the island, but 90 percent of the crop is raised in the two provinces of Taichu and Takao. Cultivated areas amounted to 53,933 acres in 1938, and the total crop to 201,652 metric tons. Next to rice and sugar, bananas are the most important article of export, followed by tea as the fourth export. Roughly two-thirds of the output is exported, under normal conditions. In 1938 over 22,000,000 pounds of bananas were exported to China, Manchuria, and Kwantung Leased Territory, and over 270,000,000 pounds to Japan Proper, out of a crop of about 400,000,000 pounds. In Taichu Province, toward the foothills, bananas are a regular product, ripening all year around. In Takao Province, in the lowlands, they ripen from April to July.

b. *Pineapples* were cultivated in Taiwan before Japanese occupation of the island, but it was not until after the introduction of canning processes (about 1923) that the industry began to expand. Area of cultivation in 1938 was 23,740 acres, the crop amounting to over 116,000,000 pineapples. Extensive plantations are to be found in the central and southern parts of the west coast plain. Taiwan is the third largest producer of canned pineapple in the world, producing 1,000,000 cases out of a total world production of about 12,000,000 cases. The two leading producers are Hawaii (about 8,000,000 cases annually), and British Malaya (about 2,000,000 cases, mainly in Johore and Singapore).

The pineapple canning season in Taiwan is chiefly during the months of July, August, and September. Principal canning companies were the *Taiwan Godo Hori Kaisha*, with large factories at Nisui, Shoka, Kagi, and Toroku; and the Taiko Pineapple Canning Company, with large factories at Nanto and Toyohara. Nine large canneries employed a total of 853 men and 2,934 women in 1935, and there were nearly 80 canneries altogether. It was reported that all of the pineapple canning concerns were merged into one company, and all the pineapple producing companies into another, in the summer and fall of 1935. The amalgamations were brought about by the Government, which exercises supervisory control over these companies, as it does over other industries.

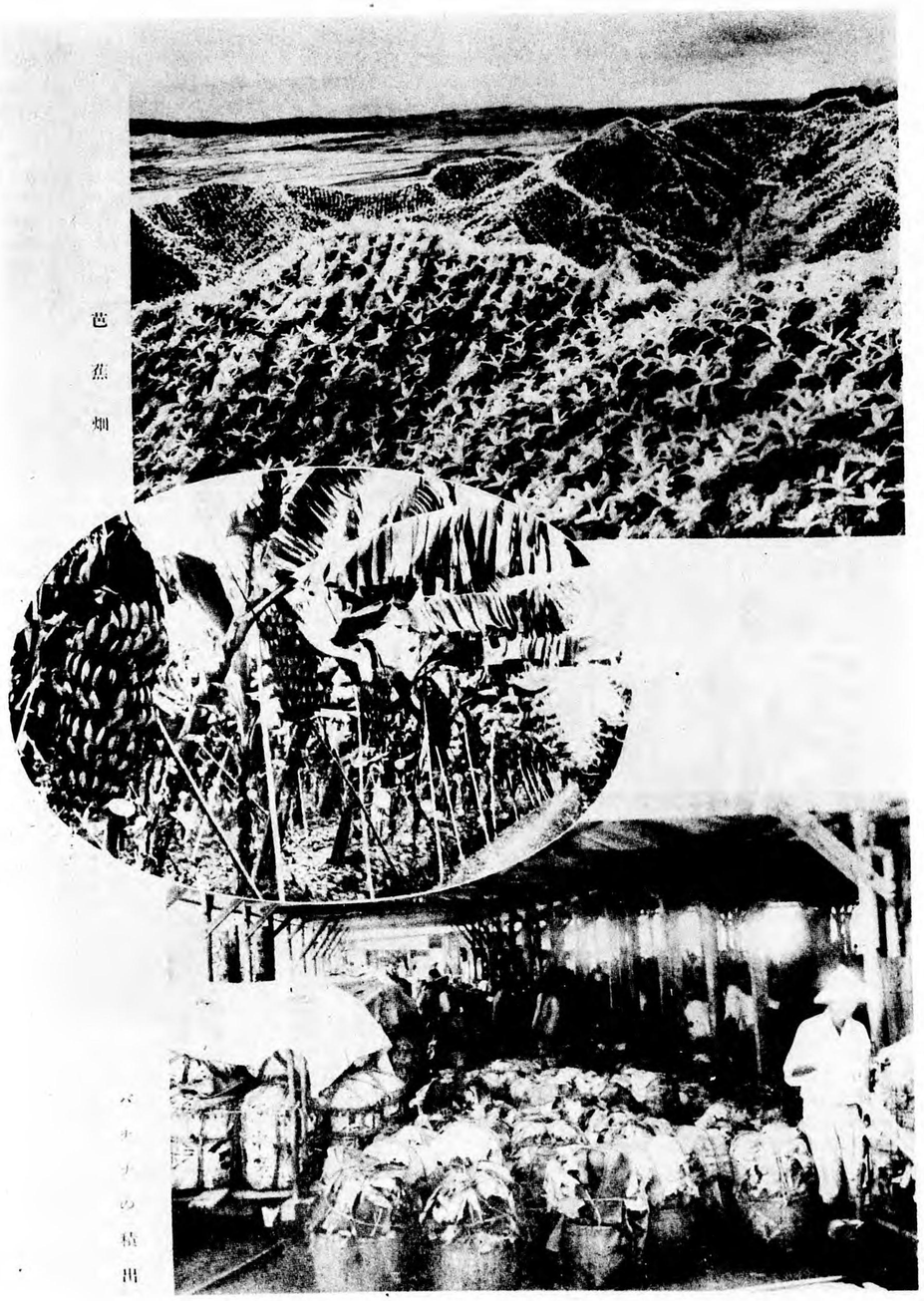
c. *Oranges* are also widely grown as a winter product, the sweet variety known as "ponkan" being considered of especially good flavor. Some lemons and grapefruit are also grown. The value of the citrus crop, around 3,000,000 yen annually, is somewhat less than that of the pineapple crop.

Other fruits such as longans, plums, pomegranates, persimmons, peaches, mangoes, and papayas are produced in smaller quantities.

12. OTHER CROPS. Statistics for minor crops of Taiwan for 1938 were given in Table 7. Those to which the Japanese have given special attention, such as cotton, castor beans, jute, hemp, and ramie, may be mentioned here.

a. *Cotton.* In spite of efforts to promote its cultivation, cotton does not occupy an important place in Taiwan's economy. Nearly 90 percent of the total acreage was in Tainan Province, and increased from 11,985 acres in 1938 to 28,764 acres in 1939. A production of 3,500 metric tons was expected in the latter year. It appeared, however, that the 1939 crop was an almost complete failure. Official statistics placed the 1938 crop at only 1,090 metric tons. (*Failure of Taiwan's Cotton Crop*, John K. Emmerson, American Vice Consul, Taihoku, September 11, 1939.) Cotton

Illus. 7. Pineapple fields, cannery, and warehouse.



Illus. 8. Banana plantations in the foothills, stand of trees, and warehouse full of banana baskets ready for shipment.

planting was begun on a commercial scale in 1937, and the Government spent considerable sums for its encouragement, although it realized that both climate and insects present serious obstacles. Farmers were urged to plant cotton as a matter of national policy. An expert was assigned to each district considered suitable for cotton growing in order to instruct the farmers there. Effort was made to develop a variety of upland cotton resistant to the boll weevil. It was believed that sowing of seeds during June or early July would minimize damage from the unpredictable visits of typhoons and heavy rains. Experiments were made with fertilizers, and a yield of 5.24 *piculs* per hectare (285 pounds per acre) was claimed. This is higher than in Mexico, China, and the United States, but not as high as in Egypt. The Tainan Provincial Government also claimed that profit was as high as that from sugar cane, and higher than that for any other single crop. (*The Cotton Growing Industry of Taiwan*, William E. Yuni, American Vice Consul, Taihoku, July 18, 1938; and *Cotton Cultivation's Future in Taiwan*, Gerald Warner, American Consul, Taihoku, December 10, 1938.) The Taiwan Raw Cotton Company, a subsidiary of the Taiwan Development Company, with a capital of 3,000,000 yen (750,000 yen paid up), was established in May, 1937. Two ginning mills were built, one at Kagi with a capacity of 800 *piculs* per day, and one at Taito with a capacity of 160 *piculs* per day. This provided ginning capacity for considerably more than Taiwan's cotton crop, and it was thought some cotton from other areas might be ginned. In spite of this effort, results were unsatisfactory in three successive years. In 1938, for example, winds and heavy rains during the first week of August practically ruined cotton planted during July. (Consular report, Gerald Warner, American Consul, Taihoku, August 12, 1938.) Although that planted in June fared somewhat better, actual harvest in Tainan Province was estimated at only 462,000 pounds instead of the optimistic forecast of 6,600,000 pounds. In 1939 heavy rains during July destroyed most of the plants. The semi-official newspaper *Taiwan Nichi Nichi Shimpo* suggested that the almost total destruction of the 1939 crop should prove to the authorities that Taiwan was not suitable for cotton cultivation. Under normal conditions the attempt might have been abandoned in favor of Taiwan's staple crops of rice and sugar, but with present wartime needs it is reportedly being continued to obtain even the thousand bales or so which can thus be added to Japan's short supply. (F. C. C., *Radio Report on the Far East*, No. 21, May 25, 1943.) Seed from Taiwan has also been used for growing cotton in other areas under Japan's control, the island being in this, as in many other things, a good laboratory for experiment.

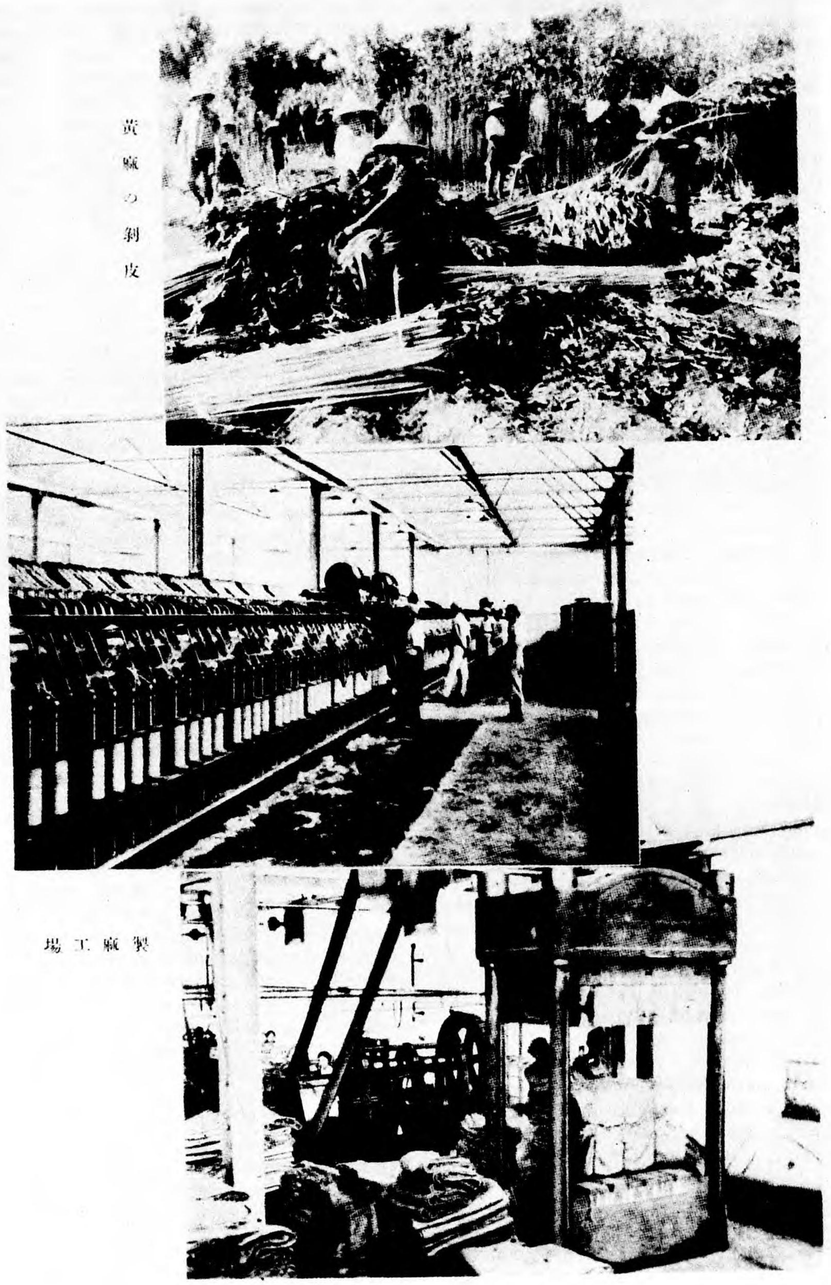
b. *Castor beans.* Under the ten-year plan begun in 1938, special emphasis was to be placed upon expanding the output of castor beans. Much more success was had with this attempt. The climate of Taiwan has always been known to be suitable, but until the oil became of wartime value as an aviation lubricant, farmers found other crops more profitable. Production in 1938 was reported as 1,645 metric tons, and in 1939 as 1,886 metric tons. The Government's plan is to increase acreage to 28,800 acres, and output to about 11,000 or 12,000 tons, by 1948. This would mean a yield of 830 pounds per acre instead of the present 215 pounds. This may be over-optimistic, but efforts thus far have been rewarded. Attempt is also being made to increase output of castor beans in Java, Thailand, and other areas under Japan's control. Farmers there are even being forced to plant them. A plant for pressing oil from castor beans is now reported in operation at Takao.

c. *Sesame and perilla.* These seeds have also been grown for the oil pressed from them. The former grows in Tainan and Takao Provinces. In 1934 a Government nursery began distribution of perilla seed and encouraged its planting in the rice fields. By 1937 about 2,500 acres were reported planted, and the Sugihara perilla oil plant at Takao and the Taiwan Development Company's plant at Tainan had been opened. (*Japan Trade Guide*, 1940.)

d. *Peanuts.* A groundnut, the peanut, grown all over the lowland, is consumed as a foodstuff, and is valuable as a source of oil and as a nitrogen-fixing alternate crop. In 1938 the crop was over 2,500,000 bushels, valued at nearly 4,000,000 yen, with Tainan Province the main producing district.

e. *Fibrous plants.* Attention has also been given to growing jute and hemp. Hemp is grown mostly in Tainan, Taichu, and Takao Provinces. Hemp manufacturing companies are located at Tainan and at Toyohara. Because Japan's former large imports of jute and gunny bags from India are now cut off, strenuous efforts are being made to increase production of jute and hemp wherever possible, notably in Indochina, Thailand, and the Philippines, as well as in Taiwan. As early as 1938 threefold expansion of the 20,000 acres then planted was planned. Achievement of such increase was hindered by Japan's rice shortage, which forced the authorities to reduce sugar acreage in favor of rice. The sugar interests thereupon obtained land allotted to jute, cotton, and other industrial crops. (*Annual Review of Commerce and Industry*, 1939, first section.) Production of jute and hemp in 1937 and preceding years was 10,000 to 12,000 metric tons, ten times as much as was produced in Japan Proper, but only about half as much as Japan's imports from India. Jute and hemp are important for the manufacture of airplane cloth, but more especially important for burlap bagging. Although output of jute in 1939 did not reach the hoped-for 35,000 tons, it did rise to about 15,000 tons in 1938 and to 25,000 tons in 1939, a significant increase.

In 1938 local production of gunny bags was estimated at 6 million bags. About 9 million new and 13 million used bags were imported (mainly from India and



Illus. 9. Cutting canes for hemp, spindle room, and gunny-sack baling outfit.

Japan) to supply the 9 million bags needed for sugar export, 11 million for rice export, and 8 million for rice locally consumed. ("Taiwan Rapidly Achieving Self-sufficiency in Jute," *Foreign Agriculture,* July, 1939.) Additionally, 3,500 tons of jute were imported in 1938.

f. *Tobacco.* Three varieties of tobacco—the American yellow leaf, Chinese, and cigar—are cultivated, chiefly in Tainan and Taichu Provinces, and in Karenko District. Formerly the American variety was grown almost entirely in Karenko District. (*Tobacco in Taiwan,* John B. Ketcham, American Consul, Taihoku, September 19, 1934.) Total area under cultivation is about 4,000 acres, and the crop amounts to nearly 3,000 metric tons. Cultivation of tobacco requires a license from the Government, which is given directly by the Monopoly Bureau through its branch offices, since tobacco is a Government monopoly. Tobacco products are manufactured by the Taihoku factory of the Monopoly Bureau. The aborigines raise a coarse grade of tobacco for their own consumption, and those in the mountain areas were exempt from the regulations of the Monopoly Bureau. Elsewhere throughout the island dealers are licensed by the Monopoly Bureau. Even in remote villages they have its insignia, indicating that cigarettes are for sale.

g. *Vegetables.* The most important of the many kinds of vegetables grown are indicated in Table 7 above. Vegetables are grown the year around, and are more plentiful in winter than in summer. Total value of the vegetables grown is almost as great as that of the fruits, exceeding 15,000,000 yen annually.

Betelnuts are a local crop of little economic significance but of some importance to the Formosan-Chinese, particularly in the southwest. Chewing of the nut has been forbidden, but there has been little attempt to enforce the prohibition.

13. STOCK FARMING AND POULTRY. Distribution of livestock and poultry is much like that of the nearby Philippine Islands. In 1938 there were reported to be in Taiwan 260,000 water buffalo (similar to the Philippine carabao) and 65,000 cattle. The water buffalo is strong and subsists on coarse fodder, but it depends on constant availability of water holes in which to bathe.

Official figures—for what they may be worth—indicate that in 1938 there were about 1,825,000 hogs, 7,000,000 chickens, 2,000,000 ducks, 400,000 geese, and 35,000 turkeys. Ducks are raised for food and their feathers are exported. Duck eggs are preferred to the eggs of chickens as food. There are few horses, sheep, or goats, and not many milk cattle. Horses were used only by the army. The Government-General appropriated sums for maintenance of a few hundred of them, and established a Horse Breeding Station at Karenko. Some goats were raised for their milk and as food. Cow's milk was not very important, output in 1938 being a little over 500,000 gallons. Like all other people of East Asia, the Formosan-Chinese have no dairy industry and care little for dairy products.

Pork is the principal meat item in the Formosan-Chinese diet. Consumption per person is about 25 pounds per year. Over 1,000,000 hogs were slaughtered annually in normal times. Some of the meat was sent to South China and the South Seas. An improved breed (Berkshire) was introduced by the Japanese. It is said now to constitute about 90 percent of the island's swine herds. (*Japan Trade Guide,* 1940.) Hogs owned by the farmers average 4 per household. These and other animals reportedly have been requisitioned by the army. Strenuous efforts have been made to eliminate hog cholera, some of which still exists.

Strict governmental regulation of the market for hides and skins was effective August 1, 1938, although the order which attempted to prohibit their use for leather goods was later rescinded. Provincial livestock associations were to purchase hides and skins, selling them to the army and to the Live Stock Industrial Company for tanning and manufacture. Leather for shoes or other consumers' articles was very scarce even then. (*Hides and Skins in Taiwan,* Gerald Warner, American Consul, Taihoku, August 10, 1938; and *Exports of Hides and Skins from Taiwan,* Gerald Warner, American Consul, Taihoku, August 23, 1938.) This was true in spite of the fact that the output of hides was reported to be between 30,000 and 40,000 during the years 1933-1937, but increased greatly, to 607,251 in 1938, and to 1,193,227 in 1939. Such facts point to a probable decline in livestock population.

14. SERICULTURE. Taiwan has had some importance as a source of silk-worm egg-sheets for Japan Proper during the winter months. Sent to Japan with the coming of spring, these egg-sheets served to eliminate a break which might otherwise have occurred each year in Japan's silk production.

Sericulture was introduced in 1912 as a sideline for farm families, but it experienced a slow growth. In early years allotments for its encouragement were small, but before 1930 about 4,000 households were engaged in it, and mulberry plantations covered 1,000 acres. (*Sericulture in Taiwan,* Charles S. Reed II, American Vice Consul, Taihoku, March 6, 1930.) The Central Nursery at Taihoku distributed egg-sheets and experimented with fertilizers for the mulberry trees. In 1930 almost the entire production of cocoons was made into raw silk at the Taiwan Silk Thread Company factory *(Taiwan Sanshi Kabushiki Kaisha)* at Taihoku. Decline set in after that year, however, and the cocoon crop which was 10,000 or 12,000 bushels just prior to 1930, dropped to only a little over 5,000 bushels in 1938.

15. MARINE INDUSTRY.

a. *Marine products.* The fishing industry was never very progressive, although recently it received Governmental encouragement. Bonito angling and trawl-line fishing for tunny and swordfish are carried on chiefly from Takao, Keelung, the east coast port of Suo, and

Illus. 10. Cinchona plantation near Raisha, Takao Province, and rice planting in south Taiwan.

the Pescadores. "Tai," a favorite fish of the Japanese, is of some importance, while sardines and shark constitute the biggest part of the fishing catch. Twenty to fifty whales were formerly caught each year by two whaling ships operating from Daibanretsu, at the southern tip of the island. Culture of freshwater fish is also of some importance, with 70,000 acres devoted to hatcheries. (*Japan Trade Guide*, 1940.) Coral from the waters near Keelung, Hoka-sho and Menka-sho is a minor product. Artistic coral articles produced at Keelung are known as "Keelung Coral," and the output is valued at nearly 1,000,000 yen annually.

Table 13. Fish Catch and Marine Manufactures (1938).

(in metric tons)

a. *Rough catch*	
Sardine	7,853
Shark	6,098
Tunny	3,641
Swordfish	2,506
Tai	1,151
Bonito	990
Shellfish	773
Shrimp	746
Cuttlefish	724
Seaweed	544
Coral	6
b. *Foods*	
Dried bonito	64
Dried fish	559
Salted and dried fish	75
Boiled and dried fish	3,945
Salted fish	124
c. *Non-foods*	
(value in 1,000 yen)	
Fertilizer	6
Fish oil	28
Other manufactures	185

Source: *Far East Year Book*, 1941.

b. *Organization of the marine industry.* Fishing is an auxiliary occupation, for the majority of fishermen are at the same time farmers living in villages along the shore and devoting more time to their fields than to fishing. In 1935 there were reported to be 34,586 full-time fishermen, and 53,131 part-time fishermen. About 63,618 of these were in the Takao district and in the Pescadores.

Takao is the most important fishing center, with special radio services for the larger fishing boats. The Spratly Island fisheries were operated under the jurisdiction of Takao City before the war. Anping is also a fishing port, and plans have been made to develop fishing activities off Karenko.

In 1937 there were sixty-two fishermen's associations, with a total membership of 16,516 persons, and there were 94 fish markets throughout the island. Fishing craft in operation included 1,053 power boats, 3,939 sailing vessels, and 5,279 bamboo rafts. (*Japan Trade Guide*, 1940.)

Two Japanese corporations, with a paid-up capital of 65,500,000 yen, and headquarters in Japan Proper, dominated the fishing and fish canning industries. Additionally, 28 Japanese firms had their headquarters in Taiwan. They had a paid-up capital of 3,044,000 yen, while 21 Formosan-Chinese firms had a paid-up capital of 399,000 yen.

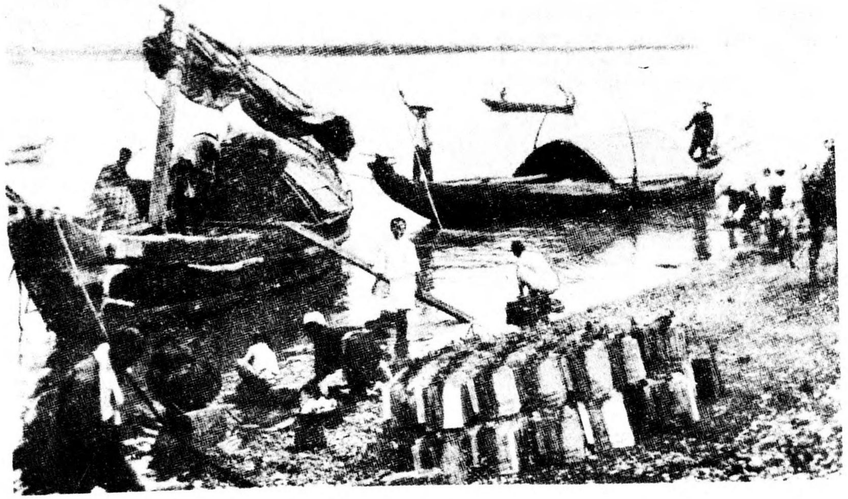
In 1943 it was reported that eleven Taiwan fishing companies had merged with marine products companies in Japan to form the South Japan Fishery Control Company, capitalized at 50,000,000 yen. Only those firms having fishing boats of 50 tons and over qualified as members.

Fresh fish are exported from Taiwan to Japan; salted, dried, and canned fish are imported. As indicated in the tables of imports and exports, the island is a net importer of fish. Exports of fresh fish amounted to about 7,000 tons, valued at around 4,000,000 yen, or $1,000,000. Imports of salted and dried fish amounted to over 25,000 tons, valued at over 6,000,000 yen, or around $1,500,000. Thus although it is often stated that the annual fish catch is large and supplied a surplus for exports, exports are much more than offset by the imports, chiefly from Japan Proper, of salted and dried fish.

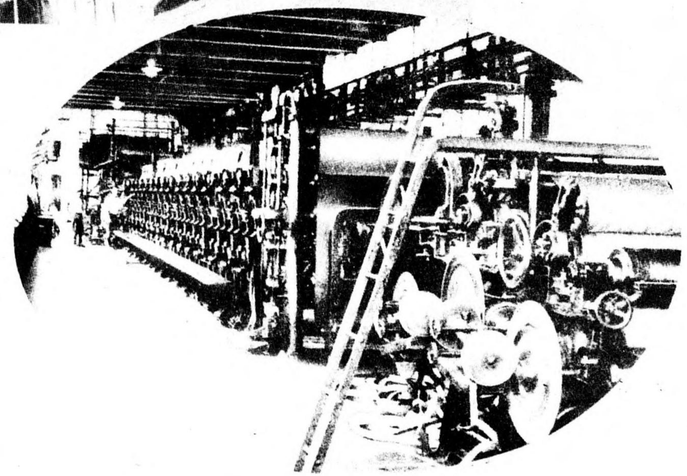
16. POSTWAR ECONOMY. The foregoing agricultural survey has indicated the outstanding features of Taiwan's economy, an economy based chiefly upon rice and sugar, which constitute 70 percent of the value of agricultural production. Sugar alone constitutes more than half the value of industrial production. As exports, sugar and rice equal the value of all imports. Taiwan will emerge into the postwar period, probably, with a minimum disruption of its economic life, if production of and markets for sugar and rice are maintained. Farm implements, which for most farmers have been very crude, and farm machinery used on lands of the sugar companies, will have deteriorated. The shortage of fertilizer, evident as early as 1939 and accentuated thereafter, will undoubtedly continue.

The two basic crops pose some problems of readjustment, because Japan has purchased most of the sugar and the exportable surplus of rice. Japan's rice deficiency, amounting to about 20 percent in the years before the war, will no doubt be as great in the postwar period. Taiwan's sugar industry has been protected against competition of lower cost sugar from Java by being within the Japanese tariff system. Severance of Taiwan from Japan would, incidentally, bring Japan into the world market for sugar. Reduction of sugar exports and other use of land now devoted to sugar cane would bring difficulties of readjustment. Rice and sugar have been competing crops, and the shift might be from sugar to rice.

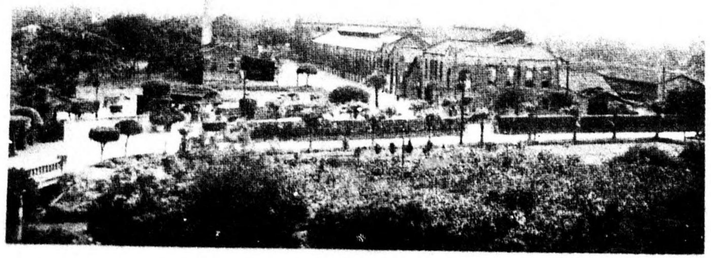
It is evident that Taiwan has neither the raw materials for textiles, nor the mills to produce fabrics. Cotton crops have been failures, no wool is produced, and even the silk industry is very small. The only textile mills of importance are those for ramie and hemp, and jute bags. In the years before the war there were recommendations that the textile industry be encouraged. Those of Dr. Yoshihiko Taniguchi, Professor at Kyoto Imperial University, in 1939, were particularly interesting: (a) promotion of the textile industry, utilizing Chinese, Indian, and Formosan cotton; (b) small-scale industry rather than any attempt at establishment of heavy industry; (c) exercise of care in any shift from emphasis upon agriculture to emphasis upon sugar; and (d) utilization of labor from the commercial and



Illus. 11. Junks for coastwise traffic tied up at Tamsui; wharf-side market for deep-sea fish.



製紙工場

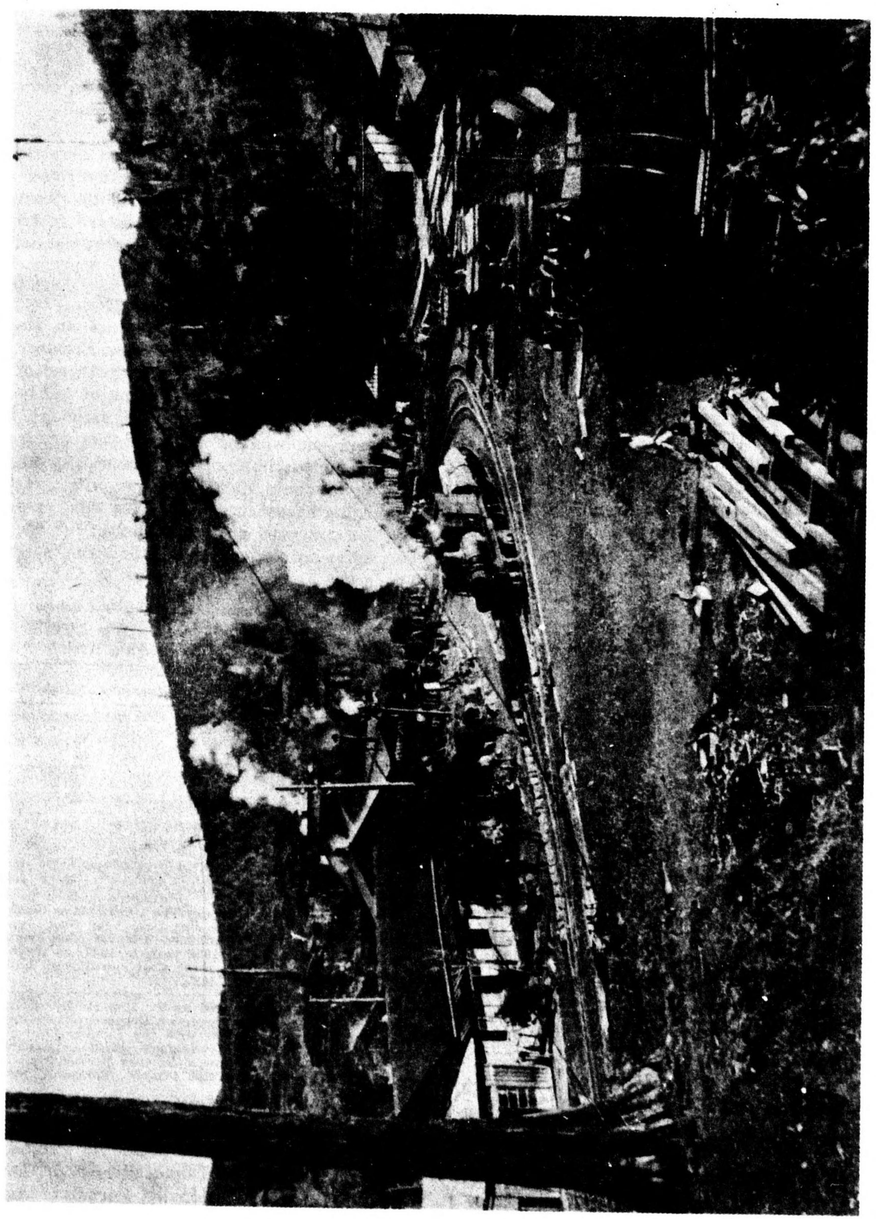


Illus. 12. Straw accumulated for paper manufacture, processing machines, and paper factory.

"non-working" classes, which he believed to constitute nearly half of Taiwan's population.

Imports of fertilizers, amounting in value to between $10,000,000 and $15,000,000 annually, have been much larger than any other import, or than any export except rice and sugar. Establishment of some plants producing artificial fertilizers can hardly have eliminated the need for imports. Fish, machinery and metal manufactures probably will be short. Some crops other than rice and sugar, such as tea (which was exported to foreign countries prior to the war), or perhaps pineapples may be exportable.

Taiwan's economy has advantages in its self-sufficiency in basic foodstuffs, and the relatively better condition of its farmers than those of Korea or Manchuria, which may enable the island to get along satisfactorily in the postwar period. Chief obstacles to this will be possible wartime destruction on the island, and the difficulty of finding markets for sugar and perhaps for other products.



Illus. 13. Lumbering equipment at Numanohira in the Arizan district.

IV.

FOREST PRODUCTS

1. Forest Areas. Forests and scrub cover almost two-thirds of Taiwan, or an estimated 5,825,000 acres out of the island's total area of about 8,885,000 acres. Of the 5,825,000 acres, about four-fifths is forest-land, and the remaining 1,300,000 acres scrub land. More than half of the forest area, however — and actually most of the good forests—lies in almost inaccessible mountain areas at elevations of 7,000 to 12,000 feet above sea level. One reason for the small lumber production is that transportation from such areas is difficult. Another is the government conservation program. At present most lumber is brought down the government lumber railways to the depots at Kagi, Rato, and Toyohara.

2. Government Forests. The Government owns most of the scrub-land and nearly 4,000,000 acres out of the 4,500,000 acres of forest land. (*Far East Year Book, 1941.*) There are reported to be no Imperial Household forests such as those which are important on Hokkaido. The official survey of 1932 estimated timber-stands at 136,792,000 cubic meters of broad-leaved trees, and 70,902,000 cubic meters of conifers, or a total of 207,694,000 cubic meters. Of this it estimated that 197,380,000 cubic meters, or 95 percent, were owned by the Government. (*Japanese Timber Stands with Particular Reference to White Oak*, Carl H. Boehringer, Assistant Trade Commissioner, Tokyo, June 4, 1936.) Estimates of timber stands were made by the Forest Research Institute of the Department of Agriculture and Forestry, and were stated to include only timber available and accessible for commercial use.

a. *Mount Ari.* The best natural forests are those on the high and inaccessible central mountain ranges. There are also extensive forests in the valley of the Dakusui River, and in some parts of the Karenko District. Famous Mount Ari, west of Mount Niitaka, is covered with red cypress, Mongolian oak, and hemlock. Some of the trees are at least 3,000 years old. From Kagi a narrow-gauge railroad runs for 46.6 miles to Nimampei on the slope of this mountain, with a 6.6 mile branch from Arisan to Niitakaguchi. Logging operations are carried on by the Government, which built the railroad in 1913 after a private company had failed. (*Japan Trade Guide, 1940.*) (For details on the building of this railway, see *Arisan Railway*, Arisan Forestry Bureau, Government-General of Formosa, January, 1913, enclosure to *Taiwan Government Reports*, Samuel C. Reat, American Consul, Tamsui, May 8, 1913.) Altitude of this Arisan forest area varies from 2,800 to 8,700 feet above sea level. American rope-way lumber conveyors and other mechanical equipment are used. Wood from these very old trees has been used for the construction of shrines and temples in Japan Proper, among them the Kashiwabara Shrine dedicated to the memory of the first emperor, Jimmu, the Imperial Mausolea at Momoyama, and the Meiji Shrine. Shipments of Taiwan lumber to foreign countries have been negligible, but shipments to Japan Proper represented about one-fourth of total sales in the years 1831-1934, amounting to nearly 9,000,000 board feet out of total sales of about 35,000,000 board feet annually. (*Japan Year Book*, 1936.)

b. *Mount Taihei and Mount Hassen.* Two other good areas for the lumber industry are on Mount Taihei, near the town of Rato, in Taihoku Province on the east coast, and near Mount Hassen, northeast of the city of Taichu. These also are locations of fairly large-scale government logging enterprises, although their elevations are somewhat greater and they are less exploited than Mount Ari. The Government has supervised the cutting of these timber regions with great care, not permitting heavy cutting, and for this reason the island has not produced sufficient lumber for its own needs. The following table indicates Taiwan's position in lumber in the Japanese Empire, as of 1940.

Table 14. Supply and Demand for Lumber in the Japanese Empire during 1940.
(in 1,000's of board feet)

	Japan Proper	*Karafuto*	*Korea*	*Taiwan**	*Total*
Lumber production	11,523,000	1,230,000	1,245,120	226,080	14,224,200
Received from other parts of Empire	333,840	.....	387,240	256,320	977,400
Imports from foreign countries	387,480	.....	37,440	2,280	427,200
Stocks at end of 1939...	3,496,920	501,720	483,600	103,440	4,585,680
Total supply, 1940.....	15,741,240	1,731,720	2,153,400	588,120	20,214,480
Shipments to other parts of Empire	669,360	254,520	26,880	26,640	977,400
Exports to foreign countries	1,042,200	36,000	60,600	7,680	1,146,480
Total demand, 1940	11,022,720	939,480	1,606,560	450,360	14,019,120
Stocks, end of 1940.....	3,006,960	501,720	459,360	103,440	4,071,480

* The figure here given for Formosa's lumber production varies from that in other sources. The *Japan Year Book* gives figures which are lower, and the *Far East Year Book* figures which are much lower. It seems unlikely, however, that lumber production should be lower in 1936-1938 than in 1927, as these latter sources suggest. Output of the three above-mentioned lumber areas was 35,000,000 board feet in 1927.

Source: Statement submitted by the Department of Agriculture and Forestry to the House of Representatives on February 18, 1941, in connection with the Lumber Control Bill, and reported in local newspapers; cited in *Review of Developments in the Japanese Lumber Market*, Carl H. Boehringer, Assistant Commercial Attache, Tokyo, August 25, 1941.

3. Uses of Taiwan's Lumber. Formosan cypress, laurel oak, cedar, camphor, and hibiscus were used both in Formosa and in Japan Proper for cabinet work and house construction. (*Annual Review of Commerce and Industry, 1927.*) Additionally, Formosan lumber is used for building wooden ships; cryptomeria (Japanese cedar), especially, may be used for keels of vessels.

Although no reports have been received of Taiwan's part in the wood shipbuilding program, Governor-General Hasekawa mentioned it among the programs in which Taiwan might well participate. (F. C. C., *Radio Report on the Far East*, No. 21, May 25, 1943.) Recent broadcast reports added that companies building wooden ships were established at Keelung and at Takao, and that a number of wooden ships were being built at each of these ports. Official figures for lumber production in the several years preceding outbreak of war, except those for 1940 cited above, were not given, but it was evidentally increasing. Shipments to Japan, which had been less than 9,000,000 board feet in 1934, rose to 13,500,000 board feet in 1938, to 19,000,000 board feet in 1939, and to 26,000,000 board feet in 1940. (*Annual Reviews of Commerce and Industry*, 1938 and 1939.) Increase in production after 1937 was thus much greater than increase in shipments to Japan.

Even with this increase in lumber output, and in spite of its high percentage of forest area, Taiwan produced in 1940 only a little over half enough lumber for its own needs. Although its area is about 5 percent of the Empire total, it produced only about 2 percent of Empire production. Karafuto, of course, has a surplus for export, while Korea produced in 1940 over 75 percent of its requirements.

There are many sawmills on the island, located chiefly at Taihoku, Rato, Keelung, Shinchiku, Taichu, Shoka, Kagi, Tainan, and Takao, with others at Karenko, Taito, Yobai, and Toen. These, like other small businesses, are chiefly Formosan-Chinese-owned, although some are Japanese.

4. Other Forest Products. Other forest products in 1938 were 407,000 metric tons of firewood, 53,000 metric tons of charcoal, together with about 40,000,000 pieces of bamboo. (*Far East Year Book*, 1941.) Tropical and subtropical forests cover the foothills, bamboo and camphor trees being important. Banyans, mangroves, tree ferns, and wild pineapples make areas difficult to penetrate. Natural camphor, of course, of which Taiwan has a world monopoly, is an important product from government-operated plantations in these foothill areas and lower mountain slopes. Camphor has been a government monopoly since 1899, although manufacturing of camphor and camphor oil was carried on by the *Taiwan Seino Kaisha* (Taiwan Camphor Producing Company), until 1934.

Along the coasts mangrove is found in many places. Wood of this shrub is used for posts and fuel. The bark is used for medicine and tanning. The Hoshi Quinine Industry Company (also referred to as the Hoshi Pharmaceutical Company), a subsidiary of the Taiwan Development Company, and capitalized at 250,000 yen (fully paid-up), has plantations of cinchona trees, the bark of which is used in the preparation of quinine. These trees, and coffee, are found in Taito Province. This same company has coca plantations in the southwest from which cocaine and other narcotic by-products are obtained.

The wood pulp industry (discussed hereafter) has also been expanding since 1935, there being two large Japanese pulp companies.

5. Postwar Position. A number of indications suggest that, although Taiwan's lumber imports have in the past been much greater than exports, Taiwan might be self-sufficient in lumber, if greater use could be made of the resources available. Greatly increased lumber production in 1940 is one indication of this, but available information is not adequate for final judgment.

In recent years the Government has encouraged reforestation, and with the virgin forests which still remain in the mountain districts, Taiwan has large forest resources. In 1935 its commercially available timber stands were estimated at over 205,000,000 cubic meters of lumber, as compared with 160,000,000 cubic meters in Karafuto, and 245,000,000 in Korea.

V.
ELECTRIC POWER

1. GENERAL. Heavy rainfall upon the mountains, drawn off by swift streams, provides an abundant supply of water power for the generation of electricity. As late as 1938, however, this resource was largely unexploited, and even now (1944) the total power capacity cannot have reached 600,000 kilowatts, and is probably under 400,000 kilowatts. Potential capacity in 1938 was estimated at 2,576,000 kilowatts, while actual power generated totaled only about 180,000 kilowatts, though electric power even at this time was Taiwan's most valuable non-agricultural resource. Another 54,000 kilowatts were generated by steam power. (*Electric Power in Taiwan*, Gerald Warner, American Consul, Taihoku, September 16, 1938.) Preliminary estimates made by the Bureau of Communications and Transport of potential power of the chief rivers and streams were as follows (in 1,000 kilowatts):

Tamsui	188	Chippon	4
Giran Dakusui	45	Roka	4
Hozan	24	Karenko	165
Dai Nan-oh	30	Dai Mari	9
Taian	98	Takkiri	211
Taiko	514	Shukoran	154
U	139	Daidakusui	168
Dakusui	364	Daibabukutsu	33
Sobun	24	Hinan Dai	101
Shimotamsui	293	Others	4
Others	4		
Total Western Provinces	1,723	Total Eastern Districts	853
		Grand Total	2,576

Establishment of strategic metal and chemical plants under Japanese wartime plans became possible only after completion of large hydroelectric plants. More complete utilization of the island's water power resources can form a basis for further industrial expansion.

The Taiwan Electric Power Company (a semi-official concern) was responsible for constructing the Lake Jitsugetsutan power plants, completed in 1934 and in 1937, and also for bringing to the island aluminum, chemical, and steel alloy plants. In 1938 it was estimated that 20,000 kilowatts of power a year should be added to provide for the planned industrial progress. This was being done, at least until 1940, in spite of shortages of materials and labor, according to a statement by an expert of the Taiwan Electric Power Co. (*Labor Problem in Taiwan*, Gerald Warner, American Consul, Taihoku, November 10, 1938.)

2. TAIWAN ELECTRIC POWER COMPANY. The Taiwan Electric Power Company has been the instrument of official Japanese policies concerning industrial development. The first power plants were built by the Government-General soon after Japan gained control of the island. When the Taiwan Electric Power Company was organised under regulations issued in April, 1919, establishing it as a quasi-public concern, the Government-General appraised its power plants at 12,000,000 yen, and invested that sum in the company. The remainder of the capital was furnished by the Japan Life Insurance Company, Mitsui, and other private interests. Later, bonds were sold in the United States to provide funds for the Jitsugetsutan project.

In 1938 plants of this concern had capacity for generating 88 percent of Taiwan's power output at that time, or 200,000 kilowatts out of 225,000 kilowatts generated. Principal plants, of course, were those at Jitsugetsutan, but the company also operated thermal (coal) plants of 5,000 kilowatts at Matsuyama, 2 miles east of Taihoku, and of 13,000 kilowatts at Takao; and about eight other hydroelectric plants, the most important of which were two near Shinten, south of Taihoku, with a combined capacity of 5,150 kilowatts, and two near Giran, on the northeast coast, with a combined capacity of 8,100 kilowatts.

At the same time it had underway three hydroelectric power projects near Shinten, at Musha, and near Rato. Two other projects were planned for completion by 1944, but without further evidence must be considered as being in the "paper-construction" stage. As part of this expansion program, capital of the company was increased from 45,750,000 yen to 70,000,000 yen, of which 51,812,000 yen were paid up in 1939.

This company thus operates throughout most of the island, except on the east coast. Although the original policy had been to grant it exclusive right to develop power resources throughout the whole island, technical and financial difficulties caused the Government-General to organize in addition the East Taiwan Electric Power Company, so that resources in the eastern area might be developed by a controlled company with capital and technicians supplied by manufacturers who were also to be power consumers. (*East Taiwan Electric Power Company to be Established*, Gerald Warner, American Consul, Taihoku, November 28, 1938.)

Current supplied by the Taiwan Electric Power Company is alternating, 60 cycles, 3 phases, furnished to consumers for lighting and other household purposes at 100 volts. In 1936, there were reported to be about 17 electric lights per 100 population, and use of power was about 8 kilowatts per 100 households. Current for power was direct, furnished in two voltages: 200 volts, called "low pressure," and 3,000 volts, called "high pressure." At the end of 1933, demand for power amounted to 76,234 kilowatts (24,028 kilowatts for lighting, 50,762 kilowatts for motive power, and 1,444 kilowatts for fans). (*Rural Electrification in Taiwan*, Edward S. Maney, American Consul, Taihoku, June 24, 1935.) All of this was supplied by the small plants, since this was prior to the initial operation of the first Jitsugetsutan Plant. By 1936 total demand for power was reported to be 107,500 kilowatts, of which the Taiwan Electric Power Company supplied 97,000 kilowatts. (Third World Power Conference, Washington, 1936 Section V, Paper No. 13, *Development of Jitsugetsutan Hydroelectric Power System.*) By 1937 industrial demand for power had increased to 44,000 kilowatts for metal plants, 36,000 kilowatts for foodstuffs, 25,000 kilowatts for mines, and 20,000 kilowatts for miscellaneous plants. Factories producing textiles, machinery, ceramic products, chemicals, lumber, agricultural and marine products, and printshops, together, required only 28,000 kilowatts. This suggests that the power of the large plants was necessary only for the metal and other plants established in the industrialization program.

a. *Jitsugetsutan.* Lake Jitsugetsutan, formerly known as Lake Candidius, is situated almost at the geographic center of Formosa. It is a small lake, 1,985 acres in area, surrounded by mountains, at about 2,500 feet above sea level. In 1919 a plan was developed to use this lake and the water of the Dakusui River to generate electric power. Lack of funds, the Japanese earthquake of 1923, and other difficulties delayed development until a survey in 1928 by an American engineering firm demonstrated its feasibility. In June, 1931, a loan of $22,800,000 (45,737,210 yen) was obtained through a New York banking syndicate. With this, plus a Tokyo issue of 19,500,000 yen, work was begun in October 1931 on the basis of plans recommended by the American engineers. A 160-foot concrete dam was built at Bukai, 9.3 miles northeast of the lake. The water impounded by this dam was diverted through a water channel to the lake. Banks of the lake then had to be raised at two points by earthen dams, the Suisha and Tosha dams, and the water led off into a tunnel 13 feet in diameter. The water falls 1,100 feet and is then diverted into five penstocks, each 47 to 66 inches in diameter, connected to five generators, each of which has a generating capacity of 20,000 kilowatts. (*Rural Electrification in Taiwan*, Edward S. Maney, American Consul, Taihoku, June 24, 1935.) This Jitsugetsutan Plant No. 1, at Monpaitan, Taichu Province, was the island's first large power plant, and at the time of its erection, one of the large plants in the Far East. Plants at the Suiho dam on the Yalu River, planned to produce 640,000 kilowatts, of course now exceed this in size.

Three years later a second plant was completed and began operation at Suiriko, southwest of the Tosha dam. This Jitsugetsutan Plant No. 2, located south of the first plant, receives water from it via a conduit 16,151 feet long. Exact location of this plant is not known. Information placed it south of the first plant, near the railroad. The location described, however, was more applicable to a point a little to the east, in the valley running down from the Tosha dam. It has 2 penstocks 948 feet long, and an effective head of water of about 450 feet. Its capacity commonly in use is 43,500 kilowatts. ("Capacity commonly in use" may be defined as the capacity available for six or nine months in each year, that is, except in the dry season.) A third plant has been planned, to have a capacity of nearly 25,000 kilowatts, and to be located west of Suiriko. As far as information is available, it has never been constructed.

Power from these plants is distributed throughout the entire west coast region of the island by 154,000 volt transmission lines, 116.19 miles to a substation at Taihoku, and 99.17 miles to one at Takao. Power also is furnished to industries at Keelung. In 1939 the largest industrial consumers were the Japan Aluminum Company at Takao (27,000 kw.), the Taiwan Denka Kaisha (Electro-Chemical Company) at Keelung (12,300 kw.), and the Taiwan Mining Company (subsidiary of the Japan Mining Company) at Kinkaseki. The two Jitsugetsutan plants in 1939 produced over 85 percent of all hydroelectric power produced by the Taiwan Electric Power Company, and 64 percent of its total power output (hydroelectric and steam power combined). In 1940 they still produced over half of all power used on Taiwan. Should they be destroyed not only would the large industrial plants be without power facilities, but other plants, cities, and power consumers might face a shortage.

b. *Supplementary steam and hydroelectric plants.* Prior to the building of the Jitsugetsutan plants, the Taiwan Electric Power Company had operated a number of steam and hydroelectric plants elsewhere in the island. Two of these, a 950 kilowatt steam plant at Taihoku and a 500 kilowatt steam plant at Takao, were dismantled. After the Jitsugetsutan plants began operation, the others were closed down but were maintained in condition for possible use. In May, 1939, they were reported again in operation. A list of these plants is given in Table 71. Most of them are small, their combined total capacity in 1934 amounting to only 41,050 kilowatts. The largest thermal (coal) plant was at Takao, with a capacity of 13,000 kilowatts. In March, 1939, the company opened a new thermal power station of 38,000 kilowatts capacity on the coast at Hattoshi, about 4 miles east of Keelung. This was to supplement output of the Jitsugetsutan No. 1 and No. 2 plants during the dry months from September to December, when their output drops to 71,500 kw. and 24,650 kw. respectively. Reports have been made of plans for a similar plant at Takao, but these are not confirmed.

c. *Further hydroelectric plant construction.* The Taiwan Electric Power Company had three hydroelectric projects underway in 1939, two of them planned for completion by the end of 1940. One of these, the Enzan plant near Rato, was to develop 16,300 kilowatts; another was at Shin-Kizan (near Shinten, in Taihoku Province), with 13,000 kilowatts capacity. The third project was at Musha, about 16 miles northeast of Lake Jitsugetsutan in the aboriginal district, and was intended to supplement the Jitsugetsutan plants. It included two generating stations: Musha No. 1 (21,400 kilowatts),

and Musha No. 2 (27,100 kilowatts). In September, 1938, a consular report stated that Musha No. 2 plant was under construction, to be completed (according to plan) by the end of 1939. In June, 1939, however, it was reported that neither of the Musha projects was scheduled for completion until December, 1943, and that plans were "subject to frequent alteration or even abandonment." (Voluntary Report, *Electric Power in Taiwan*, American Consulate, Taihoku, June 9, 1939. Commerce No. 13749.)

d. *Taiko River Plans.* The Taiko River, flowing down from Mount Hassen, and emptying near Taiko in Taichu Province, is the site of ambitious plans for development of 300,000 kilowatts of power. These plans, however, seem not to have materialized. Projects somewhat nebulously planned for operation in 1944 were to include a 70,700 kilowatt station at Toyohara, near Gosei, and a 98,000 kilowatt station at Tenrei, also in Taichu Province.

3. East Taiwan Electric Power Company. In May, 1939, the East Taiwan Electric Power Company was established by the Government-General as a "national interest" monopoly concern to exploit the water power resources of East Taiwan. Its status, in the Taito and Karenko districts, was to be similar to that of the Taiwan Electric Power Company in the other five provinces. The Japan Aluminum Company subscribed for half of the 400,000 shares authorized, and it received prior license for supplies of electric power. Other firms to receive power were the *Toho Kinzoku Seiren Kaisha* (Oriental Metal Refining Company, refining nickel, cobalt, and antimony), the Shinko Nitrogen Company (subsidiary of the Chosen Chemical Industry Company), the Ensuiko Sugar Company (producing sugar and absolute alcohol), and the Taroko Electrical Chemical Industry Company (nitrogen, explosives, etc.). Capital (in which these five companies were to participate) was to be 30,000,000 yen, later to be increased to 100,000,000 yen.

In 1938 an official investigation estimated the potential power capacity of Taiwan's east coast at 850,000 kilowatts. The first projects were to be 80,000 kilowatts on the Takkiri River, just north of Karenko, and 30,000 kilowatts or more on the Mokka River which empties into the Karenko River just south of Karenko. These projects were to be completed by 1945, but the Takkiri plants had not been begun and probably had not been surveyed in 1940. The Karenko plant of the Japan Aluminum Company reportedly began operations in 1940, obtaining its power from the Kiyomizu No. 1 station (7,000 kilowatts), and the Kiyomizu No. 2 station (5,000 kilowatts), the Hatsune plant (1,600 kilowatts), and the Domon plant (23,200 kilowatts). (*Aluminum Production in Taiwan*, Gerald Warner, American Consul, Taihoku, Nov. 1, 1938.) These are believed to be on the Mokka and Kiyomizu Rivers. Some sources indicate that they are now under the direct control of the Japan Aluminum Company.

4. Smaller Companies. Almost every village of any size is served by electric current. Although the Taiwan Electric Power Company is equipped to serve most of the west coast plain, as well as the northeast coast from Keelung to Suo, five smaller companies formerly operated small power plants in various towns. Their plants ranged in size from a 3,000 kilowatt steam power plant at Kagi to a 7.5 kilowatt water power plant at Nansho (location of a coal mine). Combined capacity of all of these plants was only 5,614.5 kilowatts. In 1940 the two most important of these companies (Taiwan Electric Company and Taiwan Godo Electric Company) were merged with the Taiwan Electric Power Company. (*Kabushiki Kaisha Nenkan*, 1941, p. 206.) It is probable that the latter semi-official power company now controls all electric power in Taiwan, except for some plants on the East Coast. The Karenko Electric Company, Ltd., served the east coast from Karenko to Tamazato, and in addition there are the Mokka River plants, mentioned above, serving factories at Karenko.

5. Private Plants. Large sugar mills, a few other industrial concerns, and several Government offices also had generating plants, to supply their own needs. The 1935 output of these private generators was 19,738 kilowatts, obtained principally from coal-burning steam engines. Of this, 12,708 kilowatts were produced by the sugar companies for their own use.

6. Future Significance of Electric Power Production. Existing large power plants were constructed to make possible the establishment of chemical, metal, and other wartime plants, as "national policy" industries. The main power plants and strategic industries may be destroyed by bombing. Prior to establishment of the Jitsugetsutan plants, the small plants furnished power for essential services, and it is possible that such plants may serve, at least temporarily, in such circumstances. Table 71 in the "Appendix" indicates that most areas on the island are supplied by some power from these small plants, except possibly the Tainan area. Around Taihoku are five plants, with a total capacity of 24,150 kilowatts. Although other areas are not so well served, small plants on the island are quite well scattered. It is significant also that the large sugar companies had generators producing 13,000 kilowatts of power for themselves, and purchased less than 3,000 kilowatts from the Taiwan Electric Power Company in 1935. Small plants could probably supply power for essential facilities, and for the sugar and other industries, excluding those established under the wartime industrialization program.

The most important area requiring power from the Jitsugetsutan plants is the Tainan-Takao area, which has only the one thermal plant at Takao. Rehabilitation of the Jitsugetsutan plants would be most vital for this area, which has been greatly expanded industrially.

VI.
MINERALS

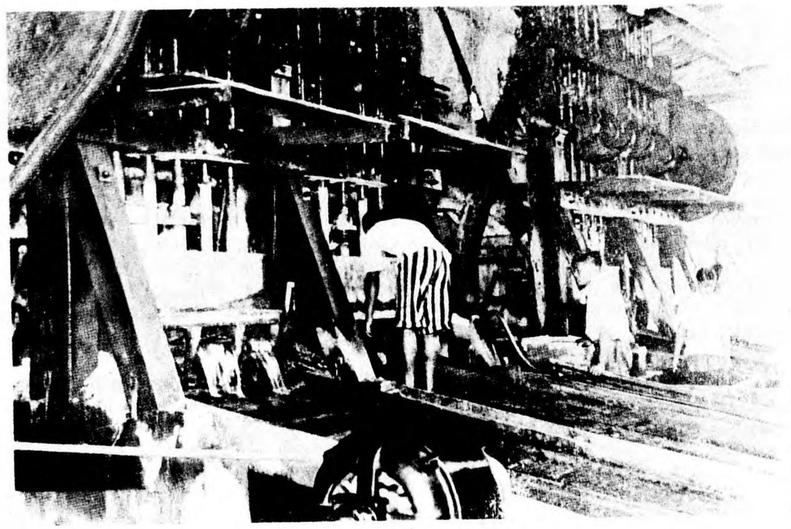
1. General. Mineral resources of Taiwan are limited in both quantity and variety. Some gold is mined, and some bituminous coal, but the only other mineral resources of importance are copper, petroleum, and salt. The Kinkaseki gold mine is the largest in the Japanese Empire with an annual refined output of over two metric tons. Its present importance lies, however, in its copper production, which may amount to 10,000 tons annually. Production of coal is about 2,500,000 tons annually, of which around 1,000,000 tons are consumed on the island. Salt is also important as an export, shipments amounting to about 110,000 tons out of a total production of about 175,000 tons annually. Petroleum output in recent years has provided for only about one-tenth of the island's needs.

2. Coal. Ninety percent of Taiwan's coal is mined in Taihoku Province, in which half a dozen important deposits are located, but it is found as far south as Boryo. Those at Gaimokusan, Denryoko, Sekitei, Shikyakutei, Sankashi, and Sanshikyaku may be mentioned. Brown coal is found in the Pescadores, at Hori (Taichu Province), and at Mikasamura (Karenko District). Quality in the southern district is poorer than that of the coal mined around Keelung, coal layers in the south being only 3 or 4 inches thick as compared with 3 feet in Taihoku Province. The Japanese have claimed that deposits in the northern part of the island suitable for coking reach 10,000,000 tons, and that with the southern fields, Taiwan's known coal supply is sufficient for a hundred years. (*The Industrialization of Taiwan*, John K. Emmerson, American Vice Consul, Taihoku, September 16, 1939.)

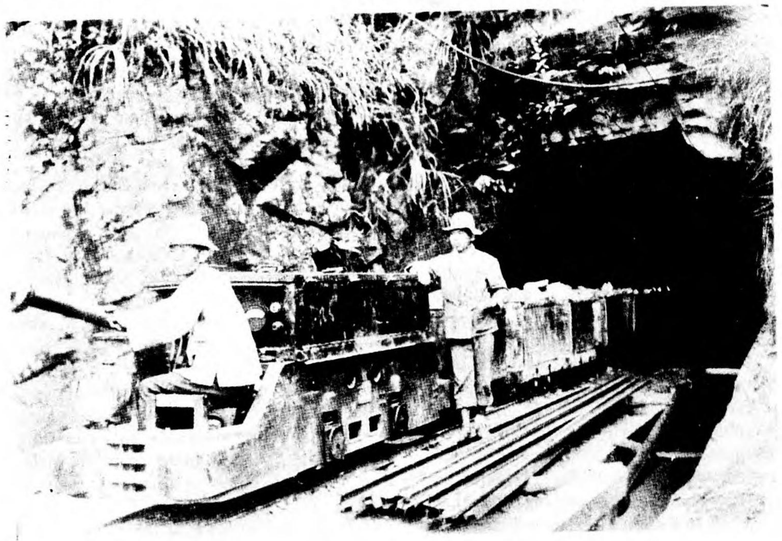
In 1938 coal production amounted to 2,145,000 tons, a record output to that date. Of this quantity, 100,000 tons were used for producing coke, 854,000 tons were consumed on the island, 639,000 tons were used as bunker coal, and 587,000 tons were exported, of which 440,000 tons went to Japan. (*The Industrialization of Taiwan*, John K. Emmerson, American Vice Consul, Taihoku, September 16, 1939.) In 1939 production rose to 2,500,000 tons, and in 1940 output is estimated to have been maintained at that level. (*Annual Reviews of Commerce and Industry*, 1939, final section, and 1940.) Coal is used by the sugar manufacturing companies, by the railroads, and to an increasing extent by factories in Keelung, Takao, and Karenko. Heating power of Formosan coal varies from 6,160 to 7,480 calories, and sulphur content ranges from about 1.2 to 4.45 percent. It is thus low-grade bituminous: one field in Taihoku Province contains as much as 75 percent of volatile matter.

Most important mining company is the Taiwan Mining Company, a Nissan subsidiary, which operates the Kinkaseki gold and copper mine and has drilled wells in the Kinsui oil field. The other two important mining companies are the Taiyo Mining Company, which controls the Zuiho gold mine, and several coal mines (the Sekitei Colliery in Taihoku Province, and the Kaisan Colliery in Shinchiku Province) and the Keelung Colliery Company, with mines near Keelung. As of June 30, 1939, figures of capitalization for these companies were 10,000,000 yen and 7,000,000 yen respectively, as compared with 30,000,000 yen for the Taiwan Mining Co.

3. The Three Gold Mines of Keelung. The Taiwan Mining Company's gold mine at Kinkaseki (ten miles east of Keelung), which in 1937 produced gold valued at 12,900,000 yen, also produces copper. The Taiwan Mining Company, Ltd., is a subsidiary of the Japan Mining Company of the Nissan interests. The mine was purchased from the Kinkaseki Mining Company in 1933. Highest recorded production of copper concentrate was 7,350 tons in 1936, but by now it may be 10,000 tons, or possibly more. If so, it ranks as one of the half dozen largest copper mines in the Japanese Empire. About 780 tons of refined copper are obtained through precipitation of the copper content of the mine water by iron dust. Three units are known to have been installed for concentration of gold, silver, and copper ores by gravity and flotation. Copper from these is estimated at 9,000 tons. The Zuiho mine nearby, gold production of which (including auriferous copper ore) was valued at 4,750,000 yen in 1937, also produces some copper, and its ores are probably treated at the Kinkaseki plant. (Annual Review of Commerce and Industry, 1937, section on mining.) The Kinkaseki and Zuiho mines and the smaller Botanko mine are often referred to as the "Three Gold Mines of Keelung." Total gold production is about 3½ metric tons a year. It was hoped to increase this to 5 tons, until the outbreak of war made gold relatively unimportant to Japan's wartime economy. Present conditions do not warrant operation of mines for the gold obtained, and gold mines in other areas, such as Korea, are now idle. Copper is vital, however, and mining at Kinkaseki is no doubt continuing. Discovery of alluvial gold deposits in late 1939 in the gorges of the East Coast created considerable flurry in the press. The Government apparently believed them to be of importance, for it sent experts to the spot, requested funds from Tokyo, and proceeded in 1940 with preparations to facilitate gold mining in the area. (Annual Reviews of Commerce and Industry, 1939, first section, and 1940, and Far Eastern Financial Notes.) The Japanese press in 1941 reported discovery of a rich tungsten mine in the Takkiri range in this region. (Weekly Economic Report, Frank S. Williams, Commercial Attache, Tokyo,



瑞芳金山　運鐵場



瑞芳金山　坑口

Illus. 14. Gold mines and equipment at Zuiho, near Keelung.

for week ended April 19, 1941.) Mining conditions are difficult there, however, and transportation difficulties almost unsurmountable.

4. OTHER MINERALS. Some sulphur is produced, chiefly north of Taihoku, but output has varied from year to year, and has not exceeded about 3,000 tons. Mercury mining was likewise carried on intermittently until 1931 at Heirin, south of Keelung, and recent needs may well have awakened new interest in this essential mineral. (*Annual Review of Commerce and Industry*, 1937, section on mining.)

Although production of iron ore has been negligible, the Showa Iron and Steel Company was carrying on some prospecting at the end of 1937 in the Chureki and Toen districts, Shinchiku Province. Silver is mined in small quantities, and nickel and Fuller's earth are reported at Riryu, on the east coast. Output of manganese is reported to have begun in 1937 from a deposit near Suo on the east coast. Ore was to be refined at Keelung or Rato. The surprisingly large output of 30,000 tons was said to be anticipated for 1938, but recent information relative to this mineral in Taiwan is not available.

Table 15. Output of Principal Minerals, 1936.

Mineral	*Unit of Quantity*	*Quantity*	*Value in 1,000 Yen*
Gold	Kilograms	1,240	4,224
Alluvial gold	Kilograms	54	160
Gold ore	Metric tons	4,798	494
Silver	Kilograms	402	17
Gold-silver-copper ore	Metric tons	198,325	7,958
Coal	Metric tons	1,744,000	11,365
Crude oil	Hectoliters	66,453*	385*
Volatile oil	Hectoliters	60,288*	490*
Sulphur	Metric tons	1,226	not given
Carbon black	Metric tons	1,237*	516*
Total including others			28,727

*—1935.

Source: *Far East Year Book, 1941.*

5. PETROLEUM. Oil fields are found at Chikuto, at Shukkoko, and at Kinsui, all in Shinchiku Province; at Gyunikuzaki in Tainan Province, and at Kosensho and Koshun in Takao Province. These are chiefly natural gas fields, recent petroleum production being estimated by one source at only about 35,500 barrels annually. This is about 1,500,000 gallons (42 gallons per barrel), or slightly more than output in 1925. By 1927 production rose to over 6,000,000 gallons, and was even higher in 1929; but after that year it was strictly controlled. Total resources cannot be accurately estimated because the most promising fields, such as the one at Gyunikuzaki, were sealed by the Navy as a reserve. Geological formations of the island do not promise extremely large oil deposits. Designated Navy reserve areas were as follows: (1) Around Shushu, Taichu Province (Shushu is on the Nisui-Gaishatei branch railroad line); (2) northeast of Kagi, around the villages of Sokei, Shishito, and Takezaki; (3) in southern Tainan Province, around the villages of Rokujukei, Gyunikuzaki, Suiryuto, Sairyo and Chikutoki; (4) in the vicinity of Kosenpo, in Takao Province, north of Rokki; and (5) near the south tip of the island, south of Koshun.

At the Kinsui oil field there is a casing-head gasoline plant, original capacity of which was 30,000 gallons of gasoline a day. It was able to handle 50,000,000 cubic feet of gas per day. Machinery for the plant, manufactured in the United States, was put in operation in 1930. Technicians and labor employed in construction of this plant were Japanese rather than Formosan. In 1931 a duplicate plant was shipped to Taiwan, with the same capacity. Presumably the gasoline produced by this plant, as well as by the first one, was purchased and utilized by the Japanese Navy. It is not known definitely where this plant was set up, but quite possibly at Chikuto, near Kinsui. Gasoline was piped for 7 miles from the Kinsui field to Byoritsu, and from there shipped by tank car to Keelung.

There is also a refinery at Shukkoko, south of Byoritsu, where the first installation was equipped to extract 5 percent gasoline, 65 percent heavy kerosene, 17 percent "light oil," 3 percent paraffin, and 10 percent residuum. Present capacity of the Shukkoko plant is estimated at 60,000 gallons of gasoline a day. Both this and the Kinsui plant are equipped to bottle butane gas.

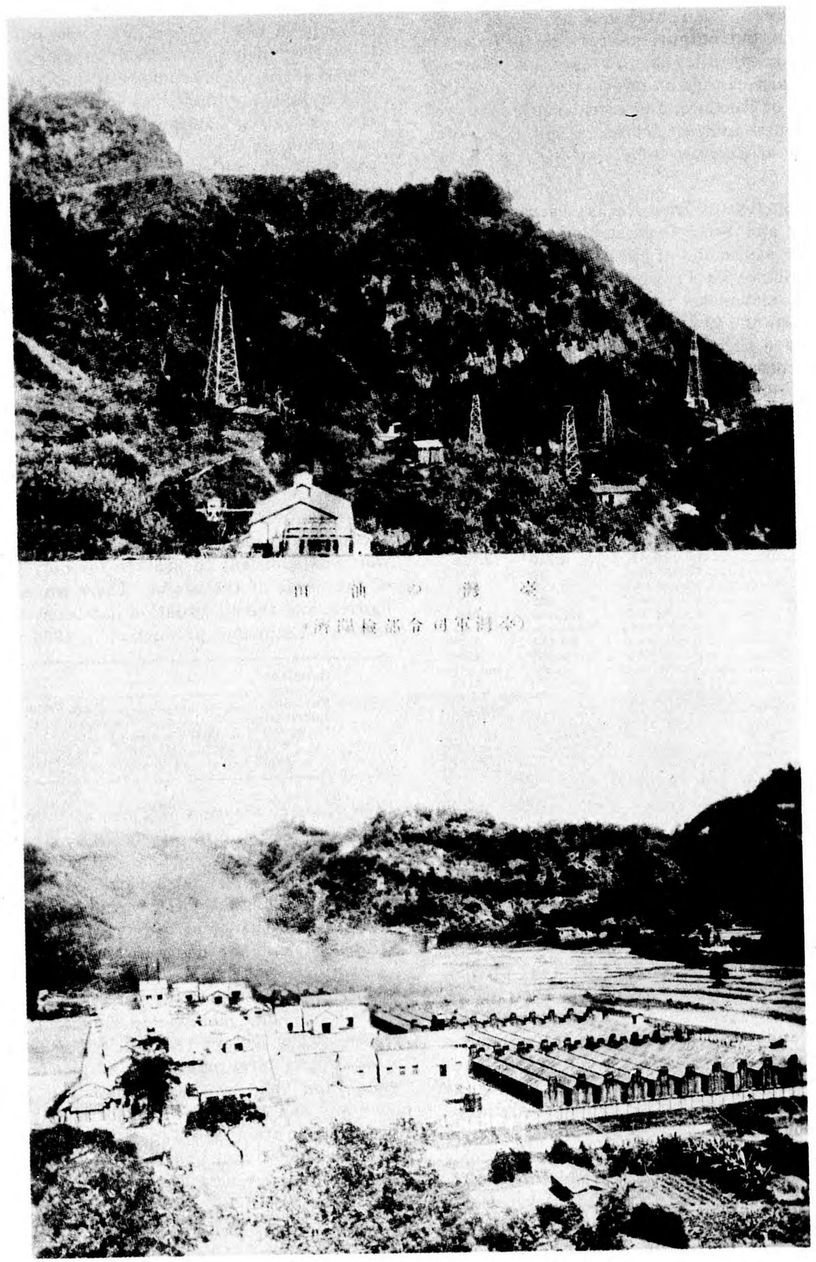
A kerosene refinery reported at Takao may process petroleum from the Navy's field at Gyunikuzaki.

a. *Taiwan's petroleum position.* Estimated petroleum production in the years just prior to the outbreak of war was sufficient to provide for only about one-tenth of the needs of the island. There are no recent official figures, and the oil situation has been veiled with great secrecy. Estimated production in 1938 was as follows:

Gasoline	800,000 gallons
Kerosene	790,000 gallons
Fuel oil	200,000 gallons
Lubricating oil	140,000 gallons
Light oil	400,000 gallons
Total	2,330,000 gallons

(*The Industrialization of Taiwan*, John K. Emmerson, American Vice Consul, Taihoku, September 16, 1939.) Production ten years earlier had been three times this size and it is difficult to know whether resources declined or production was restricted to provide wartime reserves. Efforts seem to have been made to increase production, and the budgets have included subsidy appropriations for the development of new oil fields and the digging of deep wells. In 1937 there were three wells over 3,000 meters (10,000 feet) deep, and one reached 3,500 meters (11,900 feet). Results consisted, however, in "large quantities of gas issuing from the wells" and "oil expected soon." The Taiwan Mining Company had at that time spent nearly 10,000,000 yen on oil exploration, the Japan Oil Company had spent over 20,000,000 yen, and the Government-General was spending about 1,000,000 yen a year. (*Annual Review of Commerce and Industry*, 1937, section on mining.)

Imports of petroleum products came from the Netherlands East Indies, Japan Proper, and the United States, but figures for such imports were not published after July, 1937. Even prior to that time complete figures were not given, except for imports from Japan.



Illus. 15. Oil field and carbon-black plant at Kinsui and near Byoritsu, respectively, properties of the Nippon Oil Company.

Table 16. Taiwan's Petroleum Imports, 1936.

(in 1,000 gallons)

Imports from:	*Gasoline*	*Kerosene and Light Oil*	*Heavy Mineral Oil*	*Lubricating Oil*	*"Other Mineral Oil"*
Netherlands Indies	1,802	702	4,941		
United States	1,117	556	2,587	122	
Japan		3,571		2,031	9,580
	2,919	4,829	7,528	2,153	9,580

Source: *Annual Return of the Trade of Taiwan (Formosa.)*

An indication of the character and volume of total imports may be gained from estimates for 1937 based upon sales quotas and estimated production:

Table 17. Taiwan's Petroleum Position, 1937.

(in 1,000 gallons)

Product	*Production*	*Total Sales*	*Presumable Net Imports*
Gasoline	810	9,931	9,121
Kerosene	761	4,601	3,840
Fuel Oil	171	11,220	11,049
Lubricating oil	130	2,650	2,520
Light oil	400	1,400	1,000
	2,272	29,802	27,530

Source: *Annual Review of Commerce and Industry*, 1937, section on mining.

Re-exports were generally small, except in the case of kerosene and light oil, considerable quantities of which were shipped, before 1937, to areas in China.

6. CARBON BLACK. Carbon black is also produced at the natural gas fields. The Taiwan Mining Company had a plant at Chikuto, output of which was reported to be only 400 tons in 1939, although it had been 2,000 tons in 1937. In addition, the Japan Oil Company had a plant at Kinsui, reported output of which was 2,250 tons in 1939. Quality of this product is not high, Japan having depended upon imports from the United States for manufacture of such essential rubber goods as tires, and having used Formosan carbon black for other products such as phonograph records. The Japan Oil Company was reported to have constructed three smaller plants, at Gyuzan, Bochirin, and Chikuto, with capacities of 150, 670, and 330 tons respectively.

7. SALT. Formerly about 175,000 metric tons of salt were produced in Taiwan, 90,000 tons being exported to Japan and over 20,000 tons to other countries, and nearly 65,000 tons being consumed on the island. Salt was one of the first monopolies to be established by the Government, in 1899, and the Government's salt factory has operated for years at Anping. (Opium was established as a monopoly in 1897, and camphor and salt in 1899.) Salt is produced by solar evaporation from sea water.

Because more salt was needed, and because it was believed efficiency might be increased, the Taiwan Industrial Salt Company was organized in Tokyo in 1938, to be operated outside of the monopoly regulations. It was producing about 44 tons of salt per acre of salt bed. Methods of production were crude, water being brought to the lowest evaporation levels by the tide and pumped to higher levels by hand. After being swept up in piles on the stone-covered top level, it was dissolved in fresh water and refined by boiling and crystallization. (*Narrative Report on Inspection Trip to Taiwan*, C. R. Cameron, American Consul General, September 7, 1939.) Its capital of 15,000,000 yen was to be increased to 30,000,000 yen if it could develop 10,000 acres of new salt fields. It was hoped to produce 250,000 tons of salt in 1941 and 450,000 tons by 1945. (*The Industrialization of Taiwan*, John K. Emmerson, American Vice Consul, Taihoku, September 16, 1939.) In August, 1939, the Taiwan Salt Producers' Association was formed, with headquarters in the Monopoly Bureau, to consult and cooperate in carrying out the expansion program so that the island might provide industrial salt for new industries developing there, and also for the needs of Japan Proper in the following years when it was cut off from its sources of supply in countries bordering on the Red Sea.

8. POSTWAR SIGNIFICANCE OF MINERAL RESOURCES. Lack of iron, ferro-alloys, and other metals essential to modern industry makes uneconomic any heavy industrialization in Taiwan. Only salt and coal are produced in quantities sufficient to provide sizable export surpluses; other metal and mineral production is small. Known mineral resources appear inadequate, therefore, to alter Taiwan's present dependence upon agriculture, the processing of agricultural products, and light industry pursuits in its postwar economic life.

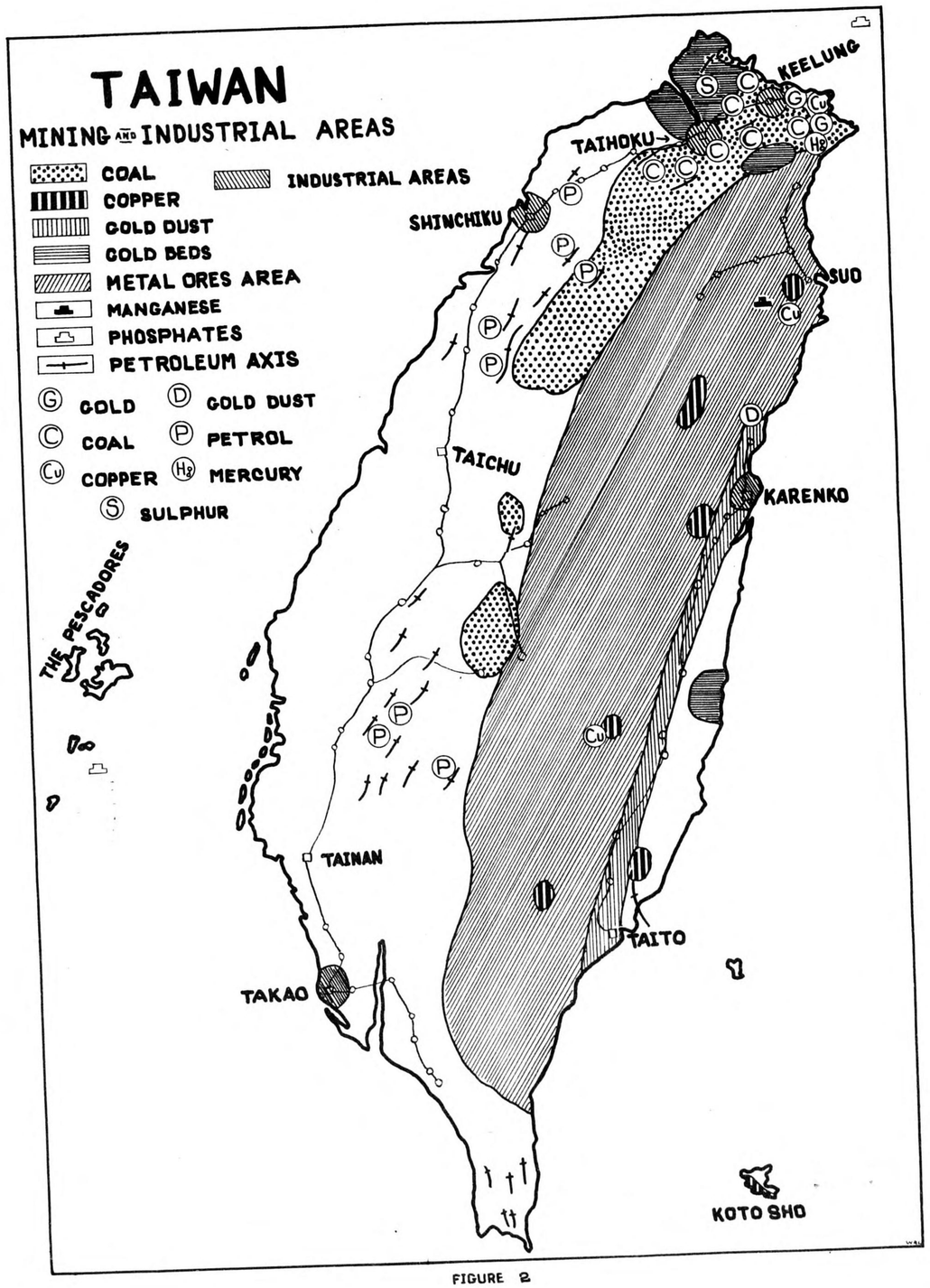


FIGURE 2

VII.
INDUSTRY AND LABOR

1. SCOPE OF INDUSTRIAL DEVELOPMENT. Industrial development in Taiwan, except for sugar mills and a little light industry, has been very recent and has not progressed very far. In 1937, however, gross value of industrial production was one-third that in Korea, and gross value per capita (150 yen) was slightly higher. The major part of this is in the sugar industry. (Per capita gross value of production approximated 125 yen in Korea and 350 yen in Japan Proper.)

Because Japanese companies which have entered Taiwan have been large, and the small industries there not very numerous, capital investment of the average Formosan enterprise is larger than that of the average enterprise in either Korea or Japan Proper. It was reported that 446 new companies were established in 1939, with an average capital of 160,000 yen each; but this was not as large as the average capital of companies already established. At the end of that year (1939), according to the *Dai Nippon Teikoku Tokei Nenkan*, paid-up capital of industrial companies in Taiwan averaged 572,000 yen per company, while in Japan Proper it was only 308,000 yen, and in Korea only 251,000 yen. Of the total capital of 191,500,000 yen invested in 335 industrial companies in Taiwan, over 90 percent was that of 32 companies, and over 75 percent was that of 5 companies. Statistics of size of companies are given in the Appendix Table 38.

2. VALUE OF INDUSTRIAL PRODUCTION. Value of industrial production rose to 375,000,000 yen in 1937. Of this total, 273,000,000 yen represented output of the foodstuff industry—or over 70 percent. Chemicals took second place with 35,000,000 yen—or nearly 10 percent. A recent report indicates that by 1940 the relative importance of the foodstuff industry had declined to 64 percent of the total, and that chemicals, metals, and machinery together had risen from 15 percent to nearly 20 percent. (*Die Deutsche Volkswirtschaft*, first August number, 1943, pp. 682-683.) Percentages for 1937 and for 1940 were given as follows:

	1937	*1940*
Textiles	1.4	1.8
Metals	3.3	5.0
Machinery	2.2	4.3
Ceramics	2.5	2.7
Chemicals	9.4	11.9
Lumber	1.5	3.4
Printing	1.4	1.3
Foodstuffs	72.5	64.2
Others	5.8	5.4
Totals	100.0	100.0

The following table indicates value of industrial production for the years 1933-1938. Of the 1938 total value, sugar and molasses constituted 200,000,000 yen, or more than half.

Table 18. Value of Industrial Production.

(in 1,000 yen)

Industry Group	*1933*	*1934*	*1935*	*1936*	*1937*	*1938*
Textiles	2,785	3,100	3,609	4,127	4,527	6,140
Metals	6,351	7,069	8,777	11,170	11,970	20,890
Machinery	5,695	5,884	6,812	5,964	7,964	not given
Ceramics	7,735	8,072	8,827	8,414	9,414	9,975
Chemicals	20,231	23,672	27,172	30,231	35,251	39,746
Foodstuffs	158,905	161,966	212,640	208,634	273,180	265,815
Lumber and Woodworking	7,372	7,279	9,227	10,753	11,753	13,309
Printing and Binding	3,566	3,704	4,364	4,766	4,966	6,843
Miscellaneous	11,864	13,403	12,003	12,925	15,906	17,178
Total	224,504	234,149	293,431	296,984	374,931	379,900

Source: *Far East Year Book*, 1941. These figures differ slightly from those given in the *Dai Nippon Teikoku Tokei Nenkan*.

3. CHARACTER OF INDUSTRY. With the exceptions of the sugar industry and the few large plants established under the wartime industrialization program, industry in Taiwan is small-scale. Commodities manufactured are generally produced in small handcraft shops. The following table gives an indication of the products:

Table 19. Output of Chief Manufactured Goods, 1938.

(*Exclusive of Sugar*)

Commodity	*Unit of Quantity*	*Quantity*	*Value in 1,000 Yen*
Hemp yarn	Metric tons	397	610
Cotton textiles			3,297
Linen			1,233
Casting			1,461
Tin-plate goods			200
Gold-silver ware			2,526*
Bricks	1,000,000 pieces	291	3,424
Roofing tiles	1,000,000 pieces	137	1,131
Cement	Metric tons	143,000	3,291*
Cement products			856
Lime	Metric tons	25,000	352
Drugs			480
Soap	Metric tons	1,716	669
Vegetable oil	Metric tons	4,772	2,351
Refined camphor	Metric tons	609	1,480
Paper	Metric tons	21,668	3,870
Superphosphate of lime	Metric tons	13,800	1,173
Mixed fertilizers	Metric tons	54,600	9,696
Coke	Metric tons	9,000**	102**
Beer	Hectoliters	25,604	916
Soy	Hectoliters	648,390	2,473
Table water			1,715
Flour	Metric tons	10,844	2,416
Salt	Metric tons	17,878	1,450
Canned pineapple	1,000,000 pieces	59	18,891
Tea	Metric tons	7,200	14,237
Lumber			6,843
Wood manufactures			6,466
Printing and binding			6,843
Paper ware			503
Bamboo ware			1,749
Hats and caps			2,371

* 1936
** 1935

Note: Sugar, molasses, and alcohol production are excluded from Table 19. Footwear production, which formerly amounted to over 2,000,000 yen a year, was negligible in 1937, and hence was also excluded.

Source: *Far East Year Book*, 1941.

4. LABOR. Some interesting information on labor in Taiwan is to be had from the report of a conference in August, 1938, attended by the foremost industrialists of the island. The shortage of labor (felt even at that time) was discussed, and it was suggested that Korean labor might be imported, and that more extensive use should be made of female labor. (*Labor Problem in Taiwan*, Gerald Warner, American Consul, Taihoku, November 10, 1938.) An official of the Taiyo Mining Company commented upon the movement of labor in search of higher wages, and the low efficiency of Formosan labor. This company employed 4,000 laborers in its gold mines, and 2,700 in its coal mines, but labor was being drawn away by inducement of higher wages at other mines. Labor represented 60 percent of mine costs, machinery not being of paramount importance. It was his estimate that miners in Japan were able to mine 1.5 to 1.8 tons of coal a day, while those in Taiwan mined only 0.35 to 0.40 ton.

Some companies, such as Nitto Development Company (a Mitsui subsidiary) employed farm laborers, paid their traveling expenses, and supplied them with living quarters. In 1939 an employment bureau was organized in Karenko. It brought 500 laborers from the west coast, gave them land (½ acre per household) and required them to raise hogs. Women were employed for tea picking, as well as in other industries. The sugar mills in North Taiwan bought cane from independent farmers, but in the southern part of the island the sugar companies had a labor problem for their own cane fields.

Taiwan industry has had a difficult labor problem because laborers (even miners) are also farmers. In the busy farm seasons they leave the mines. This decreases labor's efficiency, and prevents industry from maintaining full production. Employers also claim that efficiency of labor decreases as wages increase, so that high wages become an obstacle to increased production.

5. DISTRIBUTION OF LABOR. As of March 31, 1938, there were 1,627 factories and mines employing more than 10 laborers each. The total number of laborers employed in these factories and mines was 169,064. Of these, 152,887 were Formosan-Chinese, 10,622 Japanese, 4,090 Chinese, 1,256 aborigines, and 209 Koreans. The fact that there were 173,600 laborers in 1930 indicates that the industrial expansion program did not progress very rapidly, even allowing for the fact that the 1930 statistics include those employed in factories and mines employing less than ten workers each. The following table indicates the locations and types of enterprises, and the number of workers employed, as of December 31, 1935. It is to be noted that the average factory had less than ten workers.

6. SCALE OF ENTERPRISES. Of the total number of factories in Taiwan on December 31, 1935, 95 percent (or 6,687) employed less than thirty workers. The average factory had less than 10 workers. No factory had over 650 workers, while only 23 had over 300 workers. The latter are listed below (Table 22). There were 75 factories employing between 100 and 299 workers, and 96 employing 50 to 99 workers.

Table 20. Factories and Factory Workers (By Province).

(Not including factories operated by the Government.)

Province	Number of Factories	Number of Workers: Japanese Men	Japanese Women	Formosans Men	Formosans Women	Chinese Nationals Men	Chinese Nationals Women	Total Men	Total Women
Taihoku	1,789	1,217	48	9,913	8,314	750	158	11,887	8,520
Shinchiku	966	73	3	4,599	1,015	30	—	4,702	1,018
Taichu	1,738	329	9	9,233	4,712	84	—	9,646	4,721
Tainan	1,340	702	8	11,471	2,462	100	—	12,273	2,470
Takao	891	587	3	6,710	3,555	29	7	7,326	3,567
Taito	69	29	1	303	52	1	—	533	53
Karenko	155	163	3	1,031	277	16	—	1,210	280
Hoko	58	—	—	269	45	—	—	269	45
Totals	7,006	3,100	77	43,729	20,432	1,017	165	47,846	20,674

Table 21. Factories and Factory Workers (by trade).

Industry Group	Number of Factories	Number of Workers: Japanese Men	Japanese Women	Formosans Men	Formosans Women	Chinese Nationals Men	Chinese Nationals Women	Total Men	Total Women
Textiles	72	14	5	506	2,100	27	—	547	2,105
Metal work	108	251	1	1,474	206	47	2	1,772	209
Machinery	211	500	1	2,152	20	89	—	2,741	21
Ceramics	638	100	2	7,660	1,394	51	5	7,811	1,401
Chemicals	485	380	23	3,240	1,090	18	—	3,638	1,113
Woodworking*	309	98	3	2,089	155	131	5	2,323	163
Printing, binding	153	161	1	1,956	265	—	—	2,117	266
Foodstuffs	4,668	1,411	31	23,448	11,452	302	115	25,156	11,598
Others	362	185	10	1,204	3,750	352	38	1,741	3,798
Totals	7,006	3,100	77	43,729	20,432	1,017	165	47,846	20,674

*—Includes sawmills.

Source: *Labor Problem in Taiwan*, Gerald Warner, American Consul, Taihoku, November 10, 1938; data published by Bank of Taiwan.

Table. 22. Factories Employing over 300 Workers.

Factory	Location	Product	Number of Workers: Men	Women	Total
Taiwan Choma Boseki Kaisha	Daian, Taihoku Prov.	Ramie yarn	154	473	627
Taiwan Seima Kaisha	Toyohara, Taichu Prov.	Hemp cloth and yarn	181	324	505
Taiwan Tekkosho	Takao	Sugar machinery	348	—	348
Keelung Dockyard	Keelung	Shipbldg. and repairs	354	—	354
Taiwan Kogyo Kaisha	Goketsu-sho, Rato-gun	Wall-board, white paper	353	60	413
Shi Go Hatsu Shoko Saw Mill	Tamsui	Lumber	289	44	333
Tainichi Printing Office	Taihoku	Newspaper	258	46	304
Sharoken Sugar Mill, Taiwan Seito Kaisha	Nintoku-sho, Niitoyo-gun, Tainan Prov.	Sugar	387	—	387
*Wanri Sugar Mill, Taiwan Seito Kaisha	Zenka-sho, Shinka-gun, Tainan Prov.	Sugar	403	38	441
*Shinei Sugar Mill, Ensuiko Seito Kaisha	Shinei-gai, Shinei-gun, Tainan Prov.	Sugar	370	—	370
*Gannai Sugar Mill, Ensuiko Seito Kaisha	Ensui-gai, Shinei-gun, Tainan Prov.	Sugar	562	—	562
*Kobi Sugar Mill, Dai Nippon Seito K.	Kobi-gai, Kobi-gun, Tainan Prov.	Sugar	558	—	558
Hokko Sugar Mill, Dai Nippon Seito K.	Hokko-gai, Hokko-gun, Tainan Prov.	Sugar	443	18	461
Kohekirin Sugar Mill, Taiwan Seito Kaisha	Shoko-sho, Hozan-gun, Takao Prov.	Sugar	384	2	386
No. 18, Taiwan Godo Hori Kaisha	Nisui-sho, Inrin-gun, Taichu Prov.	Pineapple-canning	40	294	334
No. 25, Taiwan Godo Hori Kaisha	Nisui-sho, Inrin-gun, Taichu Prov.	Pineapple-canning	70	410	480
No. 26, Taiwan Godo Hori Kaisha	Nisui-sho, Inrin-gun, Taichu Prov.	Pineapple-canning	76	559	635
No. 30, Taiwan Godo Hori Kaisha	Nanaku-sho, Shoka-gun, Taichu Prov.	Pineapple-canning	66	374	440
No. 16, Taiwan Godo Hori Kaisha	Shirakawa-cho, Kagi, Tainan Prov.	Pineapple-canning	59	258	317
No. 17, Taiwan Godo Hori Kaisha	Toroku-gai, Tainan Prov.	Pineapple-canning	114	323	437
No. 4, Taiwan Godo Hori Kaisha	Taiju-sho, Hozan-gun, Takao Prov.	Pineapple-canning	87	311	398
No. 33, Taiko Pineapple Canning Co.	Nanto-gai, Nanto-gun, Taichu Prov.	Pineapple-canning	66	268	334
No. 34, Taiko Pineapple Canning Co.	Toyohara, Taichu Province	Pineapple-canning	275	137	412

*—Presumably figures include workers in two mills at each of these places.

Source: *Labor Problem in Taiwan*, Gerald Warner, American Consul, Taihoku, November 10, 1938.

7. LABOR SHORTAGE. At the conference held in August of 1938 it was estimated that additional labor needed amounted to at least 9,000 workers. This compared, according to Government officials, with about 7,000 unemployed at that time, but business men believed the shortage of labor to be much more serious, and favored importing labor from Korea or China. During the war this labor shortage has no doubt become even more of a problem.

8. WAGES AND HOURS. The working day in Taiwan was ten or eleven hours in most industries, seven days a week. No higher rate of compensation was given for overtime, and only about two days for rest were given each month. It was customary to give workers either 30 days' notice or 30 days' pay when discharged.

In July, 1938, wages in Taihoku were about 1 yen per day for stevedores, 2.30 yen a day for carpenters, 1.40 yen a day for rice-field workers, 1.80 yen a day for typesetters, and 1.80 yen a day for miners. Tea workers received 0.80 yen a day, except women engaged in tea sorting, who received only 0.27 yen a day. Wages in Taiwan were thus lower than in Japan Proper, but a little higher than in Korea, where average wages in 1938 were about 1 yen a day. Japanese workers in Taiwan received from 25 percent higher to more than double the wages of Formosans doing the same work.

9. CHARACTER OF LABOR. Japanese are not often employed as laborers, being managers, foremen, skilled workers, or employed in strategic occupations. Workers at the Kinsui oilfield, for example, are chiefly Japanese. Railroad trainmen are nearly all Japanese, and are paid higher wages than similar workers in Japan Proper. They also receive free housing and longer vacations with pay.

Most of the workers are Formosan-Chinese, less than 5 percent of the total being Japanese, and less than 2 percent immigrant Chinese nationals. Many of the Formosan-Chinese are contract workers under a "coolie-foreman" system. A foreman contracts, under this system, to supply an employer with a certain number of workers at a given price, and deducts 5 or 10 percent for his services.

Almost one-third of those employed are women. Child labor is also fairly common, persons under 16 years of age comprising 7 percent of the total. Use of older workers is very limited—less than 1½ percent being over 50 years of age. Aborigines generally do not make satisfactory industrial workers, though some members of the Ami and Paiwan tribes are employed.

To Americans wages and standards of living in Taiwan, as in other Eastern regions, may seem dangerously low. In general, however, they conform to the age-old economic structure of the area. Any sudden change, particularly a great increase in the wage earnings of the masses, would not only lead to an incommensurate inflation, but would likely cause both social and political disturbances of great momentum, difficult to check. Eastern peoples, en masse, are children in the sense of economic comprehension or provision: that is to say, if they earn enough in one day to live for one week, they will live for the week and earn the one day.

10. LABOR DISPUTES AND LEGISLATION. There are no organized labor unions in Taiwan, because the Government-General has discouraged unionization, and because many of the workers are not sufficiently educated or aggressive to form organizations. In many years there were no strikes, and when these did occur, they were handled sternly by the police. There is no protective labor legislation; workmen's compensation laws are non-existent.

11. CHARACTERISTICS OF TAIWAN'S INDUSTRY. Four outstanding characteristics of Taiwan's industry are (a) the small part played by heavy industry, (b) the importance of a few large Japanese companies, (c) the shortage of Formosan labor, and (d) the use of Japanese in technical positions.

Control of the large companies presents in the postwar period a problem of transfer of ownership, whatever solution be found. This is a part of the larger problem of Japanese investments in North China, Manchuria, and other areas, involving questions of remuneration, control after transfer, and management.

A second problem is presented by the extent to which Japanese were managers, technicians, skilled workmen, and operators of essential services, such as railroads. It may be expected, especially in view of probable hostility toward them, that many will return to Japan. Formosan labor has never been high in efficiency, and unless, or perhaps even if, technicians are brought in, productive efficiency may be expected to suffer.

Taiwan has never had any labor problem in the sense of difficulties or disputes. In recent years it has had a labor shortage rather than unemployment. At the end of 1935 nearly half of the factory workers were women, many being employed in the pineapple canning factories and hemp textile mills, but other sources of labor were needed.

Mobility of labor in Taiwan is high, movement of workers between factories and farms reflecting the importance of agriculture, and the ties it maintains with industrial labor. Absence of wartime incentives for establishment of industrial plants, shortages of labor and capital, and need of agricultural production may increase importance of agriculture in the postwar period. Movement of labor between farm and factory has, on the one hand, made Formosan labor less efficient than that of an industrial country; but on the other hand, it has made possible utilization of farm labor, which might otherwise have been idle in slack farm seasons.

VIII.

INDUSTRIALIZATION IN TAIWAN

1. DEVELOPMENT. For the first few years after Japan's occupation, Taiwan presented special problems of pacification and control. From about 1904 until 1930 it was developed into a profitable colony, producing chiefly rice and sugar for Japan. In addition, communication and transport facilities, including ports, were developed, and improvements made in public works and sanitation. About 1930 Japan's interest in Taiwan turned through it towards Southeast Asia, and with the establishment of the Taiwan Development Company the island became a "base" for economic expansion southward. By 1937 power was available from the two Jitsugetsutan plants, coal production reached 1,800,000 tons, and in this and the two following years a number of metal and chemical plants were established in a program of wartime industrialization. This program was designed to process raw materials from Southeast Asia, and by official acknowledgment, to form a model for similar developments in parts of China just occupied by Japan.

Although it was emphasized by some Japanese that careful planning was needed if emphasis were to be shifted from agriculture to industry and that light industries (such as textile mills) would be the more desirable field of expansion, the first plants established were metal and chemical plants, obviously essential in wartime industry.

2. LIGHT METALS. The Japan Aluminum Company's plant at Takao is the most important metal plant in Taiwan. Present aluminum production in the island is estimated at nearly 20,000 tons annually, with total Japanese Empire production at somewhat over 100,000 tons. With the new Karenko plant established by the same company, Taiwan thus is the site of about one-sixth of total Empire production.

The Takao plant was built in 1936-37 with the assistance of technicians sent by a German concern. Originally it was to have a capacity of 6,000 tons of aluminum and 12,000 tons of alumina (bauxite converted into alumina—aluminum oxide, Al_2O_3—and this in turn into aluminum), but provision for expansion was soon made to allow for production of 12,000 tons of aluminum and 24,000 tons of alumina. The plant occupies an area of about 90,000 square meters, fronting on Takao Bay. Power (a maximum of 27,000 kilowatts) is supplied by the Taiwan Electric Power Company from Lake Jitsugetsutan. The company manufactures and uses Soderberg electrodes, which are cheaper than other kinds. This plant employed 125 technicians and 500 workmen in 1937, the year it was completed. (*Annual Review of Commerce and Industry*, 1937, section on mining.)

The Karenko plant is reported to have begun operation in 1940. Its capacity was variously estimated at from 6,000 to 10,000 metric tons of finished aluminum. Power is supplied by the stations on the Mokka River, and the company is reported to have made plans for a yearly production of 1,000 tons of magnesium by means of the "Jiyante" carbon reduction process. Magnesite for production of ferro-magnesium would be imported from Daisekkyo, Manchuria, or possibly from Kankyo Province in Korea. Locally produced salt is used. The Taiwan Salt Manufacturing Company also is reported to have planned to produce magnesium. (*Preliminary Outline of Plans to Enlarge Productive Power of Taiwan*, Gerald Warner, American Consul, January 28, 1938). A factory of the Nichiman Magnesium Company has been reported at Anping. The enterprise may have been planned jointly by the Taiwan Salt Manufacturing Company and the Nichiman Magnesium Company.

Bauxite for the aluminum production was reportedly imported from Bintan Island, in the Netherlands East Indies, near Singapore. According to report, the Karenko plant is processing alumina brought from a plant in Kyushu Island (Japan Proper), where the bauxite has been treated. (*The Industrialization of Taiwan*, John K. Emmerson, American Vice Consul, Taihoku, September 16, 1939.)

If this is necessary, great strain is placed upon transportation facilities. Since this method requires less power it might explain the operation of the plant before completion of much of the east coast power project. Conclusive proof of operation of some of the east coast power plants is not available, although it seems certain that somewhat over 35,000 kilowatts is produced by plants on the Mokka River.

3. OTHER METAL INDUSTRY PLANTS.

a. *Manganese and ferro-silicon.* Another development concerning which information is incomplete, is that of the manganese deposits reported on the east coast, near Suo. *Taiwan Denka (Denki Kagaku) Kabushiki Kaisha* operates a plant at Keelung which is listed as one of the largest consumers of electric power in the island. It is believed that this plant produces manganese as well as ferro-silicon. It was reported that "the power consumed at the Keelung and Rato factories [of this company] is about 12,000 and 300 kilowatts respectively, the factories producing principally electro-ferro-silicon, manganese, and carbide." (*Voluntary Report, Electric Power Developments in Taiwan*, Gerald Warner, American Consul, June 9, 1939.) Since the manganese deposits are located near Karenko, they might be treated only in the Rato factory. A most reliable

observer, however, reported a manganese smelter and other smelters in Keelung, "across the bay from the city." (*Narrative Report on Inspection Trip to Taiwan,* C. R. Cameron, American Consul General, September 7, 1939.) The company imported silicon stone from Dairen and scrap iron from Japan, and expected to produce 10,000 tons of ferro-silicon annually.

b. *Iron and steel.* In 1939 the Taiwan Government-General and the Taiwan Electric Power Company jointly established the Maruyama Electric Iron Experimental Factory, at Taihoku, to become pioneers in the manufacture of iron and steel in Taiwan. This plant began operation in June, 1939. Capacity, however, was only 1,500 tons of pig iron, 1,500 tons of ordinary steel, and 500 tons of special steel per year. (*The Industrialization of Taiwan,* John K. Emmerson, American Vice Consul, Taihoku, September 16, 1939.) In view of the importance of iron and steel, and because Taiwan formerly had to import all of its requirements, it would not be surprising if additional iron and steel works have been built at Keelung or at Takao, particularly since the Japanese have claimed that they are mining iron ore on Hainan Island, about 800 miles away. It is therefore possible that ore may be shipped out from Bakli to Takao.

c. *Ferro-magnesium.* The Asahi Electro-Chemical Industry Company *(Asahi Denka Kogyo Kaisha)* operates a plant at Takao for the manufacture of ferro-magnesium, using as raw materials magnesite from Manchuria and salt produced locally. Power is furnished by the Taiwan Electric Power Company. Annual production is estimated at 1,500 tons of ferro-magnesium plus some caustic soda. Another ferro-magnesium plant at Takao was to be operated by the *Minami Nippon Kagaku Kogyo Kaisha* (South Japan Chemical Industry Company). A half interest was owned by the Japan Soda Company, and the other half by the Taiwan Development Company, Taiwan Electric Power Company, and the South Japan Salt Industry Company. In 1939 it was proceeding with plans for production of 2,400 tons of ferro-magnesium and 16,000 tons of caustic soda.

d. *Nickel and cobalt.* The Oriental Metal Refining Company *(Toho Kinzoku Seiren Kabushiki Kaisha)* planned to construct a nickel and cobalt refinery on the east coast. In March, 1940, it was reported that the plant was completed at Karenko, but that installation of machinery was not expected to be completed before the end of the year. Initial productive capacity was set at 2,100 tons of nickel and 20 tons of cobalt. Plans were made eventually to increase this to 20,000 tons of nickel, and 50 tons of cobalt. (*The Industrialization of Taiwan,* John K. Emmerson, American Vice Consul, Taihoku, September 16, 1939.)

4. MACHINERY AND VEHICLES. Most machinery has to be imported, although quantities have not been published in the official trade figures. The *Taiwan Tekkosho* (ironworks) at Takao had 348 workers at the end of 1935, and produced sugar plantation equipment and other machinery. The *Maeda Tekkosho,* located across from Hatto Station, near Keelung, produced machine tools with which it filled orders of the Japan Mining Company, Taiwan Electric Power Company, and Taiwan Development Company. (*Osaka Mainichi, Nippon Today and Tomorrow,* 1941.) The Ohba Iron Works at Takao manufactured marine engines, and the Sugihara Industry Company at Taihoku, although engaged principally in production of chemicals, fibers, paper, and foodstuffs, also produced some (probably light) machinery. (*Glimpses of the East,* 1940-41.)

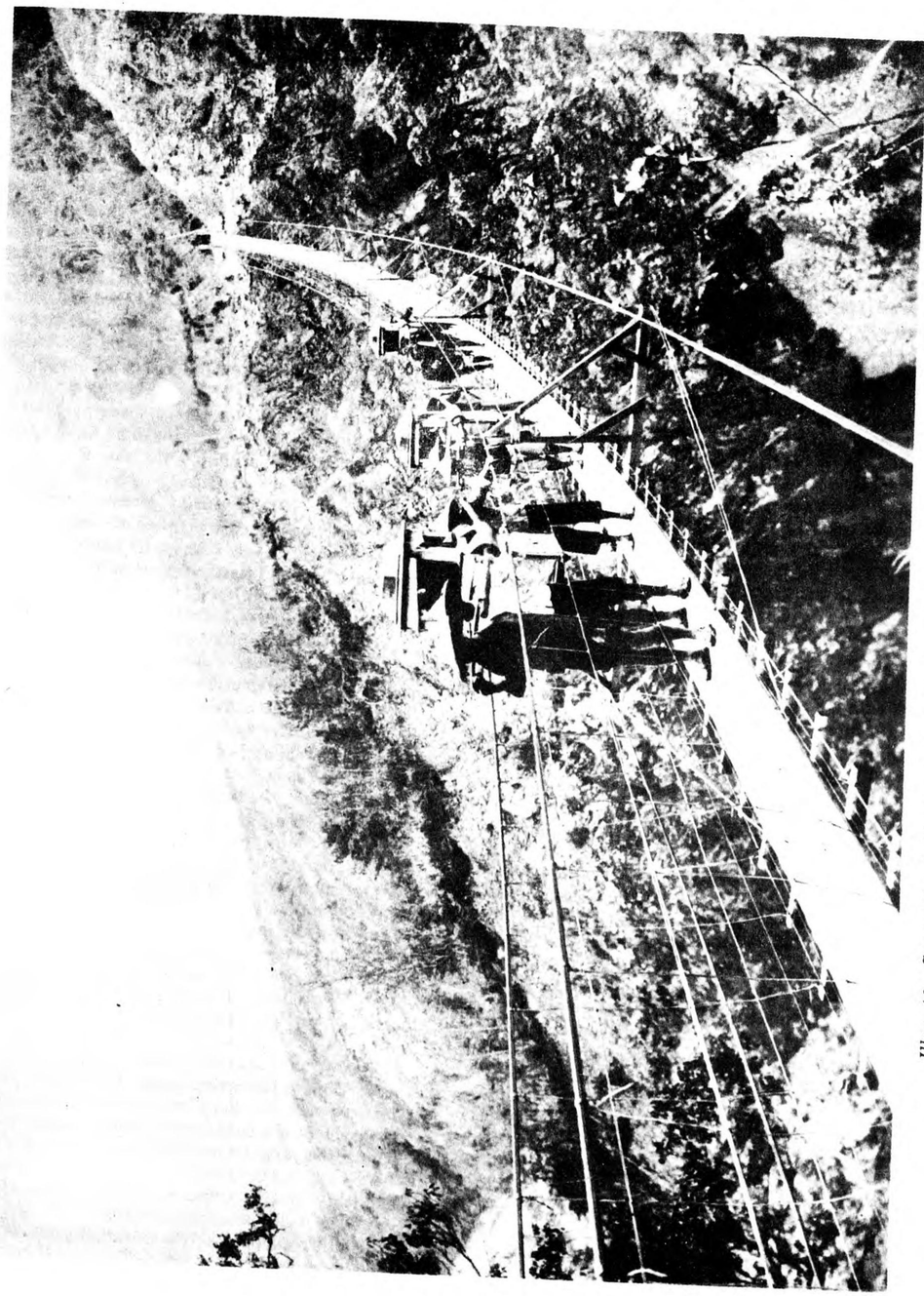
Almost all automobiles on the island were of American make, and there were no automobile plants there. The service station of the Kokusan Automobile Company at Taihoku was enlarged and manufacture of automobiles was under consideration. (*Preliminary Outline of Plans to Enlarge Productive Power of Taiwan,* Gerald Warner, American Consul, Taihoku, January 28, 1938.) There is no evidence that it developed, although the company planned to establish a plant in the new industrial district of Takao.

The railway shops of the Government-General (discussed in the section on transportation) employed about 1,500 workers, over 1,000 of them at Taihoku, nearly 300 at Takao, and over 100 at Karenko. Although the Japanese aircraft industry has overflowed to some extent into Korea, evidence of its development in Taiwan is not conclusive. Quite probably there are aircraft repair or assembly factories at Shinchiku, and probably also near Takao.

5. MUNITIONS. It is quite probable that plants for the production of munitions exist on the island. They are perhaps small plants under some form of sub-contracting system. This is particularly likely in view of Taiwan's importance as the spearhead of Japanese advance in the South Pacific. The most likely sites for such plants would be at Taihoku, Keelung, Karenko, and Takao, but nothing is known in detail.

6. CHEMICALS. The Taiwan Fertilizer Company is reported to have factories at Keelung and Takao, with a yearly productive capacity of 15,000 tons of pure sulphuric acid, 27,000 tons of super-phosphoric acid, and 70,000 tons of compound fertilizers. (*Present-Day Nippon,* No. 15, 1939.) Production of superphosphates by this company in 1936 was reported to be 19,000 tons, capacity 21,000 tons. The Taiyo Mining Company's plant at Zuiho also produces sulphuric acid, about 50 metric tons daily.

Prior to 1939 Taiwan did not produce any ammonium sulphate, which is an important fertilizer. Erection of an ammonium sulphate factory was planned by the Taiwan Chemical Industry Company (Nissan subsidiary) on 82 acres of land at Sekitosaki, one mile from Shinchiku. (Note later reference to the Chosen Chemical Industry Company. A company by this name, in Korea, has plants in Jinsen and Kogen for production of urea gypsum and ammonium sulphate,



Illus. 16. Suspension bridge on footpath in the hills, over which are being carried three Formosan-Chinese palanquins, or carrying-chairs.

but whether its activities extend to Taiwan or whether there is another company by this name in Taiwan, is not known.) Building of the factory was delayed until 1939, however, because the Tokyo Finance Ministry refused to grant a license for expenditure of 5,000,000 yen for necessary machinery to be imported from Germany. (*Ammonium Sulphate in Taiwan*, Gerald Warner, American Consul, Taihoku, August 18, 1938.) Capacity of the plant, if built as planned, would be 75,000 to 100,000 tons of ammonium sulphate, enough to satisfy nearly half of Taiwan's annual requirements. The plant expected to receive 28,000 kilowatts of power from the Jitsugetsutan generating stations.

A subsidiary of a company referred to as the Chosen Chemical Industry Company *(Chosen Kagaku Kogyo Kaisha)* was to have a plant in the Karenko district to produce 70,000 tons of urea gypsum in 1942, and 300,000 tons in 1945. Capital of the company was to be increased from 10,000,000 to 50,000,000 yen. (*The Industrialization of Taiwan*, John K. Emmerson, American Vice Consul, Taihoku, September 16, 1939.) Name of the subsidiary was Shinko Nitrogen Company and its factory was reportedly to be located at Shinko, a fishing port about 64 miles south of Karenko, and 28 miles north of Taito. (*Electric Power in Taiwan*, American Consulate, Taihoku, June 9, 1939.) The ammonium sulphate plant was reported under construction in June 1939.

Oriental Electro-Chemical Industry Company *(Toyo Denka Kogyo Kaisha)* began construction of a plant at Karenko on June 7, 1939, to produce 20,000 tons of ammonium phosphate, 1,500 tons of artificial rock crystal, 1,500 tons of sulphuric soda, and 1,500 tons of absolute ammonia. This factory was to open in June, 1940. Another plant was also projected for construction by the same company to produce 40,000 tons of ammonium sulphate in 1942, and 80,000 tons by 1945. Phosphate rock for this company was to be brought from Angaur Island in the Carolines.

A cyanide plant is operated in connection with the gold flotation mill at Kinkaseki, and the Japan Soda Company is reported to have a plant at Anping. It is clear, however, that prior to the outbreak of war the chief chemical plants in Taiwan were the plants of the Taiwan Fertilizer Company, the ammonium sulphate factory being built at Shinchiku in 1939, and the Taiwan Denka plant at Keelung, which produced manganese, ferro-silicon, and carbide. The latter was also reported to produce cyanamide, for which its capacity was increased in 1939 from 15,000 metric tons to 20,000 metric tons. (Information from a confidential source. The same source, however, indicated that production fell off from 12,000 metric tons in 1936-37 to 5,617 metric tons in 1937-38, and recovered only to 7,269 metric tons in 1938-39. If this is so, capacity of the plant may have been used for other purposes.) In addition, of course, there are the plants on the east coast, either planned or under construction. Very little is actually known about the east coast, and the power, metal, and chemical plants planned there may or may not be in operation.

7. TEXTILES. The textile industry is quite small. It consists principally of the manufacture of hemp and ramie goods. The *Taiwan Choma Boseki Kaisha* mill at Daiancho, Taihoku, produced ramie yarn, and employed 627 workers (154 men and 473 women.) The Taiwan Seima Kaisha mill at Toyohara (in the northern part of Taichu Province) produced hemp cloth and yarn, employing 505 workers (181 men and 324 women). Takekoshi Yoko, at Taihoku, manufactures some cotton and rayon goods. The Tainan Jute Mill Company, Ltd. (also known as the Tainan Hemp Manufacturing Company), was established in March, 1935, with a capital of 2,000,000 yen, later increased to 3,000,000 yen. It produces about 1,500,000 yards of jute cloth each year, and 6,000,000 jute bags, with by-products. The factory is located at Sanbunshi, Tainan city, and has planned to increase its output.

8. PULP INDUSTRY. There are three pulp firms in Taiwan—the Taiwan Kogyo Kabushiki Kaisha, the Taiwan Pulp Industry Company, and the Ensuiko Pulp Industry Company. Taiwan Kogyo, the oldest, is co-operating with Dai Nippon interests for manufacturing pulp from bagasse. It planned to produce 13,000 tons of bagasse pulp each year at its plant at Rato. It has also obtained a forest concession near Karenko as a source of raw material for pulp manufacture.

The Taiwan Pulp Industry Company (also Dai Nippon Interests), capitalized at 10,000,000 yen, uses a magnesium sulphite process, and has an annual capacity of 15,000 metric tons. Its plant is located at Taito, in Taichu Province, near Taichu city. The Ensuiko Pulp Industry Company, capitalized at 23,000,000 yen, is a subsidiary of the Ensuiko interests. It planned to produce 30,000 metric tons of bagasse pulp at its plant at Shinei. Meiji and Taiwan sugar companies are also making experiments at their plants for production of pulp from bagasse. The Ensuiko plants at Karenko have begun a five-year plan to produce 10,000 tons of bagasse pulp and 20,000 tons of wood pulp annually. Bagasse is now burned as fuel, providing power for the sugar mills. A small percentage of it was mixed with wood pulp until recently, when larger percentages were added. The resultant paper product was yellowish because of impurities which chemists have not yet been able to remove.

9. SMALL INDUSTRIES. Some of the other consumer goods companies which make up the rest of Taiwan's industry deserve mention as an indication of the type of goods produced in the island. A few of these are among the larger plants in the island, as for example the *Shi-Go-Hatsu Shoko* sawmill at Tamsui, and the Tainichi Printing Office in Taihoku, each of which employed over 300 workers in 1935.

Food products are the most important output of these companies. Thus the Takuyo Marine Products Company at Takao produced fish products. The Takasago Beer Brewing Company is located at Taihoku. The Japan Carbonic Acid Co., Ltd., located at Takao, manufactures carbonic acid for local consumption and

for export to South China and the South Seas. The Eastern Marine Industry Company, Ltd., was established in Karenko with a capital of 1,000,000 yen in November, 1939. It operates cold-storage enterprises in Keelung, Suo, Shinko, and other towns. The Taiwan Livestock Industry Company *(Taiwan Chikusan Kogyo)* at Taihoku, deals in livestock and canned foods, and was to have established a plant at Takao sometime ago.

Construction materials are produced by the Asano Cement Works. The factory is about 2,000 yards north of Takao City. It produced 9,000 bags (1 bag weighs about 50 kg.) a day in 1938. The Taiwan Brick Company, Ltd. *(Taiwan Renga Kabushiki Kaisha)*, which has a capital of 3,000,000 yen, is at Taihoku. The Taiwan Kasei (Cement) Company was established at Takao in 1939. Paper and insulating products are produced from bagasse, under the trade name of Artex, by the Artex Manufacturing Company, at Taihoku.

Fireworks also was a small industry in Taiwan. Most important was the Taiwan Bakuchiku (Firecracker) Company, at Taihoku, which presumably has been converted to war production.

Hand-made paper and fibre hats produced in Taiwan have been one of the island's staple exports. Although formerly about 10,000,000 of these hats were shipped to Japan each year, exports declined of late, partly because of the competition of machine-knit hats made in Japan Proper. In the years just prior to the outbreak of war exports were only about 5,000,000 hats. The industry was established in Taiwan under the aegis of Kobe commission merchants, mainly because of available labor. Almost all shipments were made to that city, whence the hats were distributed to foreign countries, chiefly the United States. This is one example of a number of Formosan products exported to foreign countries indirectly through Japan Proper, and an illustration of the middlemen (who receive satisfactory profits) through which much of Taiwan's trade passes. The making of paper and fibre hats from paper, rush, Manila hemp, viscose fibre, and Japanese cypress is a cottage industry, piece-work being done by women of the poorer classes. Center of the industry is in Shinchiku Province. The severe earthquake of April 21, 1935, which resulted in partial destruction of nearly 25,000 houses there, seriously affected production in that year.

10. PUBLIC WORKS. In 1936 there were but three city gas producing plants in operation in Taiwan. Only the Taihoku gas works furnished as much as 5,000 cubic meters a day. About 6,000 customers are served in the Taihoku area, the gas is being used chiefly for heating. Takao, Shinchiku, and Byoritsu also have gas facilities, but the last two use natural gas piped directly from the Kinsui oil field. It is used by brick and chemical factories and sugar refineries, as well as for heating.

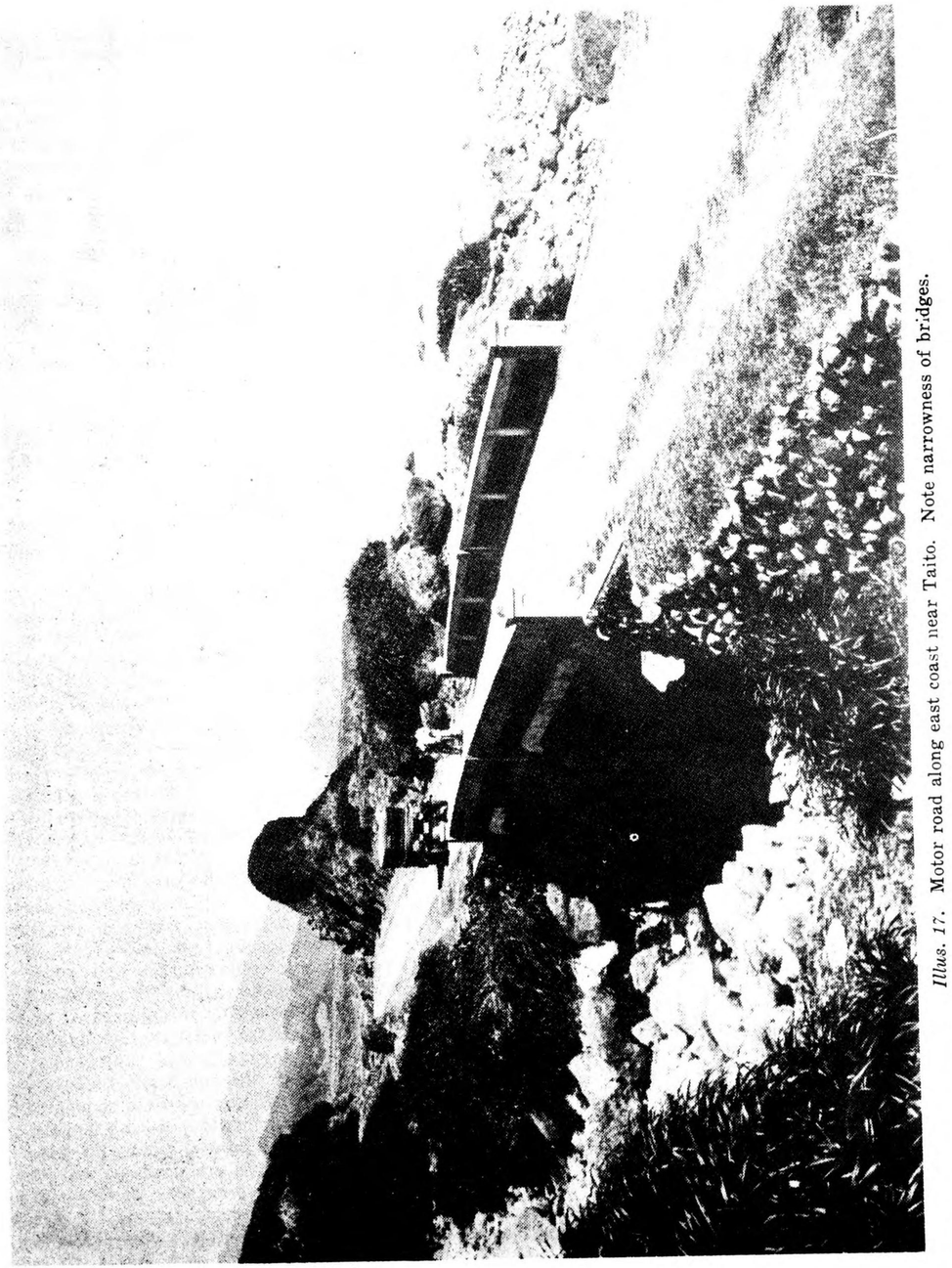
In 1935 there were 90 water works on the island, and 28 others planned or under construction. The city of Taihoku has a fine water supply drawn from the Shinten River into modern reservoirs. The city uses about 10,000,000 cubic feet annually, while Keelung and Takao use much less. Kagi and Tainan are supplied by artesian wells.

Taihoku City has a limited sewage canal system, serving some of the more modern buildings. In other places sewage systems are not modern, because as in other parts of the East, night soil is collected and used as fertilizer. These conditions do not make for a highly sanitary environment, nor should it occasion surprise that enteric diseases are common.

11. GOVERNMENT MONOPOLIES. The Government monoply of salt has already been discussed. Other Government monopolies are those of opium, camphor, tobacco, and alcoholic beverages. All the monopolies have been very profitable. In the fiscal year 1934-35, receipts amounted to 42,320,607 yen, and expenditures to only 22,354,052 yen. In recent years secrecy has surrounded the operations of the Monopoly Bureau, but there is little doubt that profits have remained high. (With reference to the Government monopolies see especially the Annual Reviews of Commerce and Industry, 1934 to 1940, and the *Japan Trade Guide*, 1937 and 1940 editions.)

The opium revenue obtained in 1939 amounted to 1,863,065 yen, when 15,581 kilograms of opium were produced. The Government claims that it has endeavored to eliminate opium smoking, and allows only licensed smokers to purchase opium. It is claimed officially that measures have been taken to prevent smuggling and secret smoking of opium, and that the number of licensed smokers was only 9,613 at the end of 1939. Before its dissolution, the Minshuto Party protested against the operation of the opium monoply (and other monopolies), and once sent a protest (without Japanese permission) to the League of Nations. The Monopoly Bureau supplies prepared opium to the provincial governments, which distribute it through officially appointed wholesalers to retailers. As in other areas under Japanese domination, it can be obtained illegally without much difficulty.

Annual yields of camphor have been about 3,000 metric tons. The camphor monopoly (together with the salt monopoly) dates from 1899. Until 1934, however, production of crude camphor was carried on with Government permission by the *Taiwan Seino Kaisha*. In that year the company was purchased by the Monopoly Bureau, and thereafter the Bureau made efforts to provide for the increase and improvement of camphor production on the island. In 1935 it was estimated that about 2,500 acres should be planted in camphor trees each year in order to maintain the tree reserve. Sixty years' growth must take place before camphor distillation is practical, so that this is of necessity a long-range program. *Hosho* camphor trees, yielding a greater percentage of oil *(Hosho oil)*, were to be planted in addition to ordinary camphor trees. Plans for experimentation also showed the concern of the authorities with camphor by-products. Crude camphor and camphor oil, obtained from the camphor



Illus. 17. Motor road along east coast near Taito. Note narrowness of bridges.

forests by distillation from camphor tree chips, are refined in the Government Monopoly Bureau factory at Taihoku. Exports of both are in the hands of the Government.

Natural camphor, like Ooling tea, has special importance because it has long been a special product of Taiwan and an important export to foreign countries. Rice and sugar are of much more significance in Taiwan's economy, but tea and camphor have constituted nearly 50 percent of the island's direct exports to foreign countries. The United States, England and France were formerly important customers. Exports amounted to from 1,500 to 2,500 metric tons of camphor annually, and from 1,200 to 1,500 tons of camphor oil. Demand was increasing with the growth of the celluloid industry, but the monopoly in Taiwan kept the prices high. As a consequence, synthetic camphor has been developed to compete with Taiwan's natural product and has steadily reduced the demand for the latter. It seems unlikely that this product will regain its previous importance. The Taiwan Government has even considered plants for development of a synthetic camphor industry on the island.

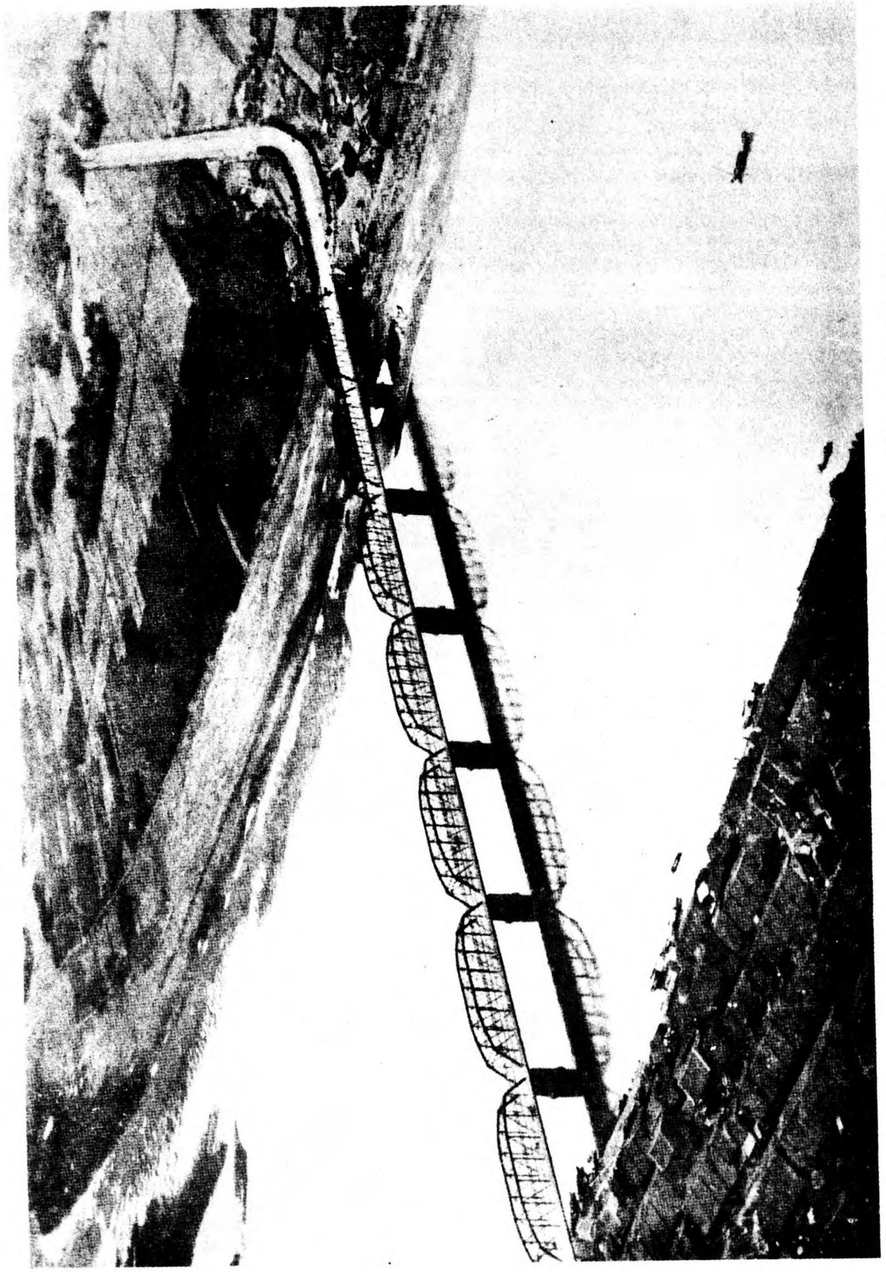
Tobacco crops have been discussed in the section on agriculture. At the time of introduction of the tobacco monopoly in 1905, the Government needed additional revenue since subsidies from Tokyo ceased at that time. This was the chief reason for its establishment. Government sales of tobacco manufacturers in 1938 (including those made from imported leaf, as well as from the island's tobacco crop of 2,896 metric tons valued at 2,600,000 yen), produced a revenue of 26,642,000 yen. Cigarettes, pipe tobacco, and cigars are produced in the Taihoku factory of the Monopoly Bureau. In 1937 the output was 912 metric tons of pipe tobacco, 980,000,000 cigarettes, and 660,000 cigars, with a total value of 23,350,000 yen. As in other parts of the Japanese Empire, tobacco imports were negligible after 1937, partly because tobacco was considered non-essential and partly because of the increase in local crops.

Rice wine *(Sake)* and other alcoholic beverages were placed under the Government monopoly in 1922, while beer was included in the system in 1933. Eleven manufacturing plants were taken over by the Government, but the brewing of beer was left with private companies, the most important being the Takasago Beer Brewing Company, in Taihoku. Sales of alcohol within the island are also a monopoly of the Government, although private plants produce it, chiefly for export to Japan Proper. The sale of alcoholic beverages is the largest monopoly revenue producer, sales amounting to 25,954,784 yen in 1937, and 31,573,000 yen in 1938. Of this nearly one-third was from *sake*, another one-third from sales of rice liquor, and about one-sixth from beer.

12. FUTURE OF INDUSTRIALIZATION. The industrialization discussed in this chapter has been developed by the Japanese as part of a wartime program. Possible destruction of industrial and power plants, the problem of management and skilled workers, and perhaps the expense of transport of raw materials for considerable distances, suggest that Taiwan will continue to have fundamentally an agricultural economy. The major problem for any period of occupation and for the immediate postwar period will be rehabilitation of agriculture.

There has been a fertilizer shortage in Taiwan for several years, and it is possible that some of the fertilizer plants, such as the ammonium sulphate plant near Shinchiku, even if uneconomic, may be useful in meeting the island's deficiency. Imports of fertilizers and revival of agricultural production will be basic needs.

The textile industry in the island is very small, and Taiwan has imported most of its fabrics in spite of recommendations that the industry be developed.



Illus. 18. Main highway bridge over the Tamsui River at Taihoku. The crowded Daitotei quarter can be seen along the riverside in the lower left corner. Considerable building has taken place on the south bank since this picture was made. Note the silted banks in the river, marking the upper limits of river and coastal junk traffic.

IX.

TRANSPORTATION AND COMMUNICATIONS

1. GENERAL. Transportation facilities have never been of the first order, even according to Japanese standards. On railway lines grades, curves, light rails, and short crossing loops have limited the speed and length of trains, while the capacity of freight cars (10-12 tons is small. Prior to the war, the main line from Keelung to Takao via the chief cities (Taihoku, Shinchiku, Taichu, Kagi, and Tainan) was double-tracked only in the north from Keelung to Chikunan, and in the south from Tainan to Takao. There were, however, two lines from Chikunan to Oden, just north of Shoka.

Gravel roads, often full of holes, leave much to be desired for motor transport, and bridges are narrow. Rivers must in many places be crossed by ferries, or be forded. When the war began, good highway bridges had just been built over the Seira-Dakusui River which crosses the west coast plain, and over the Shimotamsui River in the south. Road development has been carried forward during the war, and facilities may now be somewhat improved through pressure of military necessity.

Supplementing the railways and the roads is the unique *daisha* or pushcar system. Pushcar tracks run through the cane fields and along the roads, and often in the foothill areas *daisha* are the only means of transport.

In the extensive mountainous area a network of trails is patrolled by police. No railroad connections exist between the west coast system and the east coast Karenko-Taito line, and no roads for vehicular traffic cross the central mountain barrier. Recent road-building has made possible a circuit of the island. At the north, the east coast Keelung-Suo-Karenko cliff road was connected to Taihoku by an additional route via Shinten and Shokei. In the south the extremely poor road below Taito was connected to the west coast via Daibu and Fuko. It is doubtful if it is even yet possible to motor around the island because of inadequate bridges, stretches of poor roads, frequent landslides, and washouts.

Taiwan's coast has few indentations. Hence there are only two important natural harbors, Keelung and Takao. At great expense and labor, Gosei (Niitaka) on the west coast and Karenko on the east coast, have been developed by construction of artificial harbor works, but as late as 1939 over 90 percent of Taiwan's trade passed through Keelung and Takao. The former is most important as the port of entry for goods from Japan, and Takao as the export outlet for sugar and shipments to Southeast Asia and the South Seas. Small ports are located at Tamsui, Hotei, Anping, Taito, and Suo. Landing beaches and anchorages are found at Shajo, Daibanretsu and Shinko (east coast). Toshien, just north of Takao, is being developed as a naval base. Mako in the Pescadores is a naval base, but less important than Takao and Keelung. Japanese broadcasts of March 30 and April 1, 1943, announced the designation of Takao as a "strategic port" and the abolition of the Mako naval station. The administrative headquarters of the naval base appear to have been removed to Takao from Mako, thus somewhat diminishing the importance of that harbor. The importance of Taiwan as a naval base in the Western Pacific is not likely to be overlooked in the postwar period, whatever its fate as a focal point for commercial shipping may be.

Air service and facilities have rapidly changed. In summary, it may be noted that prior to the war daily air service was maintained between Japan and Taiwan, around the island, and fortnightly to the Pescadores. Numerous airfields on the island have been improved, and others have been added to strengthen its defenses. Important airdromes are located near Taihoku, Shinchiku, Kagi, Tainan, Okayama, Takao, and Heito. Taiwan is thus undoubtedly an important Japanese airbase. In the postwar period it could well be a stopover for airlines from Manila to Shanghai, Manila to Tokyo, and Tokyo to Hong Kong.

2. RAILROADS.

a. *Main line.* The main Government railroad (Jukan line) runs from Keelung in the north to Takao in the south, a distance of approximately 250 miles. It passes through Taihoku and other principal cities—Shinchiku, Taichu, Shoka, Kagi, and Tainan. From Takao the Choshu line, an extension of the main line, runs 15 miles eastward to Heito, and formerly terminated about 14 miles south of Heito at Keishu. The extension of this line for another 15 miles to Boryo has been completed. Plans for a further extension to Koshun near the southern tip of the island may not have been carried through because of difficult terrain and incommensurate economic and strategic value.

From Chikunan junction (south of Shinchiku) nearly to Sheka (below Taichu), a distance of about 57 miles, the express line via Byoritsu and Taichu is paralleled by a freight line which follows closely along the coast. The point at which the two lines rejoin is Oden. The coastal line is the easier, the inland alternative having heavy gradients, sharp curves, and a number of tunnels and bridges. It is known as the "mountain line," and often suffers from landslides and washouts. It has in the past (1935) suffered very badly from earthquakes. The main line is double-tracked in the north between Keelung and Chikunan (78 miles), and in the south from Takao up to Tainan, 27.9 miles. (*Railway*,

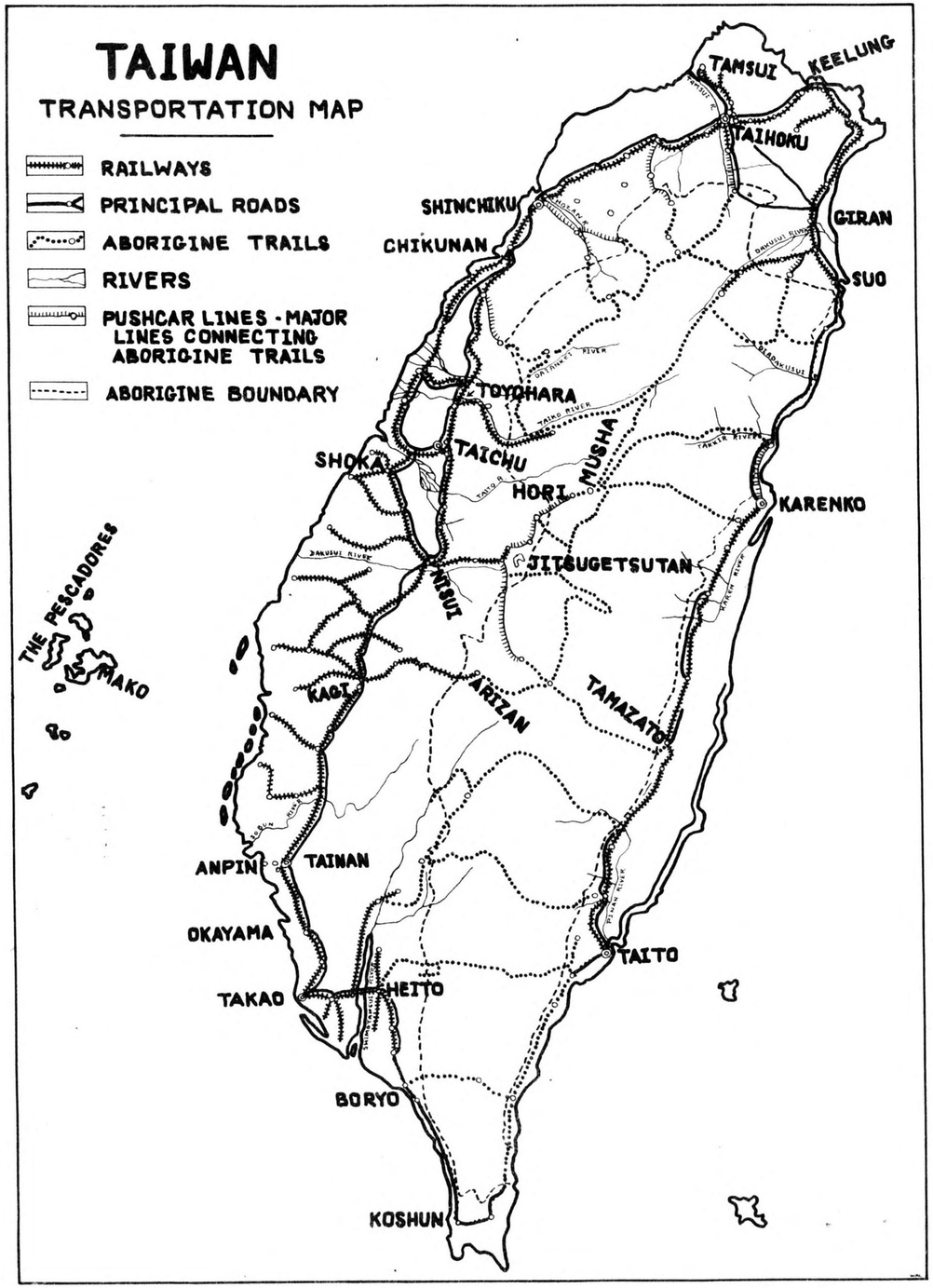


FIGURE 3

Illus. 19. "Daisha" or pushcar train, made up of mail load and first-class passenger car; and Japanese official being carried in a chair over a rough connecting stretch on the southeastern section of the road from Koshun to Taito.

Bus, Truck, and Pushcar Transportation in Taiwan in the Fiscal Year 1937, Gerald Warner, American Consul, Taihoku, April 26, 1938.) Short stretches between Taihoku and Itahashi, and between Toen and Heichin may not yet be double-tracked. In 1938 double-tracking was begun from Tainan to Shoka, 88.5 miles, and was expected to require seven years for completion. When completed, there will be two tracks from Keelung through to Takao.

Main lines in Taiwan are 3'6" gauge, as in Japan Proper. Rails are 33 feet long, 60 to 75 lbs. weight per yard. Only wooden ties are used. Japanese cypress, chestnut and oak, found locally, and chestnut and *shiba* from Japan Proper are found suitable. A dozen ties are used to a rail. Speed of trains is restricted by the light rails and other factors, such as gradients up to 1 in 80, sharp curves and tunnels. Train length is limited to 30 cars by shortness of the crossing loops. First among the recommendations of a group of Japanese bankers who visited Taiwan in November, 1939, was double-tracking of the remainder of the main line, and replacement of rails by a heavier type. (*Investigation of Taiwan by Japanese Bankers*, John K. Emmerson, American Vice Consul, Taihoku, December 4, 1939.)

b. *Government branch lines.* Several government-operated east-west feeder lines are connected with the north-south trunk line. One connects Taihoku with its small original port, Tamsui, a distance of 13.9 miles. From Nisui, below Taichu, there is a line running 18.4 miles eastward to Gaishatei, near Lake Jitsugetsutan, the site of Taiwan's largest electric power plants. It has been planned that the Boryo extension of the main line, at the south, should have a branch to Toko. These lines are 3'6" gauge. The Forestry Bureau operates the narrow-gauge Arisan Mountain line, from Kagi, 44.6 miles, with a 6.6 mile branch from Arisan to Niitakaguchi. This is a winding lumber line which affords fine scenic views, but very slow transportation. It has a 2'6" gauge, a maximum slope of 1 in 16, over 70 tunnels, three spiral sections, and two switch-backs enroute. (*Far East Year Book*, 1941.) Another lumber line runs from Dogyu to Kahodai, providing transport for lumber from Mount Hassen, and coming near the main line north of Taichu City near Toyohara. Length of this line is 28.2 miles. Sidings are not included in these mileage figures, nor in those of the main line. Yard track and sidings approximated a third of the total mileage—or about 182 miles. Gauge on this is also 2'6", and rails on these lumber lines are from 24 to 30 feet in length, weighing 25 to 40 lbs. per yard.

c. *East coast line.* Only disconnected railway facilities are available on the east coast. In the north, from a junction with the Jukan Line at Hatto (near Keelung), the Giran Line runs for 61.4 miles to Suo, via Giran. From it another lumber line (gauge 2'6") runs from Rato westward 23.2 miles to Doba, on Mount Taihei. The Heikei coal line runs from Sanshorei to Seidooko, serving the Sekitei Colliery of the Taiyo Mining Company. From Suo southward for 75 miles to Karenko there is only a narrow highway—in some places cut from the face of the cliff. A narrow-gauge line with antiquated rolling stock operates between Karenko and Taito, 105 miles farther south. In 1934 this line had 108.6 miles of single track, and about 22 miles of yard track and sidings. It has the same gauge and rails as the lumber lines. There is no railroad across South Taiwan from the east to the west coast.

d. *Condition of the railroads.* (1) *Rolling stock.* Railway facilities have been taxed to the limit during the last five or six years. The general control of materials made it difficult to obtain supplies and replacements of equipment needed for the increased traffic, due both to industrial and economic development of the island and to military requirements. To alleviate the freight car shortage, 230 freight cars were imported from Japan Proper. The Chief of the Government Railways stated that in the fiscal year 1940 about 700 additional freight cars would be purchased if appropriations and materials were available. (*Annual Review of Commerce and Industry, 1939*, first section.) Rolling stock on Government railroads was reported at the end of 1941 to consist of 220 locomotives, 600 passenger and baggage cars, and 8,000 freight cars of all kinds. (*Railway Gazette*, December 12, 1941.) No official figures have been given for ten years, however, and the source or basis of these estimates is not known. In 1932 the Government railroads had 182 steam locomotives, 6 steam-powered combination passenger and freight cars, 24 gasoline-powered combination passenger and freight cars, 482 passenger cars, and 3,645 freight cars (including 60 refrigerator cars.) It was reported that no new rolling stock was purchased in the 1932-1933 and 1933-1934 fiscal years, but that 6 new gasoline cars were bought in 1934-35. Except for these, the gasoline cars were of American make. (*Railway Conditions in Taiwan*, John B. Ketcham, American Consul, Taihoku, August 28, 1934.)

The subsidiary Government lines in 1931 had 50 locomotives, 71 passenger cars, and 768 freight cars with total freight capacity only 4,362 tons. Little new equipment was purchased in the several succeeding years.

Passenger cars have a seating capacity of 76 third-class, 48 second-class, and 30 first-class. Sleeping cars carry 39 third-class, 22 second-class, and 6 first-class in special compartments of second-class cars. No air-conditioned equipment is known to be available. Freight cars have a capacity of 10 to 12 metric tons, total freight capacity being less than 100,000 tons. While sleeping cars are similar to American types, ordinary passenger cars are of the Japanese model, some having only two long seats running the length of the car. It is reported that high-speed gasoline cars, running either singly or in pairs, have recently replaced steam trains on the east coast line.

(2) *Traffic.* During the fiscal year which ended March, 1939, receipts of the Government railways totaled 30,000,000 yen, of which nearly two-thirds was derived from passenger services. Before the war the east coast line carried only three percent of all traffic. Between Keelung and Takao one dining-car day-express was run daily each way, covering the 252 miles in 8¼ hours. Night service consisted of one sleeping-car and dining-car express, which took 9¼ hours to complete the trip, and one semi-fast night train, with dining and sleeping cars, which required 13 hours for the run. Both were routed via Taichu. One fast dining-car all-station train was routed via the coastal line. All of these trains carried all classes of passengers. In addition, there were several local or through slow trains. There were five all-station trains to Suo from Keelung and two from Taihoku, covering the 60 miles from Hatto in 3 hours. On the east coast line there were one day and one night express each way between Karenko and Taito, taking 5 hours by day and 8 hours by night. These east coast trains had no sleeping or dining cars, however.

Freight trains were run throughout the day and night at almost the same frequency as passenger trains. The following table indicates the chief services operated:

Table 23. Railway Services.

Main Line	Miles	Single or Double Track	Trains per Day: Passenger	Trains per Day: Freight
Keelung-Taihoku	17	D	23	4 to 12
Taihoku-Shinchiku	49	D*	14	4 to 10
Shinchiku-Chikunan	12	D*	16	4 to 12
Chikunan-Shoka (coastal)	56	S	9	4 to 8
Chikunan-Shoka (inland)	56	S	8	1 to 4
Shoka-Kagi	50	S**	12	4 to 8
Kagi-Tainan	38	S**	7	2 to 4
Tainan-Takao	29	D	17	2 to 8
East Coast Line				
Hatto Junction-Suo	60	S	7	1
Karenko-Taito	108	S	6	1

* Except possibly for very short stretches.
** Double-tracking begun in 1938.

Although carloadings amounted to almost 25,000 tons a day, there was freight congestion at every station in 1939. On January 1, 1940, over 125,000 tons of freight awaited shipment. Coal, sugar, rice, and fertilizers accounted for the major part of this.

Table 24. Freight Carried on Government Railways, Year Ending March 31, 1939.

(in 1,000 metric tons)

Commodities	Quantity
Coal	1,637
Sugar	1,159
Rice	885
Fertilizers	654
Lumber	336
Cement	261
Bananas	144
Molasses	129
Bricks	77
Petroleum	52
Others	2,523
Total	7,861

In the previous year only 7,249,235 metric tons of freight had been carried, together with 23,000,000 passengers. (These figures include the Taito line.) Trains averaged about 15 cars, and ran a total of 6,224,553 miles. There were no electrified lines on the island prior to the war. Both oil and coal were used as fuel, 141,458 short tons of coal and 58,249 American gallons of oil being consumed in 1937.

(3) *Stations, shops and yards.* Before the war new railway stations were being built at both Taihoku and Takao. The new Taihoku freight station was completed at the end of 1937. (*Railway and Highway Transportation in Taiwan*, William E. Yuni, American Vice Consul, Taihoku, July 23, 1938.) Passenger and freight stations at Taihoku were separate. Extensive yards exist at Kagi. Stations are not over 5 miles apart; crossing loops at the stations and elsewhere are short.

On the main line, about two miles from Taihoku on the way to Keelung, are fairly new shops, completed in 1936, but later reported about to be enlarged to meet the increased demand for rolling stock and repairs. (*Preliminary Outline of Plans to Enlarge Productive Power of Taiwan*, Gerald Warner, American Consul, Taihoku, January 28, 1938.) These shops reportedly involved an investment of 3,500,000 yen, specifically 100,000 yen for land, 2,200,000 yen for the shops, and 1,200,000 yen for shop equipment. They were built by Japanese and all equipment was of Japanese manufacture. Shops covered nearly 350,000 square feet, and 6 miles of track were to be laid in and to these yards. Prior to completion of these, the chief shops were located in the city of Taihoku near the station. These had 1,017 workers at the end of 1935. It is not known, however, whether these shops continued operation after completion of the new workshops.

Secondary shops were at Takao, where in 1935 there were 284 workers. Located at the west end of the main wharf, they were able to make both major and minor repairs, although of course most repairs were made at Taihoku. All necessary repairs for the east coast railway had to be made at Karenko, where 100 workers were employed in the small shops.

Small repairs can be carried out at the engine-shed shops—on the west coast at Keelung, Taihoku, Toen, Shinchiku, Chikunan, Taiko, Taichu, Shoka Junction, Kagi, Tainan, Takao, Keishu, and Boryo and on the east coast at Giran, Suo, Karenko, Tamazato, and Taito.

e. *Organization and personnel.* The Government railways are operated, and the private railways, tramways, and road transport services are controlled from other headquarters of the Government Railway Bureau (now the Transportation and Communications Bureau) at Taihoku. It is to be doubted that much change has occurred below the higher levels of organization. The Railway Bureau formerly had 9 departments: General Affairs, Finance, Traffic, Operation, Civil Engineer's, Mechanical Engineer's, New Works, Private Railways, and Road Transport. A traffic division office at Karenko is in charge of the east coast line.

Personnel consisted of a General Manager, 10 chiefs of departments, 13 technicians, 142 assistant technicians, 276 chief clerks, 3,600 clerical staff, 6,200 freight

staff. All persons in responsible positions are Japanese, and wages paid are comparatively high.

f. *Safety measures.* Many of the grade crossings between Keelung and Taihoku have been eliminated as a safety measure, and important crossing gates are guarded by watchmen. Crossings without watchmen were equipped with a flashing warning light and bell to operate at the approach of a train. Accidents on lines in Taiwan have been infrequent in spite of the congestion, largely because of the care taken and because of the slow speed of trains.

g. *Bridges and tunnels.* There are a number of fairly long and vulnerable bridges on the main railroad line. Most important bridges are those over the Keelung River at Hatto, 2 miles from Keelung; over the Tamsui River near Taihoku; over the Hozan River, just north of Shinchiku; over the Choko (Chunkan) River, just south of Chikunan; over the Taito River, just north of Shoka; over the Seira River, just south of Nisui; over the Sobun River, near Kwanden, north of Tainan; and over the Shimotamsui River, east of Takao on the Choshu line. Bridges over the Taian and Taiko Rivers, both on the coastal and "mountain" lines, are less important because of the alternative routes on this stretch.

The bridges near Chikunan and Shoka are strategic bottlenecks through which traffic must pass, because they are located just north and just south, respectively, of the dividing points of the "mountain" line and the alternative coastal route. The bridge over the Shimotamsui River is the longest, and is important because it lies between the vital port of Takao and the airbase at Heito.

Important tunnels on the main line are located on the "mountain" line in Shinchiku Province, just north of the border of Taichu Province. North of Toyohara on this line there are nine tunnels and three bridges. On the line from Keelung to Suo there are tunnels just south of Zuiho, and where the railroad reaches the coast near Tairikan. There are also tunnels between Keelung and Taihoku. On the Karenko-Taito line the longest tunnel is just south of Mizuho.

h. *Private lines.* Private companies (chiefly the sugar companies) have constructed a network of narrow-gauge lines to refinery centers and railway junctions. This network spreads out from the main west coast line, though there are usually no physical connections between the Government main line and the private lines, because of differences in gauge. It is not certain that there is physical connection between the Government main line and some of its branches, as, for instance, the Nisui-Gaishatei line. Maps indicate no physical connection there, but it is peculiar if none exists, for the line was originally built to carry heavy power plant machinery to Jitsugetsutan.

Gauge on the private lines is generally 2'6", although some private lines are of 3'6" gauge. Some sources indicate that the Manka-Shinten line is 3'6" gauge. Rails are 24 to 30 feet long, and the weight of rails is 25 to 40 lbs. per yard. Total mileage of these private railways was 1,626 miles in March, 1939, compared with 885 miles for Government lines. At the end of 1931 there were 251 locomotives, 273 passenger cars, and 15,273 freight cars on these lines. Little new equipment was purchased in the following several years. It is not known how much has been added just prior to and during the war.

The line from Manka (a district of Taihoku city) to Shinten, 6.5 miles, was operated by the Taihoku Railway Company (*Taihoku Tetsudo Kabushiki Kaisha*). A line of 8.1 miles was operated by the Taichu Light Railway Company, the head office of which is at Toyohara. The Keelung Colliery Company, the Taiwan Mining Company, the Taiwan Pineapple Canning Company, The Kanan Irrigation Works, and the sugar companies owned the rest of the private railway mileage. At the end of March, 1938, out of 1,562 miles of these lines, 317 miles were open for public use (for passengers and freight), and 1,245 miles were for exclusive use of the companies themselves.

The following list includes the most important of these lines, which are also shown in Figure 3.

Table 25. Private Railway Lines.

Shinchiku Province

1. Shinchiku to Koko—about 20 kilometers, or 12½ miles.

Taichu Province

2. Taiko to the "mountain line" just south of the border between Shinchiku and Taichu Provinces—about 16 kilometers, or 10 miles.
3. Toyohara to Tosei and south—about 24 kilometers, or 15 miles.
4. Rokko to Shoka and back almost to the coast, via Wami—about 20 kilometers, or 12½ miles.
5. Taichu south via Soton and Nanto to Nama, and west to Nisui—about 40 kilometers, or 25 miles.
6. Rokko to Inrin via Keiko—about 24 kilometers, or 15 miles.
7. Keiko to Nirin—about 12 kilometers, or 7½ miles.
8. Nirin to Denchu, via Keishu and Hokuto—about 30 kilometers, or 19 miles.

Tainan Province

9. Seira to Kobi—about 17 kilometers, or 10 miles.
10. Tonan to Hokko via Kobi—about 29 kilometers, or 18 miles.
11. Shinko to Kagi, and back nearly to the coast, running near the south bank of the Bokushi River—about 56 kilometers, or 35 miles.
12. Shinko to Koume—about 25 kilometers, or 15 miles.
13. Shin-ei to Hotei—about 20 kilometers, or 12½ miles.
14. Tainan to Hokumon—branch from Kari via Mato to the main line—about 48 kilometers, or 30 miles. (Tainan to Kari may be a pushcar line only.)
15. Tainan to Tamai—about 28 kilometers, or 17½ miles. (May be pushcar line only.)
16. Tainan to Anping—about 4 kilometers, or 2½ miles.
17. Tainan to Kwanbyo—about 12 kilometers, or 7½ miles.

Takao Province

18. Rokki south nearly to Toko, via Heito—about 64 kilometers, or 40 miles.
19. Kominato to Hozan to Rinshihen—about 24 kilometers, or 15 miles.
20. Kizan to Kyukyokudo—about 29 kilometers, or 18 miles.

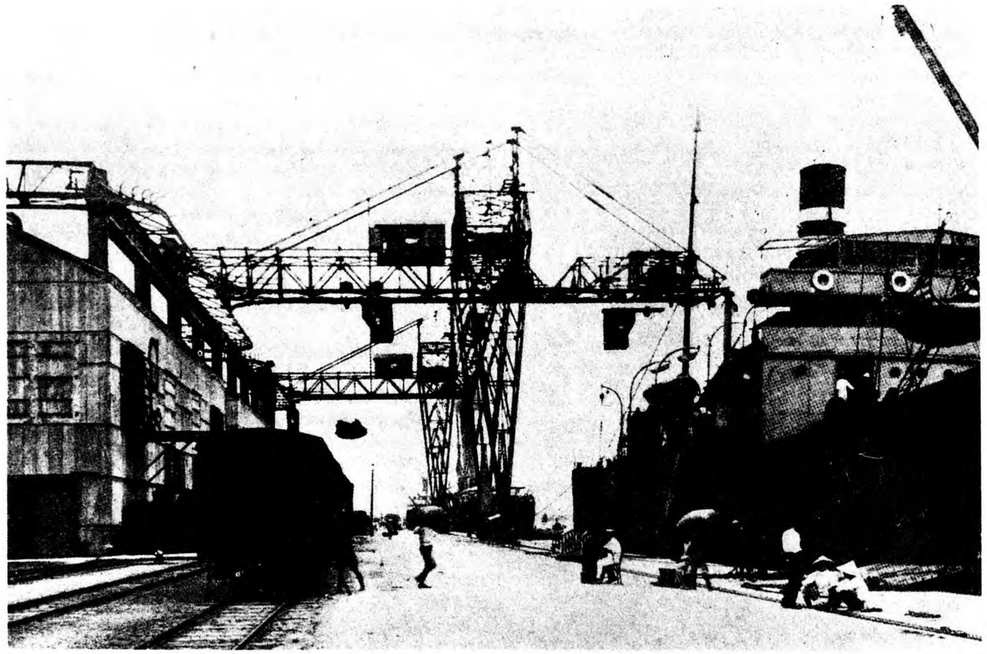
Taihoku Province

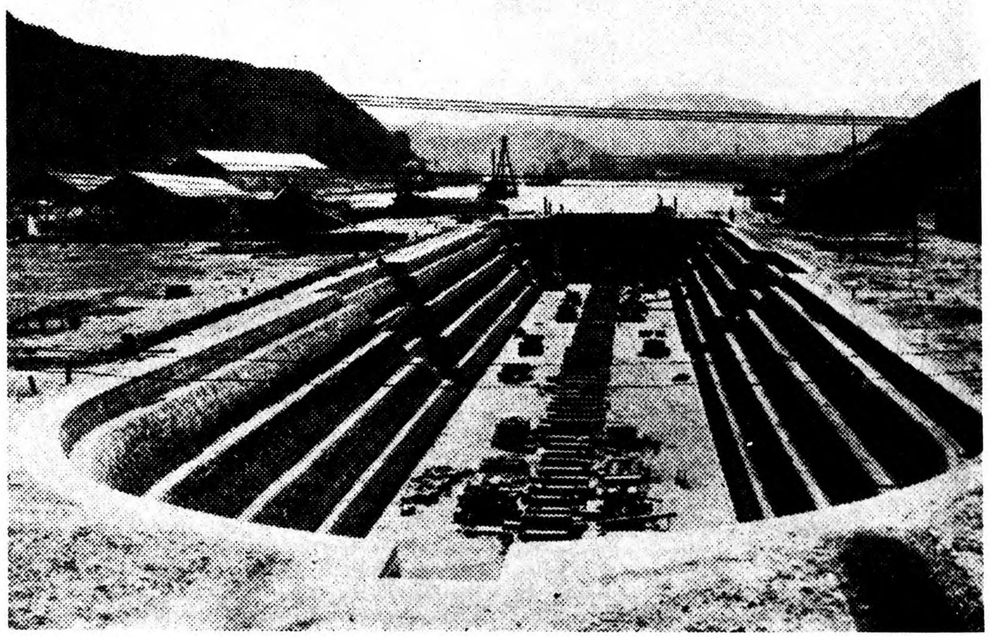
21. Rato to Korosha—about 12 kilometers, or 7½ miles.

NOTE: Distances are approximate, as no official distance tables are available to date. Known pushcar lines have been omitted; but in one or two cases available information does not indicate whether the line is a railway or for pushcars.

i. *Pushcar lines.* There is to be found in Taiwan the oft-mentioned and unique system of privately-owned pushcar lines, operating with cars known as "daisha," or "Tai(wan) vehicle." Small flat cars are pushed along rails by one or two coolies. Several passengers or small amounts of freight can be carried at a time. In

Illus. 20. Width and character of east coast motor road along the cliffs between Suo and Karenko.





Illus. 21. Dock installations at Takao, and drydock at Keelung.

1937 there were 645 miles of such track; gauge was 18″ or 20″, and rails weighed 10 or 12 pounds per yard. For ties, unfinished logs of small diameter were used. With the shortage of gasoline and other means of transport, these lines are probably enjoying some considerable revival. They serve points in the interior, and are often the only means of transport available over a considerable area. They may be seen all over the lowlands, and in the foothills, too, usually running along the side or in the middle of the road. The cars may be nothing more than flat cars on wheels, or they may be "first class" cars with posts at the corners and a flat roof, in which Japanese or those Formosan-Chinese who can afford it, ride in "style." Pushcar railway bridges look like rails on stilts, their underpinning consisting only of poles and crosspieces. In some areas pushcar lines appear everywhere in the cane fields, coolie labor for pushing them apparently being cheaper than other means of transporting cane to the centrals. Their very ubiquity prevents their being shown in detail on small maps, but their activity may be indicated by the fact that in 1937 they carried 3,302,125 passengers, and 457,149 metric tons of freight. Revenue from passenger traffic was 327,381 yen, and that from freight, 958,246 yen.

3. PORTS AND SHIPPING.

a. *Location in shipping lanes.* The island of Taiwan lies in the main Japanese shipping lane to Southeast Asia, with shipping connections to Japan Proper, Korea, and Kwantung in the north, and to China, Hong Kong, Java, the Philippines, and other points in the south. Unfortunately the island's coast has but few navigable identations, so that there are only two important ports, though several others are in process of development.

b. *Naval bases and ports* (1) *Comparative importance.* Keelung (Kiirun) in the north, and Takao on the southwest coast, are the island's only important natural harbors. By tonnage of vessels entering and clearing, Keelung accounted for 63 percent of all shipping in 1936, and Takao for approximately 22 percent. In 1939, trade at Takao amounted to 419,270,000 yen, and at Keelung, to 503,836,000 yen. *Nippon Today and Tomorrow*, 1941 (published by *Osaka Mainichi*) placed the value of the trade of Keelung at 350,000,000 yen, and of Takao at 384,270,000 yen. *Glimpses of the East*, 1940-41, published by *Nippon Yusen Kaisha*, stated that vessels entering and clearing Takao port in 1939 totaled 777, of 1,736,613 tons, and that the port was equipped to handle 20 liners and 2,800,000 tons of cargo annually. This is as much as is normally handled at Keelung. Tamsui, formerly the port of Taihoku, is now of little importance. Artificial harbors are in process of development at Karenko on the east coast and at Gosei or Niitaka on the west coast. Just south of Takao, offshore at the mouth of the Toko River, there is a roadstead which was used for concentrating naval vessels taking part in Japan's advances on South China and Indochina areas. In addition, there is an important submarine and destroyer base at Mako in the Pescadores, and a new port has been built at Toshien, just north of Takao.

(2) *Keelung.* Keelung, northern terminal of the main railroad line, is an export port for rice, sugar, ores, camphor, and carbon black, but more important as the import port for canned foods and tobacco, textiles, machinery, and vehicles coming from Japan. The port has been heavily fortified, and the harbor and hills around have long been a restricted military zone in which no photographs could be taken without permission. There is a wide Outer Harbor running south, an Inner Harbor running southwest, and an artificial basin running northwest from this Inner Harbor. At the end of the basin is the Keelung Dockyard. Along the northwest side of the Inner Harbor, berths can accommodate 6 vessels up to 20,000 tons.

Oil storage tanks are located north and northeast of the Keelung Dockyard. The drydock there will accommodate a vessel 300 feet long, with a draught of 14 feet. According to the *Official Shippers' Guide*, 1934-35, of *Osaka Shosen Kaisha*, the works are equipped with the latest machine tools, pneumatic and oxyacetylene welding, and electric welding plants. It advertised itself as "shipbuilders, engineers, and boiler makers, manufacturers, forgers, and founders of cast iron and brass of any size."

Warehouses are located along the northwest side of the Inner Harbor. At Berths 1 to 4, there are three electric-powered luffing jib type cranes, one of thirty tons, and two of ten tons, with tower transporters of 9½ tons capacity. Five godowns at Berths 14-18 were serviced by 10 cranes of 3 tons capacity; three more godowns are known to have been under construction.

Coal is brought by cable car direct from the mine head to the coaling wharves on the west side of the artificial basin, Gyucho-ko. Electric power is supplied from Jitsugetsutan, and a steam generating plant (38,000 kilowatts) is located at Hattoshi nearby.

Railroad facilities extend beside and around Gyucho-ko to all warehouses on the northwest side of the Inner Harbor. Because of the fuel storage tanks nearby, and the delivery of petroleum products from Kinsui and Byoritsu, oil tank cars may well use these facilities.

(3) *Takao.* Takao harbor is located at the entrance to a narrow lagoon, which extends southeastward parallel to the coast for six miles. The narrow entrance to the harbor is protected by two breakwaters. The Inner Harbor basin, dredged to 4-5½ fathoms, is supplemented by a small artificial basin extending northeastward at the mouth of the Takao River, and by short canals into the warehousing area.

Takao (with adjacent Toshien) is the most important center of naval activity on the island. It is also Taiwan's chief sugar port. Other important exports are alcohol, rice, and fruits. Principal imports in past years have been ammonium sulphate and other fertilizers, ores and metals, comestibles, and tobacco. While trade in these products has been chiefly with Japan, Takao is also important for trade with Southeast Asia.

Takao is heavily fortified. Photography, sketching

and similar activities nearby have long been forbidden. Okayama to the north and Heito to the east are the sites of major airdromes. Other fields are in the neighborhood, for it offers optimun flying conditions.

The recent attempt partially to industrialize Taiwan has been centered here—with many new factories established in the industrial district southeast of the city. The Japan Aluminum Company, the Taiwan Fertilizer Company, Japan Oil Company, Japan Mining Company, Kokusan Motor Company, Taiwan Ironworks, Taiwan Livestock Industry Company, Shiono Trading Company, Maekawa Mining Company, Nitto Petroleum Company, Taiwan Electric Power Company, Commercial and Technical School, and the Asahi Electro-chemical Company all planned to establish themselves in and near Takao. There is reason to believe that many of these plans have been carried through.

The Mitsubishi Heavy Industry Company was to construct a large-scale dockyard to supplement the small one on the southern side of the harbor, but this may not have been done. If not, only small repair facilities are available. (*Shipping in the Japanese Empire During October*, 1941, Roy M. Melbourne, American Vice Consul, Kobe, November 7, 1941.) Major installations are under construction at Toshien, a suburb just north of Takao harbor and city.

In 1939 the port could accommodate 20 vessels of 10,000 tons, and half a dozen smaller ones. Dredging operations were begun to enlarge the facilities. On the main dock, extending for 4,000 feet along the north side of the harbor, there are 5 government warehouses, each of 5,000 tons capacity, and fitted with overhead electric cranes. At No. 3 berth there is reported to be one fixed 15-ton electric crane, and one floating steam crane capable of lifting 30 tons.

As the southern terminus of the main railroad line, Takao has track yards and a roundhouse just west of the main wharf. This repair shop was the second largest in 1935, when it employed 284 persons.

(4) *Other ports on the main island.* Except for these two harbors, others along the northern and western coasts are shallow, silting up from the discharge of rivers and streams. Tamsui, at the silt-filled estuary of the Tamsui River, nine miles from the capital, has had to be abandoned as an important port. Anping, near the city of Tainan, and small ports like Hotei, Toseki, Rokko, Koryu, and Kyuko are used chiefly by coastwise junks, or by those trading with the China coast.

At Gosei, (officially renamed *Niitaka* by the Japanese) on the central western coast near Taichu, a harbor project was started in August, 1939, to relieve congestion of naval and commercial shipping at Keelung and Takao. Original plans were to have this harbor ready in 1945. An appropriation of 3,000,000 yen was made for the first year's work, and 4,000,000 yen were to be spent in each succeeding year. The port was to be built to accommodate 21 10,000-ton ships, six of them at the wharf, and 15 at anchorage buoys, as well as 100 fishing vessels. Cargo handling capacity was to be 1,500,000 tons annually. There is reason to believe that these plans are being carried through.

(5) *Mako, in the Pescadores.* The Pescadores, lying off the west coast in the channel between Taiwan island and China, consist of many small islands and numerous rocks. The three main islands, Hoko-to, Gyoo-to and Hakusa-to, enclose a harbor, Hoko-ko. Within this, and almost landlocked by Hoko-to, is the harbor of Bako or Mako. This has been developed as a destroyer and submarine base, and for long constituted the headquarters of a naval sub-command. Japanese broadcasts have indicated, however, that the naval administration has been removed to Takao, presumably reducing the importance of Mako. The town is situated on the north shore of Jukoku Wan (Junks Bay), at the entrance to the harbor. Across this bay from the town is Sokuten-to (Observatory Island), where the naval station is located.

Mako harbor can be used by vessels of deep draught. In 1937 there were two concrete piers, and one of iron and wood at the town waterfront. There was also a government drydock 285 feet in length and 80 feet in width (both bottom measurements). In connection with this there were a small foundry, a small machine shop, a small pattern shop, a small carpenter shop, and other facilities.

(6) *The east coast.* The east coast of Taiwan has few indentations, and no good harbors. Suo, a fishing port in Taihoku Province in the north, is the only natural harbor. It has in addition a fairly large artificial T-shaped basin, which provides wharfs for a large fishing fleet. At Karenko and Taito, the chief cities until recently, it was necessary for vessels to stand offshore, loading and unloading by lighter. In October, 1939, Karenko's artificial harbor was opened as an international port. In 1938, 170,000 tons passed through. By 1945 the Japanese hoped that tonnage would increase to 2,000,000 tons. The harbor was enlarged to accommodate a number of 4,000-ton vessels, a number of 500-ton ships, and many small fishing boats. With electric power from the Mokka River stations and with some new industrial plants, it seems likely that considerable development has occurred. It is true, however, that the harbor entrance is narrow, and prevailing strong winds make this difficult to navigate. At Shinko, midway between Karenko and Taito, and at Taito itself, all freight must be handled by lightering from the beach. This operation becomes impossible during adverse weather conditions at some seasons of the year. At each landing pushcar lines serve the beachhead.

c. *Shipping.* Shipping service between Taiwan and Japan Proper was formerly carried on by a fleet of six 10,000-ton steamers operated by the *Nippon Yusen Kaisha* and the *Osaka Shosen Kaisha.* Lines also operated to North and South China, to Dairen, to Korea, and to Java and the Philippines. Although many such lines are no doubt not operating today, while others are operating irregularly or on different schedules, the following table of pre-war shipping lines is presented to show previous connections of the island. Except for a very few lines, all are Japanese concerns.

Table 26. Shipping Lines in 1939.

Line	Number of Vessels Plying	Minimum Number of Voyages per Year	Minimum Tonnage of Vessels Used
Keelung to Kobe	6	84	8,000
Keelung to Amoy	1	36	1,500
Keelung to Hong Kong	2	48	1,500
Keelung to Java	2	12	3,000
Keelung to Philippines	3	24	3,000
Keelung to Karenko	2	300	2,500
Takao to Tokyo	6	90	4,000
Takao to Tokyo°	2	24	2,500
Takao to Seishin	2	12	2,000
Takao to Jinsen	2	24	2,000
Takao to Dairen	2	46	4,000
Takao to Tientsin	2	24	2,000
Takao to Shanghai	2	36	2,000
Takao to Canton	1	24	1,500
Takao to Aparri (since '38)	1	30	3,000
Takao to Pescadores	1	156	700
Calls of Southern Lines	2	24	5,000
Coastal Line, East Taiwan	2	70	700
Calls of European Lines	8	24	8,000
Shinko to Koto°°	1	60	50

°—Used for "special purposes of the Army."
°°—Koto islands lie southeast of Taiwan, and are under the jurisdiction of the Government-General.

Source: Grajdanzev, A. J. *Formosa Today*, New York, Institute of Pacific Relations, 1942.

4. ROADS. a. *The road system.* Within the island, the railways are supplemented by about 800 miles of truck lines, constituting an important auxiliary means of traffic. The north-south chain of mountain peaks, however, limits transportation across the island to one rough coastal road at the southern end, and several trans-mountain roads at the extreme north. At least until recently, no motor-vehicle could cross the central mountain barrier. Some maps have shown a road crossing from Musha to Karenko. In 1937 a secondary road did go from Nanto to Hori, and from Hori it was completed to Musha by the end of that year—19½ feet in width, and maximum grade 1:10. From Musha, however, only a trail crossed the 10,000 foot mountains to Karenko, and although surveys were made for a road here, it is unlikely that this has been completed, for other projects are more urgent, the terrain is extremely difficult, and the whole operation very costly.

The main highway runs north and south along the western agricultural plain, generally paralleling the Government railroad line.

Table 27. Estimated Road Mileage in 1938.

Character of Road	Miles
Unimproved earth and non-surfaced	1,000
Improved earth, sand, clay, gravel, etc.	9,905
Macadam	11
Concrete and asphalt	70
Cement construction	14
	11,000

Source: *Progress of Highway Development in Taiwan*, William E. Yuni, American Vice Consul, Taihoku, July 22, 1938.

Government roads are wide and well-graded, but often full of holes, and bridges very narrow. Local roads are rough, narrow, and often without bridges or served by temporary pontoon arrangements. They are generally constructed with deep ditches alongside.

Roads on the east coast are poor. A narrow single-lane Government road runs from Suo to Karenko, but it is rough and frequently blocked by landslides. For 36 miles it passes along the face of the sea-cliffs, where construction has been a major engineering feat. It is fed by trans-mountain trails, which come down through the river gorges. Other cross-country traffic is confined to trails, or, on the west coast, to footpaths across the rice fields and foothills. Below Karenko on the east coast, surveys were being made in 1938-39 for improvement of the road to Taito. With completion in 1939 of the road across the south of the island (from Fuko to Daibu), presumably some improvement was made in the poor road south of Taito.

b. *Road construction.* The main highway from Keelung to Heito, which traverses western Taiwan, was begun in 1919. In 1938 motor traffic was possible over its entire length of 287 miles with the exception of two stretches—one near the Dakusui River and the other near the Shimotamsui River (near Takao). The bridge over the Shimotamsui River at Kyukyokudo was scheduled for completion at the end of 1938, and that over the Dakusui River for 1941; this was to make it possible to motor all the way around the island. The Dakusui bridge, to cost 3,000,000 yen, provides the only good crossing of that river, which otherwise separates Taiwan's west coast highway routes. Unless a second bridge has been completed (which is possible), this bridge and the nearby railroad bridge are especially vital links in the west coast transport system for movement of goods and troops between Taichu and points north and Kagi and points south. It was estimated that this 500-mile trip would take at least 5 days. The condition of the roads was such that it was quite likely that a car would be unable to complete the trip under its own power. (*Annual Review of Commerce and Industry*, 1938.)

Connections between east and west coasts, also necessary for round-the-island road transport, were completed before 1941. A road from Shinten, south of Taihoku, was cut through mountainous territory for 40 miles to Shokei, near Giran on the east coast, providing a fairly direct route from Taihoku to Suo, and thence to Karenko. In the south, a road of 65 miles was built from Fuko on the southwest coast to Daibu on the southeast coast. Completion was reported in June, 1939. (*Progress of Highway Development in Taiwan*, William E. Yuni, American Vice-Consul, Taihoku, July 22, 1938.)

A concrete highway was nearly completed in 1939 between Keelung and Taihoku, with several overhead crossings still under construction. The road from the center of Taihoku to Kantau, near Tamsui, is of good macadam construction, but the bridges and culverts are narrow.

The Hori-Musha highway—19.5 feet wide, maximum grade 1:10—was completed in the fall of 1937. (*Annual Review of Commerce and Industry*, 1939.) Much of

the construction cost was met by the Taiwan Electric Power Company, although work was done by the Aborigine Administration Division of the Government-General. This road is important for the effective policing of an area where the aboriginal tribes rose in rebellion in 1930.

The Suo-Karenko roadway on the east coast was in poor condition in 1939, numerous landslides and washouts making motor travel on it somewhat hazardous. The road between Karenko and Taito was better, and was undergoing improvement, but work on bridges was needed before the trip could be made all the way without changing automobiles. (*Annual Review of Commerce and Industry*, 1939.)

Other reported road construction included a 17.4 mile road from Taichu to Meiji Hot Spring; industrial roads around Shinka-gun and Kagi-gun, Tainan Province; a 20.5 mile macadam road from Bokushi to Daikoro, in Toseki-gun, west of Kagi; and a road from Shoka to Rokko, 6.7 miles. In addition, the Tainan Provincial Government started in 1937 to pave about 195 miles of highway. The first construction undertaken was 3 miles from Tainan to its airport, 11.45 miles of the distance from Tainan to Kagi, 4.22 miles between Shinei and Ensui, 18.95 miles between Kagi and Hokko, and 5.34 miles between Bokushi and Taho. No doubt the Japanese have built and are building more roads in preparation for defense of the island.

Recent official figures on highway mileage by widths have not been published, for this is considered to be information of military importance. The latest available are for 1937. Figures for the two preceding years indicate the difficulty in securing reliable statistics:

Table 28. Highway Mileage by Widths.
(in miles)

Year	Less than 12 feet wide	12 to 24 feet wide	Over 24 feet wide	Total
1935	4,311	3,173	2,769	10,253
1936	1,832	2,293	6,426	10,551
1937	3,921	3,099	3,567	10,587

Source: for 1935 and 1936, *Taiwan Year Book*, 1937 edition; for 1937, *Far East Year Book*, 1941.

In the "Appendix," Table 53, are listed the chief roads of Taiwan, with pertinent available information.

c. *Construction methods.* Either the Taiwan Government-General or one of the provincial governments can authorize construction of a road. The Government-General usually bears the entire expense of constructing important bridges and shares the expense of roadbuilding with the provincial governments according to the importance of the route. The Government-General usually pays from one-half to two-thirds of the cost of building a trunk highway. Such appropriations in the Taiwan budget are subject to approval of the Imperial Diet in Tokyo. Ordinary labor is contributed by villagers who stand to benefit somewhat from the improved roads. Provincial governments are responsible for the maintenance of roads. The Government-General does not participate in the cost of maintenance except for the cliff road from Suo to Karenko, where frequent landslides occur. Bus companies and landowners are frequently required to contribute either cash or labor. Repair work consists mainly in filling holes and ruts. Gravel is the chief material used and is plentiful in the island. Cement is manufactured locally as well as imported from Japan. Asphalt is imported from Japan by the Japan Oil Company, a firm which has a virtual monopoly on asphalting jobs in Taiwan. These are generally city streets. Except for a few steam rollers, roadbuilding equipment consists almost entirely of hand tools.

d. *Bridges.* Just south of Keelung is a concrete bridge over the Keelung River, parallel to the railway bridge on the Taihoku-Keelung line. A steel and concrete bridge crosses the Tamsui River at the city of Taihoku, and another bridge crosses the east branch of the Tamsui there. The bridges over the Dakusui and Shimotamsui Rivers, mentioned above, are very important. Bridges along the east coast cross gorges filled with huge boulders subject to intermittent torrential streams. Usually the east coast bridges are of suspension type. The Daidakusui Bridge is over a mile long, in several sections. Through the aboriginal territory there are vulnerable suspension foot bridges on the trans-mountain trails. For instance, the Senkan Bridge in Taroko Gorge is 354.25 feet long, about 40 inches wide, and hangs 295 feet above the stream bed. It is reached by a cliff trail which runs steeply to an altitude of 2,000 feet above the river, and at one place it is simply a groove dug out 3,300 feet along a sheer rock wall.

e. *Number of vehicles.* In 1937 the number of vehicles on the island was estimated as follows:

Table 29. Vehicles in Taiwan.

Kind of Vehicle	Number		
	Private	Government	Total
Trucks	1,179	121	1,300
Passenger cars	243	245	488
Taxicabs	973	—	973
Buses	944	495	1,439
Motorcycles	588	162	750
Bicycles	143,000	11,000	154,000

Source: *Progress of Highway Development in Taiwan*, William E. Yuni, American Vice Consul, Taihoku, July 22, 1938.

Restrictions on import of passenger cars have been in effect for some time, and shortage of gasoline adversely affected automotive transportation services as early as 1938. All users of gasoline, including gasoline cars on the railroads, were greatly restricted in their operation, in spite of the increased demand for transportation facilities.

f. *Bus services.* Prior to 1933, a number of bus routes were operated by private companies, the first services having been established around Taihoku sometime before that. In that year the Government-General took over the management of important lines, especially those paralleling the railways, where it was claimed competition had reduced bus fares below cost. By 1939 all bus services from Keelung to Choshu (south of Takao), which paralleled the railways, were under Government operation. Motor trucking services were still operated, however, by private companies, although no statistics concerning these services are available. In the 1937 fiscal year the buses operated by the Railway Bureau carried 8,596,516 passengers. They carried no freight. Routes covered were between Keelung and Shinchiku (66 miles); between Taihoku and Tamsui (14 miles); between Taiko (north of Sharoku) and Nanoden (the railway junction point) (17 miles); between Toyohara and Nisui (39 miles); between Enri (in Shinchiku Province) and Taiko (in Taichu Province) (7½ miles); and between Kagi and Takao (66 miles). Other bus routes were added, but the rationing of gasoline which began in July, 1938, and other restrictions make it unlikely that service is as extensive as it was prior to the war. Both public and private bus lines decreased their services, and truck owners in Taihoku and Shinchiku Provinces were merged into a single corporation in each province to effect the most economical operation of necessary services. Transportation between Suo and Karenko, and between Taito and Boryo, is necessarily by bus. Two motor convoys leave Suo each day and two leave Karenko. Ten to twenty vehicles (buses, official cars, taxis and trucks) make up each convoy. They travel according to a rigid schedule and meet at designated places in order to pass. Stops are made enroute, and at the province borders all travellers must register with the police.

5. INLAND WATERWAYS. River traffic of importance is found only on the Tamsui River, which is used by motor launches and light coastwise junks for traffic only to the city of Taihoku. Small junks and sampans run along the coasts, into the lagoons, and for short distances up the mouths of rivers. The Formosan-Chinese and the aborigines on the southwest coast use a raft called a "teppai," made of giant bamboo. These bamboo poles, up to forty feet long and often a foot in diameter, are lashed together, and the rafts are useful in making landings through the surf.

Coolies operating flatbottomed boats serve as public ferrymen along the main highways. There is a small toll. Along footpaths small boats operated by single oarsmen carry pedestrians and their market-loads across streams. The charge is one or two *sen* and the ferry is usually operated by someone from a nearby farmhouse.

The only canal is one from Tainan to Anping, dredged to a depth of 6 feet. It was completed in 1926, and its cost, including later improvements, was over 1,500,000 yen. This short canal was designed to provide an outlet to a seaport, but Anping has never been of much importance as such. Small canals along the Takao waterfront serve the warehousing and factory district.

6. AVIATION. Air service from Japan Proper was supplied before the war by the Japan Airways Company, which maintained a daily service between Fukuoka (on Kyushu Island) and Taiwan, via Naha in the Ryukyu islands. A new schedule for this service, to be available four times weekly, was announced in the spring of 1943. (F. C. C., *Radio Report on the Far East*, No. 17, March 30, 1943.)

Supplementing the service from Japan Proper, a round-Taiwan airline was inaugurated in July, 1938, bringing the isolated east coast cities of Taito and Karenko into closer communication with the rest of the island. At Giran there is a municipal airport two miles southwest of the city. The Karenko airport is three miles northeast of the city, and the one at Taito is two miles north of the city. Regular stops were made at Taihoku, Taichu, Tainan, Takao, Taito, Karenko, and Giran. In addition, flights were made twice weekly to Mako in the Pescadores. The round-the-island flights were made twice daily, once in each direction. Flying aids and landing fields are unavailable in the central mountain district, and Japanese commercial aviation avoided it in its round-the-island service. Conditions for flying are poor over the Pescadores, due to strong and variable winds. Taihoku was also a stop on the Tokyo-Bangkok route, and was used for refueling on the Shanghai-Canton air service.

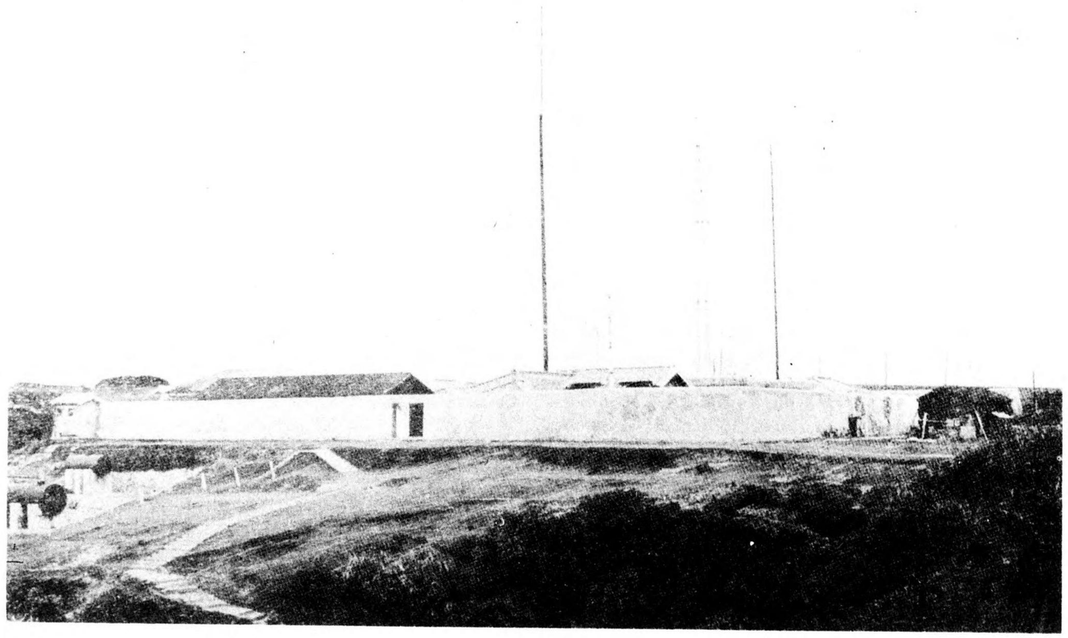
Taiwan is a logical center for aviation in the Far East, since it is on the direct line of the Manila-Shanghai and Tokyo-Hong Kong routes, and not far out of the direct line from Tokyo to Manila. Taiwan served as an airbase during the years of attack upon coastal China, and much of the attack on the Philippines after December 7, 1941, was launched from its well-developed bases. The most important airfields are centered around Takao at the south.

In Central Taiwan there is a second cluster of airfields, of which the most important is probably near Kagi. A third cluster of airfields protects northern Taiwan, with a major field at Shinchiku bombed by United Nations' planes on November 25, 1943. The civil airfields mentioned above are also no doubt now used exclusively for military purposes.

Details of these military airfields are unavailable. The fields are non-commercial and many changes no doubt are being made. It is difficult to maintain the surfaces of dirt fields in Taiwan, because of the torrential rainy seasons. Enough has been said, however, to indicate the considerable development of airfields of a military character on the island.

7. COMMUNICATIONS. Communication facilities are much better in the centers of Japanese settlement than elsewhere, and all services are used to a much greater extent by Japanese than by Formosan-Chinese. Thus in 1938 Japanese sent 50,879,000 letters and other pieces of mail, or 165 pieces per capita, while Formosan-Chinese sent only 30,957,000 pieces, or 5.7 per capita. Discrepancy is even greater with respect to telegrams of which 1,736,200 were sent by Japanese (5.56 per capita) and 366,100 by Formosan-Chinese (0.068 per capita).

In 1939 there were 194 post offices, 219 telegraph offices, and 222 telephone offices. About 103,000,000 pieces of mail were delivered, and over 2,000,000 telegrams. There were over 20,000 telephone subscribers, but less than 7,000 of these were Formosan-Chinese.



Illus. 22. Radio broadcasting station at Itahashi, and radio station on Cape Garambi (below).

Communications are supervised by the Transportation and Communications Bureau. In 1937 there were 2,357 miles of telephone routes, with 64,186 miles of wire, and 766 miles of telegraph routes, with 3,532 miles of wire.

It is apparent that, as in Japan Proper, telephones are a luxury. The *chokai* units in the cities, and the *hoko* units in the country, however, subscribe for telephone services. The instruments are installed in a home or shop which is conveniently located, so that all members of the unit can have access to it. Supplementing this system, the police maintain a net of private lines covering the island and reaching back into the remote police posts in the aborigines' territory. The Government-General maintains its own direct telegraph wire service linking the central offices with all provincial offices.

Two cables link Nagasaki with Taihoku via Tamsui, one links Tamsui and Kagoshima (via the Ryukyu Islands), one links Tamsui and Foochow, China, and it is believed that two run from Taiwan to the Pescadores, one from Hotei and one from Anping, although one of these is reported to have been discontinued.

In 1934 radio-telephone service was opened between Taiwan and Japan Proper, and in 1944 direct service was established with Shanghai. The sending station is at Chureki and the receiving station at Shinchiku, both in Shinchiku Province. There is also direct radio telegraph communication with Japan Proper. In addition, there is ship-to-shore radio telegraph communication for commercial and naval vessels, and for fishing vessels operating from Takao and Keelung.

In 1939 there were 3 radio broadcasting stations operating, under the Taiwan Broadcasting Corporation. JFAK in Taihoku, operating on 750 kilocycles, had 10,000 watts of power; the other two were JFBK at Tainan, 720 kilocycles and 1,000 watts; and JFCK at Taichu, 580 kilocycles and 1,000 watts. A 100 kilowatt broadcasting station near Kagi, in Tainan Province, was scheduled for completion in 1940. There were 45,399 radio receiving sets on the island in 1938. 18,175 of these were in Taihoku Province, and only 1,112 in Taito and Karenko Districts combined.

The following table indicates the distribution of receiving sets in 1940:

Table 30. Radio Receiving Sets.

	Total Sets	*Japanese-Owned*	*Formosan-Owned*
Taihoku Broadcasting District			
Taihoku Province	20,988	16,359	4,629
Shinchiku Province	3,331	1,993	1,348
Karenko District	837	670	167
Taito District	328	272	56
Total	25,484	19,284	6,200
Tainan Broadcasting District			
Tainan Province	10,388	6,356	4,032
Takao Province	6,436	4,287	2,149
Pescadores	235	199	36
Total	17,059	10,842	6,217
Taichu Broadcasting District			
Taichu Province	9,752	5,368	4,384
Grand Total	52,295	35,494	16,801
Sets per 100 Families	5.3	66.6	1.8

A tax of 1 yen per month was laid on radio sets, which was very high for the average Formosan-Chinese family. Official programs are heavily propagandistic. Persons in Taiwan were prohibited from listening to radio broadcasts from other sources than stations on the island or in Japan Proper. Two shortwave stations in Taihoku, JFO (9,630 kilocycles) and JIE$_2$ (9,695 kilocycles) also broadcast propaganda for Japanese nationals in Southeast Asia and for the inhabitants of the countries in that area.

The propagandistic character of the broadcasts has no doubt increased with the continuation of war. Even before 1941, at temples or market-places or wherever crowds gathered, loudspeakers brought the official programs to the population, with no need, as with printed propaganda, to rely upon literacy for effectiveness. Private radio sets were almost exclusively a luxury for the Japanese, as is evident in the table above.

X.

FOREIGN TRADE

1. GENERAL FOREIGN TRADE POSITION. Prior to the war Japan supplied 85 percent of Taiwan's imports, and took over 90 percent of its exports. The United States was the only Western country that had any important share in Taiwan's trade in recent years. This is significant when it is remembered that 20 percent of its exports went to countries other than Japan in 1925, and 30 percent of its imports came from such countries. In 1918 these percentages were 24 and 33 percent respectively. Japan has eliminated other countries from trade with the island in the years since occupation. This process appeared to have culminated about 1937. Actually it was later, for the increased exports to "foreign countries" after that year represented increased shipments to yen-bloc areas under Japan's control in China and Manchuria. Actually in 1939, out of exports valued at over 500,000,000 yen, only 13,000,000 yen went to countries outside of the yen-bloc; and out of imports over 350,000,00 yen, only 14,000,000 yen came from countries outside of the yen-bloc.

Table 31. Trade with Principal Countries, 1935-1937.

Country	Imports in $1,000			Exports in $1,000		
	1935	1936	1937	1935	1936	1937
Japan and Korea	62,622	70,765	80,009	90,198	104,158	118,118
China	1,991	2,502	1,785	3,745	2,287	1,505
Manchuria	6,260	5,694	4,948	109	247	390
Kwantung Leased Territory	509	1,996	2,041	1,181	1,163	1,412
United States	867	844	845	1,626	1,783	1,848
Germany	1,006	955	346	1	24	24
United Kingdom	375	114	228	365	398	603
India	800	928	851	1	64	50
Netherlands Indies	508	535	945	354	107	94
Thailand	68	60	60	147	182	191
Hong Kong	9	36	27	1,882	774	959
Other Countries	519	514	658	1,079	1,404	1,437
Totals	75,534	84,943	92,743	100,688	112,591	126,731

It should be noted that the trade statistics are somewhat misleading. Many American and European commodities were purchased from Japanese importing firms, where stocks were on hand and delivery could be made in a few days. This was encouraged by the fact that articles imported from Japan were admitted into the island free of duty. Such imports, shown in the trade statistics as trade with Japan, actually represent indirect imports from foreign countries. Automobiles, machinery and many manufactured consumers' goods came from the United States. Some local products also were exported to foreign countries by firms in Japan. It is also known that several hundred junks engaged in trade between Taiwan ports and South China. Although some of these were legitimate traders, many were engaged in smuggling. Sugar and kerosene were favorite items in this clandestine trade. In the case of trade with Japan Proper, it must be remembered that statistics for important commodities such as petroleum products were not given after July, 1937.

2. TAIWAN'S "FAVORABLE" TRADE BALANCE. There is a "favorable" balance of trade. This was true until 1938 in the small trade outside of the yen-bloc, as well as in the trade with Japan Proper. Nearly three-fourths of the value of all exports in 1937 consisted of rice and sugar, with a total value (as exports) of over $90,000,000, practically as much as the total value of all products imported into the island. Sugar, constituting the most important export, enters Japan from Taiwan free of duty; while sugar from Java, where costs are lower, has had to pay a duty. This duty was raised slightly in 1927, and again in 1932. In recent years the comparatively small imports of sugar into Japan from outside the Empire have been of raw sugar intended for re-export after refining, in which case there is a drawback of the duty. Nearly 90 percent of Japan's sugar comes from Taiwan, and the sugar companies have benefited accordingly. About 6 percent of Japan's rice requirements are met by Taiwan. The total value of Taiwan's exports has been equal to one-half of the total gross value of production on the island. (In 1938 Korea's exports equalled 35 percent of the total gross value of production in the peninsula; both this ratio and that of Taiwan are unusually high.) This is considerably larger than the total value of imports. Many of the latter are military commodities, of no individual benefit to the population. Thus production minus net exports leaves a much smaller quantity for domestic consumption than would be available if products exported, or an equivalent volume of imports, could be consumed.

In 1938, trade with non-yen-bloc countries showed an "unfavorable" balance, as exports declined heavily. Exports to Manchuria and Kwantung Leased Territory increased with these and exports to China were also rising in 1939. It was admitted in Taiwan that profits in trade with China and Manchuria were greater than elsewhere, but of course the needed foreign exchange was not obtained. In the fiscal year which ended March 31, 1940, an appropriation of over 115,000 yen was made for promotion of trade with non-yen-bloc countries. A subsidy of 240,000 yen was provided for encouragement of exports of tea, pineapples, and similar commodities to foreign countries.

3. TAIWAN'S HIGH PER CAPITA TRADE. Total exports in 1940 amounted to nearly 600,000,00 yen, and total imports to over 400,000,000 yen, so that total trade of the island exceeded 1,000,000,000 yen, or $250,000,000 in value. This was a per capita trade of over 170 yen,

much higher than the per capita trade of Japan Proper, which was approximately 100 yen. In the Far East only New Zealand, British Malaya, and Australia surpass Taiwan in per capita trade, if the following total figures are used. In fact, the foreign trade of Taiwan (total) is much larger than that of Indochina, which has four times as much population.

Table 32. Approximate per capita trade of Far Eastern Countries.

(in U. S. dollar equivalents)

Country	Year	Imports	Exports	Total
New Zealand	1939	108.60	127.55	236.15
British Malaya	1939	61.20	72.35	133.55
Australia	1938-39	67.25	64.20	131.45
Taiwan	1937	16.55	22.70	39.25
Korea	1939	15.00	10.85	25.85
Japan Proper	1939	10.45	12.70	23.15
Philippine Islands	1939	7.65	9.85	17.50
Burma	1938-39	5.10	11.70	16.80
Netherlands E. Indies	1939	3.90	6.15	10.05
Thailand	1938-39	3.85	5.35	9.20
French Indochina	1937	2.60	3.85	6.45
China	1939	0.85	0.25	1.10

4. SELF-SUFFICIENCY OF THE ISLAND. Large exports of rice and sugar are the foundation which enables this small island to import a variety of goods in considerable volume. These basic exports have gone almost entirely to Japan. They thus present a significant postwar problem, for should this trade be cut off, or barriers erected to it, the whole economy of the island would suffer. While industry in Taiwan is important to the Japanese (and especially, in wartime, such products as aluminum and chemicals are vital), it has little close connection with the life of the people, except those few employed therein. Foreign trade, however, vitally affects the economy of the island. As is obvious from its large export surplus, the island is self-sufficient in basic foodstuffs for the type of diet of its people, which includes rice, fresh fish, sweet potatoes, salt, sugar, pork, and other foodstuffs such as fruits and vegetables. For most of these it has a large surplus for export. Observers have often commented that even when Formosans have little cash income, they have enough to eat and a place of shelter.

Because of this, the burden imposed upon Taiwan by a cessation or interruption of trade with Japan would be indirect rather than direct. No longer able to export rice and sugar, tea, tropical fruits, and other commodities to Japan, the people of the island could not purchase those imports which their basic exports have made possible: viz, dried fish, wheat and flour, beverages and cigarettes, textiles, petroleum, cement, lumber, metal manufactures, machinery, vehicles and vessels, and fertilizers. Some others may be included here, as soap, matches, and pottery, but the above commodities are the most important. Jute and gunny bags are omitted both because the island has made considerable strides toward self-sufficiency, and because substitutes may be available, like coconut coir, or sisal from the Philippines.

Probably the most serious losses would be those of textiles and of iron and steel, and manufactures thereof. Whether fertilizers should be added to this list depends upon the extent to which planned increases in fertilizer production in the island have been realized. For example, one plant was planned to produce about half of the island's needs of ammonium sulphate. Textiles, however, present a definite problem. The only textile mills in the island of any size are those making jute, hemp, and ramie fabrics, and these are insufficient. No wool is raised in the island, and the cotton crops have been failures, 1,000 or 2,000 bales being the most that can be expected. Nor does sericulture constitute an important industry. Prior to the war imports of silk and cotton fabrics were valued at about $6,000,000 annually, and imports of wool fabrics at about $500,000. Quantity figures have never been given for Taiwan's imports of textiles, but quantities of imports into Korea having comparable values were around 100,000,000 square yards. This would mean about 16 yards per person annually. This was the Korean per capita consumption in 1936, and it seems likely that Taiwan's per capita textile consumption would be about the same, or perhaps somewhat smaller.

Imports of iron, iron manufactures, vehicles and machinery are also important. The island produces only negligible quantities of iron ore, and has only three or four small manufacturers of machinery, exclusive of the Keelung dockyard. Recent reported attempts to establish iron foundries at Takao to utilize ore from Hainan Island may have materialized, but even so, production must be very small. Over 100,000 metric tons of iron were imported annually prior to 1937, together with 1,000 metric tons of copper, and 1,500 metric tons of lead. Imports of iron manufactures, construction materials, and railway materials were valued at about $500,000 each, annually, and imports of automobiles and parts at about $1,500,000 annually. Such imports in the years preceding the war were designed to expand Taiwan's industrial and transport capacities for military purposes. This expansion need not necessarily continue, but some such imports are probably essential.

Fertilizer imports before the war were valued at about $15,000,000 annually. The war has brought a shortage of fertilizers, and it is probable that fields will have suffered some loss of fertility during this period. Manufacture of fertilizers has, however, been one of the important industrial developments of the past several years in the island. For example, factories were planned and probably established to manufacture over half of the island's needs of ammonium sulphate, former imports of which (nearly 200,000 tons annually) were valued at over $5,000,000. Some imports will be necessary, but they will be smaller than would have been the case several years ago.

Imports of consumers' goods have not been essential in character. Such commodities as cigarettes, alcoholic beverages, condensed milk, canned foods, and similar items are not vital to a population like that of Taiwan, and have been imported in good part for the Japanese minority. Imports of dried fish exceeded exports of fresh fish by about 18,000 tons a year. Fish is, of course, less important in the diet of Taiwan than in

Japan. Pork is the chief meat in the Formosan-Chinese diet. Consumption of pork in the island is about ½ pound a week per person, but there are sufficient hogs there to meet the demand.

Although the island formerly imported substantial quantities of lumber, such large imports may not be necessary. It was stated that in 1940, lumber production in the island amounted to 225,000,000 board feet. Production in 1937 amounted to 75,000,000 board feet or less. In view of Taiwan's excellent forest resources, it is quite possible that production may be increased substantially, to levels higher than that attained in 1940. The Government has strictly supervised the cutting of timber on the island.

Imports of cement reached 200,000 metric tons in 1937. This is important in the construction of electric power dams, a few roads, and other projects. Production has doubtless increased since establishment of the Taiwan Cement Company in 1939.

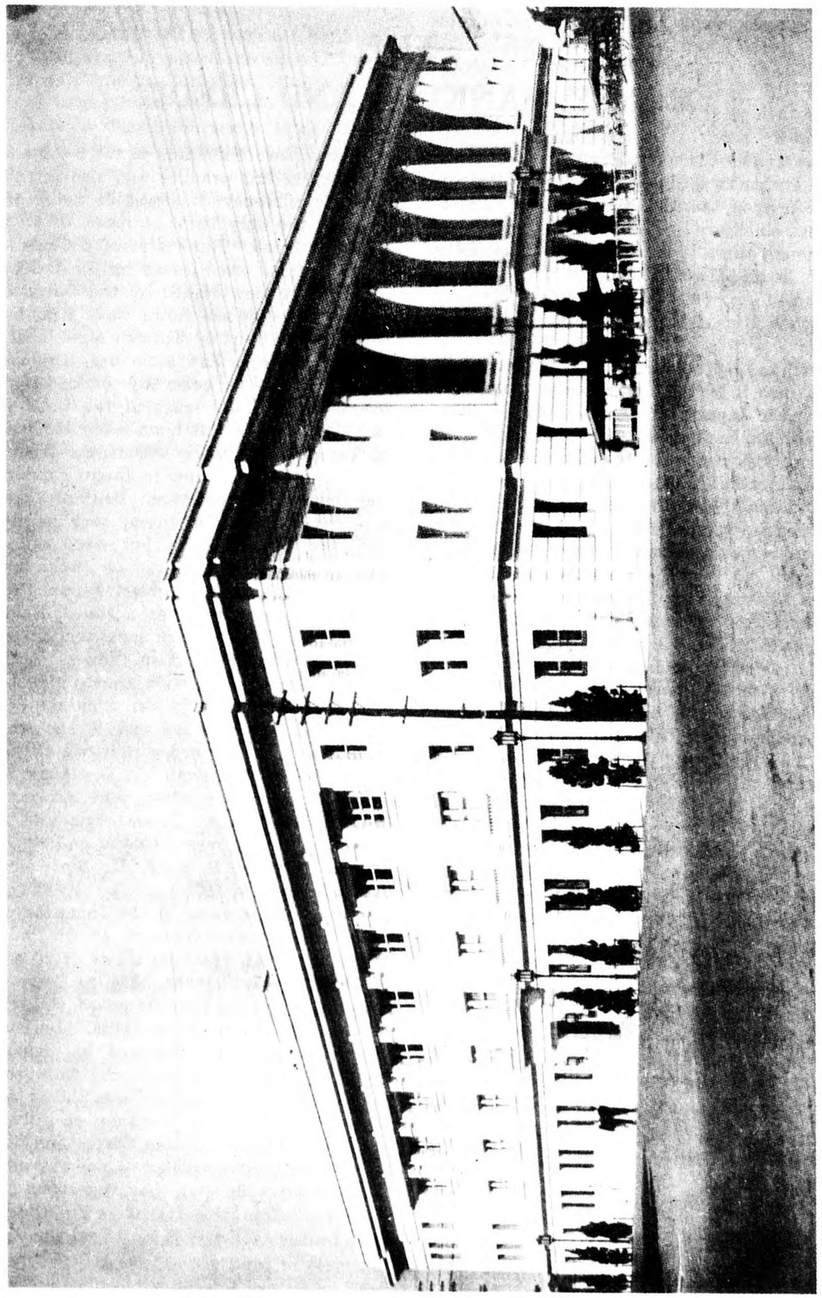
5. TARIFF. Although Taiwan is within the Japanese tariff and has no separate customs tariff policy, Formosan importers often found that local customs procedure and delays made direct imports so difficult they generally preferred to import from distributors in Japan Proper. No further customs action was required in Taiwan for non-monopoly commodities which had cleared customs in Japan Proper.

6. EXCHANGE CONTROL AND TRADE REGULATIONS. In general, the regulations governing trade and exchange imposed in Taiwan have been the same as, or very similar to, those imposed in Japan Proper. Japan's basic exchange control law, effective May 1, 1933, was extended to Korea and Taiwan by Imperial Ordinance. (See W. J. Sebald, *A Selection of Japan's Emergency Legislation*, The Japan Chronicle Press, Kobe, 1937, for a translation of these ordinances. Translations of succeeding amendments are available in the files of the Far Eastern Unit, Bureau of Foreign and Domestic Commerce.) This law and the first succeeding amendments were designed chiefly to prevent flight of capital from Japan. By 1937, however, exchange control had come more and more to be used as an instrument of control of the volume, direction, and kind of trade. An ordinance of early 1937 required that exchange permits be obtained for payments for import of goods, as well as for other payments to foreign countries. In October of that year the *Temporary Law for the Control of Exports and Imports* established lists of commodities (a) for which import permits were required, (b) which might not be imported without special permission, and (c) which might not be exported without special permission. Consolidation of this with the exchange control system, extension of the latter, and general tightening of trade regulations made Government control over trade almost complete in 1941.

The embargo of July 26, 1941, first, and finally the outbreak of war in December, 1941, cut Japan off from trade except with Far Eastern countries. Now this trade is strictly regulated for the purpose of obtaining necessary materials for Japan from those countries, and for supplying them with a few extremely essential materials supplemented by a small volume of non-essential commodities. Thus, for example, Japan's agreement to purchase rice from Indochina has been renewed. Recent reports have indicated continuing trade between Taiwan and Indochina, with a lesser volume of trade with other areas in Southeast Asia. Goods to be shipped from Taiwan to Indochina were reported to include a quota of sugar, cement, sawmill machinery, and (if shipping space were available) drugs and other consumers' goods. Taiwan (i.e. Japanese technicians from Taiwan) was also to provide technical assistance for cultivation of wheat, cotton, and jute. In return, it has obtained rush bags to be used in shipping rice, and some other materials, including small quantities of machinery.

7. TABLES OF EXPORTS AND IMPORTS. Tables 62, 63, 64, 65, 66, and 67 in the Appendix indicate the value, and where possible, the quantity, of imports and exports of Taiwan for the five years 1934-1938.

Sugar constitutes 40 to 45 percent of the total value of all exports, and rice another 30 percent. These two exports together are equal to the value of all imports. Bananas, tea, pineapples, alcohol, and hats follow in importance. Fresh fish, hemp textile, and sweet potato exports are of some value. Exports of sweet potatoes are large, but unit value is small.



Illus. 23. Bank of Taiwan headquarters at Taihoku.

XI.

MONEY, BANKING, AND CREDIT

1. GENERAL. The yen is the monetary unit of Taiwan and the coinage system is the same as in Japan Proper, Japanese coins forming the metallic currency. Paper currency consists chiefly of notes issued by the Bank of Taiwan, although there is some circulation of notes of the Bank of Japan. Probably at the present time either military yen or notes of the Central Reserve Bank or the South Seas Development Bank circulate to some extent.

(Prior to April 1, 1943, military yen circulated both in South China and in other territories in Southeast Asia occupied by the Japanese. Issuance of new notes by the Central Reserve Bank—Japanese-dominated bank at Nanking—and announcement that the South Seas Development Bank, established in 1942 by the Japanese for areas in Southeast Asia, would also issue notes, were supplemented in October, 1943, by announcement that military yen in South China would be withdrawn from circulation.)

The Bank of Taiwan, the Government-controlled Central Bank, furnishes the chief banking facilities of the island, although there are also branches of the Hypothec Bank and of the Sanwa Bank of Japan Proper, and several small private banks. In 1939 two-thirds of the ordinary banking business was being conducted by the Bank of Taiwan. Its outstanding loans on June 30 of that year were 233.4 million yen; those of the branch of the Sanwa Bank, 18.6 million yen; and those of the three private banks having head offices in Taiwan, 99 million yen, (Taiwan Commercial and Industrial Bank, 65.4 million yen; Shoka Bank, 36.4 million yen; and Kanan Bank, 7.2 million yen.) In addition, loans of the branches of the Hypothec Bank, a mortgage-banking institution, amounted to 107.3 million yen. By the end of 1941 the Bank of Taiwan had 80 percent of the outstanding bank loans, excluding those of the Hypothec Bank. It should be noted that all of the above banks are Japanese. The only credit institutions in which Formosan-Chinese have influence are the cooperative credit associations discussed below.

2. CURRENCY. As in Japan, the coins in circulation formerly consisted of gold coins, in denominations of 20 yen, 10 yen, and 5 yen; silver coins in denominations of 50 sen and 20 sen; nickel coins of 10 sen and 5 sen; and copper coins of 1 sen. Due to wartime conditions gold coins were withdrawn, and the Emergency Currency Law, providing substitutes for the nickel and copper coins, was put into effect from June 1, 1938. The substitutes were coins of 5 parts aluminum and 95 parts copper (for the nickel coins), and coins of 90 parts copper and 10 parts zinc for the copper coins. Later aluminum was also used in Japan for the 1-sen coin, and more aluminum in the 5-sen and 10-sen coins. Presumably this practice was also extended to Taiwan.

Paper currency consisted of notes of the Bank of Taiwan, the only bank of issue, of 50 yen, 10 yen, 5 yen, and 1 yen. Banknotes of 200-yen and of 100-yen denominations were issued by the Bank of Japan, and perhaps are now issued by the Bank of Taiwan. In recent years 50-sen notes have also been used. All notes of the Bank of Taiwan were legal tender in any amount. Checks had some use, although until fairly recently they were generally confined to payments within one city. Bank notes of the Bank of Japan were also legal tender, but upon being received by the Bank of Taiwan they were withdrawn from circulation in the island and returned to Japan Proper. The reverse was theoretically not true. Bank of Taiwan notes were accepted at ports of entry, such as Shimonoseki, or Moji, in Japan Proper, but were expected to be exchanged, at 1:1, for Bank of Japan notes, and were not legal tender throughout Japan Proper, although sometimes circulating for a time. Bank notes of the Bank of Chosen were not legal tender, nor was foreign currency, although certain Chinese coins formerly enjoyed a limited circulation among persons of that race.

There were formerly also some old coins in denominations of 50, 20, 2 sen and ½ sen which were legal tender, but which were withdrawn as soon as received by the Bank of Taiwan. A few notes of the Bank of Taiwan based upon silver were acceptable at 50 percent of face value. These coins and notes are now presumably very rare. (*Metal and Paper Currency of Taiwan*, Charles S. Reed, II, American Vice Consul, Taihoku, May 9, 1930.)

The exchange value of the Japanese yen depreciated after Japan's abandonment of the gold standard in December, 1931, reaching a low of 20 cents at the end of 1932. From October, 1934, to October, 1939, it was linked to the pound sterling at 1 shilling 2 pence, and hence remained at 28-29 cents. Decision to link the yen with the dollar followed the depreciation of the pound with the outbreak of the European war in September, 1939, and the yen was linked to the dollar at 23⅛ cents when the embargo of July, 1941, cut off trade between the United States and Japan. Link of the yen with either dollar or pound was officially abolished January 6, 1942. Average noon buying rates in New York for cable transfers for the past ten years have been as follows, in cents per yen:

1933	25.54	1938	28.451
1934	29.715	1939	25.963
1935	28.707	1940	23.436
1936	29.022	1941	23.439*
1937	28.791	1942	not available

* To July 26, 1941.

Rates in Taihoku, of course, varied slightly from the above rates.

3. BANKING AND FINANCIAL INSTITUTIONS. Banking facilities in the island are fairly well developed. They include the Bank of Taiwan, branches of Japanese banks, and several banks having their head offices in Taiwan, as well as a savings bank and a fairly large trust company. Financial institutions of the island have extended assistance not only to Japanese firms in Taiwan, but also to Japanese traders and entrepreneurs in the "southern regions." Purpose of the Kanan Bank was to offer financial aid to Chinese Merchants in the South Seas. After 1935 the Bank of Taiwan and the Taiwan Development Company extended financial aid to enterprises in South China and Southeast Asia, a number of companies being established as subsidiaries of the Taiwan Development Company. With the outbreak of war the Bank of Taiwan (together with the Yokohama Specie Bank) took on new functions in liquidating foreign banks and conducting financial operations in occupied areas.

4. BANK OF TAIWAN. The Bank of Taiwan, established in 1899, performs the ordinary functions of a central bank, engages in the trust business, makes loans to industrial or stockbreeding associations (without security), and subscribes for national and local bonds and company debentures. (Details of the early history of the bank are available in H. M. Bratter, *Japanese Banking*, Trade Promotion Series No. 116, Bureau of Foreign and Domestic Commerce, 1930, pp. 200-218.) It also discounts bills of exchange, and deals in foreign exchange. Broadcasts announced that as of January 1, 1944, handling of foreign exchange transactions in South China was to be limited to the Central Reserve Bank, eliminating branches of the Bank of Taiwan in Amoy and Swatow from this function. It was privileged to issue banknotes of 1-yen and higher denominations. The Government issued 50-sen paper notes. Notes of the Bank of Taiwan were engraved in Japan.

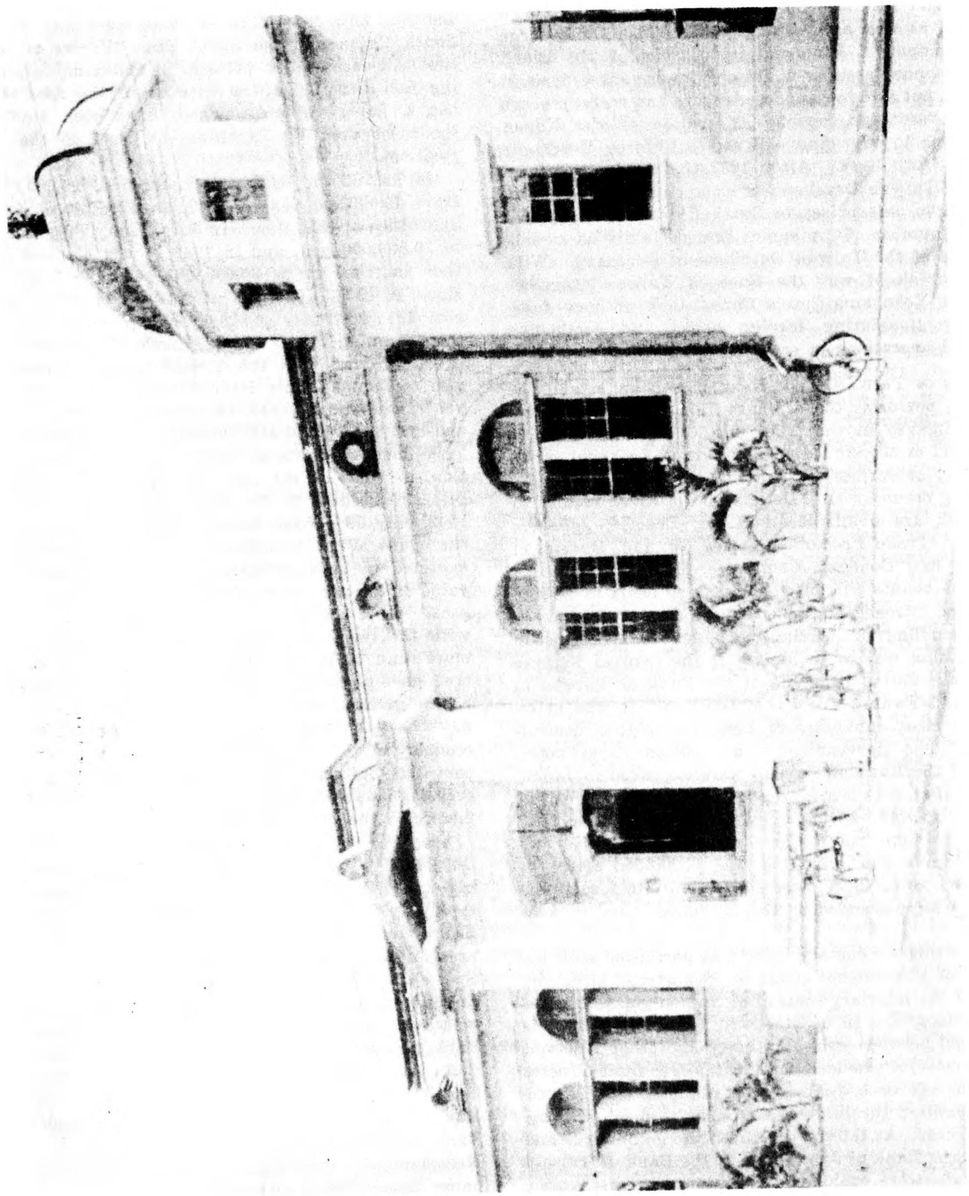
Until 1941 note issues were permitted on the basis of reserves of gold, silver, and "convertible banknotes." Bank of Japan notes were termed "convertible" although conversion into gold was suspended after the gold embargo of 1931. Free conversion into foreign exchange was suspended by the Exchange Control Law of 1933.

In addition a fiduciary issue was permitted with the backing of Government bonds for commercial bills. Any excess of the fiduciary issue of 80 million yen was taxed at 3%. Law No. 15 of March 1, 1941, eliminated the distinction between gold and silver and other reserves. Furthermore, it provided that the tax-free limit of notes was to be set each year by the Minister of Finance. This permitted the limit to be raised to meet wartime requirements. At the end of March the gold, silver and notes of the Bank of Japan held by the Bank of Taiwan as reserves were exchanged for deposit credits at the Bank of Japan. The Bank of Taiwan now holds its reserve in the form of government bonds and deposits with the Bank of Japan.

The bank has its head office in Taihoku, and had sixteen branches in Taiwan, at Keelung, Tamsui, Toen, Shinchiku, Taichu, Nanto, Shoka, Kagi, Tainan, Takao, Heito, Taito, Karenko, Giran, Gosei, and Mako. It maintained other branches in Japan, China, the Netherlands East Indies, Hong Kong, Singapore, Dairen, London, and New York. It was especially active in South China and the South Seas. Forces of occupation will encounter a problem in maintenance of banking facilities in Taiwan because of the fact that all banks, being Japanese-owned, have been staffed for the most part by Japanese—at least in the higher positions.

Capital of the bank was reduced to 15,000,000 yen from 45,000,000 yen in 1927, as a result of financial difficulties at that time. In July, 1940, it was increased to 30,000,000 yen, and in 1942 it was planned to further increase it to 60,000,000 yen. Its note issues stood at 197,901,000 yen at the end of June, 1941, as compared with only 82,129,000 yen in July, 1937, before the beginning of the China "Incident". After the outbreak of war with the United States a more rapid rise took place, note issues increasing to 252,845,000 yen at the end of 1941, to over 280,000,000 yen at the end of 1942, and to 410,000,000 yen at the end of 1943. This increase indicates an element of potential inflation, in spite of the fact that the level of wholesale prices, according to the official index, rose by October, 1942, only 50 percent above its level in July, 1937. In the event of an occupation of Taiwan, prices may be expected to be appreciably higher, and the exchange value of the yen correspondingly lower for several reasons. Price control will be more difficult to maintain with the increase of note issues, which amounted to more than 40 percent during 1943. This is especially true since production of goods in Taiwan probably cannot be greatly increased, and may well decline. Occupation would itself bring some disorganization of the economy of the island, disrupting still further present controls. Additionally, it would obviously indicate increasing Japanese weakness, tending to diminish confidence in the value of the yen.

Assets of the Bank of Taiwan are not entirely within the island, since the bank undertook financing of mining and industrial production in the southern areas, especially in South China after 1935 and in the South Seas after 1936. In the spring of 1942, after the outbreak of war, the Bank of Taiwan and the Yokohama Specie Bank were the agencies designated to handle financial operations in occupied territories, especially where the newly established South Seas Development Bank did not operate. For example, in Hong Kong there was entrusted to the Bank of Taiwan the liquidation of the following banks: National City Bank, Chase Bank, American Express Company, Underwriters' Bank, Nederlandsche Handel Maatschappij, N. V., and Nederlandsche Indishe Handelsbank, N. V. The Yokohama Specie Bank meanwhile carried out liquidation of other foreign banks, including the Hong Kong and Shanghai Banking Corporation, the Chartered Bank of India, Australia, and China, the Mercantile Bank of



Illus. 24. Tainan branch, Bank of Taiwan.

India, Ltd., and others. (Robert S. Ward, *Hong Kong Under Japanese Occupation*, Far Eastern Unit, Bureau of Foreign and Domestic Commerce, 1943.)

The Bank of Taiwan together with the Yokohama Specie Bank and the Mitsui Bank (now the Teikoku Bank) were to be the exchange banks for the "southern regions," although direction of the foreign exchanges was reportedly assigned to the South Seas Development Bank. (F. C. C., *Radio Report on the Far East*, No. 17, March 30, 1943.)

5. ORDINARY BANKS. A number of "ordinary" banks were established in Taiwan at various times, but mergers and failures reduced them to three in 1930, at which number they remained in 1939. The Kagi Bank. This bank, with its head office at Taihoku, and the Taiwan Commercial and Industrial Bank in 1910, the Niitaka Bank in 1915, and the Kanan Bank in 1919. The Niitaka and Kagi banks were later amalgamated with the Taiwan Commercial and Industrial Bank. This bank, with its head office at Taihoku, and capital of 5,000,000 yen (of which 2,590,000 yen was paid up in 1939), is the most important ordinary bank, having 31 branches in 1939, and, prior to some losses in 1927, a larger capital than others. The Kanan and Shoka banks are the other two ordinary banks having head offices in the island. In 1939 the Shoka Bank (head office in Taihoku) had a paid-up capital of 2,840,000 yen, and the Kanan Bank (head office in Taihoku), 1,875,000 yen. There is also at Taihoku a branch of the Sanwa Bank, one of the "big five" (formerly "big seven") banks of Japan Proper. At the beginning of 1943 the Dai Ichi Bank was merged with the Mitsui Bank, and the One-Hundredth Bank with the Mitsubishi Bank. The "big five" banks are now the Teikoku Bank (the bank formed by the merger of the Dai Ichi and Mitsui Banks), the Mitsubishi Bank, the Sumitomo Bank, the Yosuda Bank, and the Sanwa Bank.

Additionally, the Hypothec Bank of Japan has branch offices at Taihoku, Taichu, and Tainan, giving credit on real estate, making loans to public corporations or industrial associations, and also financing agriculture.

6. CREDIT ASSOCIATIONS, MUTUAL LOAN COMPANIES, AND PAWNSHOPS. As in Japan, credit associations and mutual loan companies (*Mujin Kaisha*) are of some importance in providing credit facilities. The banks are all under Japanese control, so that these other agencies are the only financial organizations in which Formosan-Chinese have influence. Further, the banks provide credit chiefly to Japanese firms, and their credit requirements differ little from those in effect in Japan Proper. Small firms (including most Formosan-Chinese firms) secure their credit from the cooperative credit associations and the mutual loan companies. Rates of interest are much higher than those charged by banks, rates for urban credit associations sometimes exceeding 12 percent per annum, and those of rural credit associations with deposits of 36,052,377 yen, and or more. At the end of 1939 there were 22 urban credit associations with deposits of 36,052,377 yen, and loans of 21,320,497 yen—and 413 village credit associations with deposits of 120,381,895 yen and loans of 93,618,766 yen. Since the beginning of war, the cooperative credit associations have been utilized as agencies for collection of rice and other activities for the Government. The associations were developed by the Formosan-Chinese with little assistance from, and often hindrance by, the Government-General; managerial and controlling staffs of the cooperatives had to be approved by the Government.

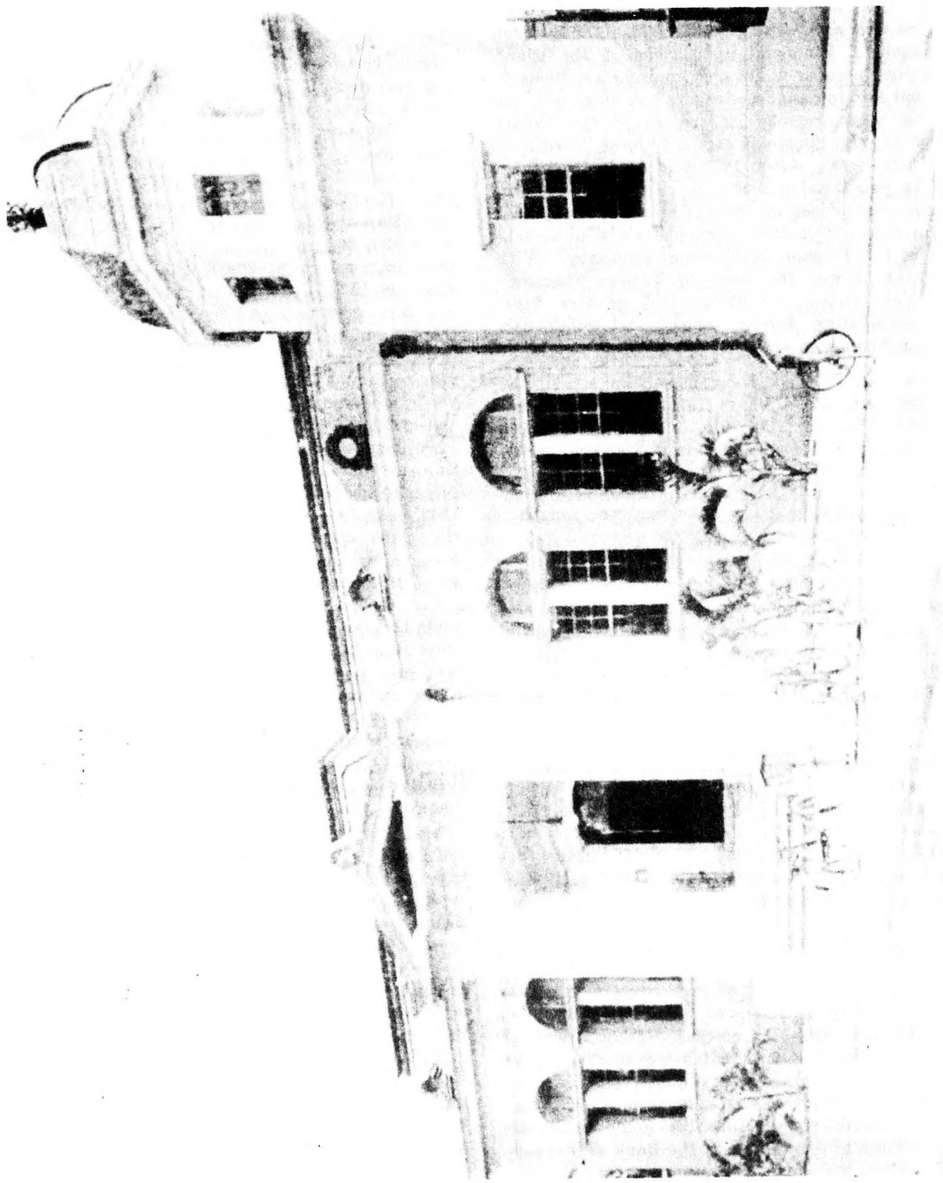
Three mutual loan companies, the Taiwan Industrial Mujin Company, Ltd., the East Taiwan Mujin Company, Ltd., and the South Taiwan Mujin Company, Ltd., with aggregate capital of 850,000 yen, had nine branches and six agencies in the principal towns.

Public pawnshops (numbering 16 in 1939) were established by local governments under Imperial Ordinance No. 485 of November, 1919. During the fiscal year 1938-39 their aggregate loans amounted to 2,246,396 yen, of which 1,443,868 yen were repaid, and 598,823 yen remained outstanding at the end of the year. Pawns for the remainder, valued at more than 200,000 yen, were forfeited.

7. TAIWAN DEVELOPMENT COMPANY. The officially-sponsored Taiwan Development Company was authorized by a law of June 2, 1936, and commenced operations at the end of that year. With a capital of 30,000,000 yen, it was designed to develop and exploit both Taiwan and the South Seas. In 1938 its subsidiaries included the following:

Table 33. Affiliates of the Taiwan Development Company.

Company	*Business*	*Capital in 1,000 yen*		
		Authorized	*Paid-Up*	*Owned by Taiwan Develop. Co.*
Taiwan Raw Cotton Co.	Purchase of raw cotton and ginning	3,000	750	750
Taiwan Marine Transport Co.	Express	250	125	10
Taito Development Company	Laborers' employment agency	150	37.5	2.5
Taiwan Kokusan Motor Car Company	Mfg. and sale of automobiles, parts	500	250	25
Fukudai Konsu	Enterprises in So. China	3,000	750	125
Taiwan Chikusan Kogyo Kabushiki Kaisha	Dealing in livestock	5,000	1,250	837
Nanho Industrial Co.	Forestry and lumber in Nanyo	400	200	18
Nanko Konsu	Exports of Formosa's monopolized goods and raw materials	450	135	69
So. Japan Salt Industrial Co.	Manufacture and sale of salt and its by-products	10,000	4,000	1,200
Nanho Metallic Co.	Refinery and sale of minerals	10,000	5,000	125
Hoshi Quinine Ind. Co.	Plantations for cinchona trees	250	250	250
Taiwan Wild Silk Co.	Production of wild silk	500	125	62
Taiwan Pulp Industry Co.	Manufacture of pulp	10,000	2,500	6



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Taiwan Wild Silk Co.	Production of wild silk	500	125	62
Taiwan Pulp Industry Co.	Manufacture of pulp	10,000	2,500	6

This holding company, the Taiwan Development Company, is thus a semi-financial, semi-industrial company with projects involving mining, agricultural and forestry developments, and investments in cotton seed oil, butyl alcohol made from sweet potatoes, motor cars, cotton, wild silk, and other products. It has interests in mines in British Malaya and Indochina, and interests in various enterprises in Thailand, South China, and the Philippines. (*Translation of Ordinance for the Enforcement of the Law of the Taiwan Development Company, Limited,* Edward S. Maney, American Consul, Taihoku, August 12, 1936; *Taiwan Development Company's Five Year Expansion Plans,* Gerald Warner, American Consul, Taihoku, March 26, 1938; and *The Overseas Activities of the Taiwan Development Company during 1937,* William E. Yuni, American Vice Consul, Taihoku, July 14, 1938.) For example, it established the Indochina Industry Company in January, 1938, and the Indochina Mining Company in March, 1939. (*Taiwan Keizai Nempo,* and *Development of South Seas Region and the Role of Formosa, Contemporary Opinions* No. 394, August 14, 1941.) Its Taiwan Cotton Company had a cotton-growing area in Thailand. Of course, other Formosan companies also had holdings in these areas. The Taiwan Hemp Company had acreage in Indochina. Bus lines and electrical and other enterprises were operated in Canton, Amoy, and Swatow, and on Hainan Island by Formosan interests.

As with the Sen-Man (Chosen-"Manchukuo") Development Company, established the same year, an increase in the capital of the Taiwan Development Company was subject to Government approval, officials were appointed by the Government, and the company was subject to Government supervision. The Government subscribed for 15,000,000 yen of the 18,750,000 yen paid-up capital as of June 30, 1939. (*Monthly Circular,* Mitsubishi Economic Research Bureau, September, 1939, which gives a list of all of the important semi-official companies established to that date.) The company was empowered to conduct agricultural, forestry, and marine enterprises necessary for colonization or development, to manage land on trust, to buy and sell land for colonization, to supply necessary goods and funds, and to conduct ancillary business.

8. Savings, Insurance and Trust Companies. The Taiwan Savings Bank had in 1939 an authorized capital of 1,000,000 yen, of which 250,000 yen was paid up, and deposits of 25,294,000 yen and loans amounting to 2,672,000 yen. Postal savings, utilized to a considerable extent in the Japanese Empire, had over 1,000,000 depositors in the island on March 31, 1940, with deposits totaling 44,214,908 yen. By December, 1942, the total of savings deposits was 85,200,000 yen. (Fortieth Financial and Economic Annual of Japan, 1940, and the *Oriental Economist.*) The postal savings offices also handled life insurance policies and annuities.

There were, in 1939, 22 life insurance offices and 33 property insurance offices. All of these were branches (or sub-branches) of companies having their head offices in Japan Proper, except for the Taisei Fire and Marine Insurance Company, with a capital of 5,000,000 yen, and with its head office at Taihoku. Some of these offices may since have been eliminated, as has been the case with similar offices in Japan Proper.

There were several trust companies, the most important being the Taito Trust Company with its head office at Taichu, and capital of 2,500,000 yen.

XII.
PUBLIC FINANCE

The condition of public finance in Taiwan was better than in any of the other parts of the pre-war Japanese Empire. The budget of the Government-General, for the fiscal year ending March 31, 1941, amounted to over 280,000,000 yen. Accounts for the government enterprises, included in the ordinary revenue and expenditure portions of the budget, were responsible for over three-fourths of the ordinary revenue and two-thirds of the ordinary expenditures. Taxes and duties produced only a small part of the revenue. From 1935 to 1940 borrowing was insignificant in amount.

1. Revenues. Ordinary revenues in recent years have consisted chiefly of receipts from such government enterprises as the railroads; the monopolies of opium, salt, camphor, tobacco, and alcoholic beverages; and postal, telegraph, telephone, and radio services. These constituted over 75 percent of ordinary revenues, while taxes provided, additionally, less than 20 percent. The remainder of ordinary revenue consisted of stamp receipts and miscellaneous items. Although the proportion provided by government undertakings is less if only net receipts are included (expenditures and an equivalent amount of revenue being deducted from each side of the budget), they still contributed more than half of all ordinary revenue.

Although details are not available for recent budgets, it may be of interest to indicate the receipts from these sources in the fiscal year ending March 31, 1935:

Table 34. Ordinary Revenues, Fiscal Year Ending March 31, 1935.

Source	*Amount in Yen*	
Taxes:		
Land tax	5,846,839	
Income tax	2,832,955	
Mining area tax	161,919	
Tax on note issues of Bank of Taiwan	51,594	
Sugar consumption tax	2,735,915	
Alcohol tax	3,206,170	
Textile consumption tax	1,785	
Import duties	1,847,320	
Tonnage dues	48,500	16,732,997
Revenue stamps		4,040,316
Revenues from government enterprises and properties:		
Postal, telegraph, and telephone service	6,148,350	
Railways and buses	22,727,812	
Government monopolies	42,320,607	
Forestry	3,114,196	
Hospitals	920,360	
Textbooks	206,276	
Weights and measures	427,377	
Prisons	381,572	
Rent on government land	1,012,048	
Rent on government property	429,093	77,687,691
Miscellaneous revenues:		
Licenses and fees	5,930	
Fines and confiscations	726,408	
Indemnities	70,571	
Customs miscellaneous receipts	22,197	
Contributions to pension fund	84,899	
Transfer from special accounts of Deposit Section of Department of Finance, Tokyo	140,000	
Others	275,806	1,325,811
Total ordinary revenues		99,786,815

It will be noted that these budget figures for revenue are somewhat lower than the settled figures as given in the "Appendix," in Table 69.

Land was classified into four general classes: rice land, other agricultural land, fish ponds, and building sites. Within these general classes the land tax was levied according to the grade of land. On rice land, in 1930, the highest rate of taxation was 25.80 yen per ko, the lowest, 1 yen per ko. Other agricultural land was taxed at lower rates, the highest rate being 19.60 yen per ko, the lowest 0.40 yen per ko. Land used for fish ponds was taxed at from 0.40 yen per ko to 13.80 yen per ko.

More recent figures are not available in detail, but in 1938, taxation of rice fields ranged from 30.20 yen per cho to 47.50 yen per cho, while other agricultural land was taxed at from 10.00 to 20.00 yen per cho. This naturally tended to encourage the use of agricultural land for sugar and other crops, rather than for rice. (Shiroshi Nasu, *Aspects of Japanese Agriculture,* New York, Institute of Pacific Relations, 1941.)

A cho (2.451 acres) is slightly more than a ko (2.397 acres). Presumably these tax figures (as well as those above) include taxes levied on land by the provincial and local governments, as well as by the Government-General. In the 1939 budget, revenue of the Government-General from land taxes was estimated at 8,342,000 yen; that of the provincial governments at 7,805,000 yen. Data for local governments were not available, but if taxes were levied as in Japan Proper, revenue would have been about 6,000,000 yen. Thus the total revenue from land taxes was about 22,000,000 yen, of which about 3,000,000 yen was derived from taxes on building land, etc. An average tax of somewhat over 20 yen per ko on 885,000 ko of cultivated land would yield about 19,000,000 yen of revenue.

The income tax in Taiwan, although levied under a separate law, was virtually the same as the income tax in Japan Proper, and presumably the increases in recent years have been the same, or nearly so. Income of individuals or companies domiciled in Japan was taxed in Japan Proper, and not in Taiwan, even though some of it might have been derived from Taiwan. In other cases of conflict of jurisdiction, the amount of the tax was determined in Japan rather than in Taiwan.

After 1934 other taxes were levied, including a special profit tax, a tax on dividends, and an inheritance tax. Wartime consumption taxes were also introduced, including a building tax, and taxes on amusements, admissions, and travel. Receipts from the tax on alcohol declined to small amounts in 1938 and in succeeding years with establishment of a Government alcohol monopoly.

Prior to 1937 the need for extraordinary revenue was

not great, over 80 percent of it being simply surplus from the preceding year. After the beginning of hostilities in China, the North China Incident Special Tax and then the China Incident Special Tax were introduced, and the Special Profit Tax became of more importance. Beginning in 1940 borrowing, to the extent of 6,000,000 yen, had to be resorted to in order to supply sufficient revenue to balance the budget.

Budgets of provincial and local governments are small in comparison with the budget of the Government-General. The latter secures three-fourths of all revenues collected by governmental units in Taiwan. Provincial taxes are surtaxes, calculated as percentages of the corresponding Government-General taxes, the rates being 18 percent of the income tax, 90 to 100 percent of the land tax, 70 to 80 percent of the business tax, and 120 to 150 percent of the house tax.

2. EXPENDITURES. As might be anticipated, the two chief items of expenditure, as well as of income, were those of the Monopoly Bureau and those for transportation and communications. Next in importance were the grants to local governmental units. Details of expenses for 1934-35 are shown below:

Table 35. Ordinary Expenditures, Fiscal Year Ending March 31, 1935.

Type of Expenditure	*Amount in Yen*	
Shrines		43,000
Government-General:		
Salaries	632,863	
Office expenses	801,574	
Textbooks	196,074	
Weights and measures	332,669	
Commercial museum	11,546	
Weather bureau	56,004	
Manufacture of a serum for animal diseases	63,126	
Official expenses	27,540	
Secret fund	115,425	2,286,821
Local government offices:		
Salaries	2,927,213	
Office expenses	9,738,214	
Peace preservation expenses	853,583	
Police and detectives	21,640	
Port quarantine	30,159	
Secret fund	53,865	13,624,674
Customs:		
Salaries	285,306	
Office expenses	234,189	
Disposition expenses	100	
Expense for officers on special mission	8,667	528,262
Courts		1,299,777
Prisons		1,139,119
Police Officers' Training School		193,000
Hospitals		1,176,096
Central Research Institute		784,354
Sugar Research Institute		567,762
Educational expenses		4,521,192
Social work		298,764
Bureau of Communications and Transport:		
Salaries	1,483,938	
Railways	11,970,417	
Postal service	4,440,290	
Ports and highways	136,400	
Lighthouses	76,075	
Bus service	565,994	
Refunds	1,885,368	20,558,482
Monopoly Bureau:		
Salaries	534,733	
Monopoly enterprises	8,207,499	
Purchase of monopoly goods	13,611,820	22,354,052
Forestry		3,147,843
Transfer to special account of sinking fund		6,562,145
Share in pensions		4,293,377
Miscellaneous		1,777,827
Reserves		2,000,000
Total ordinary expenditures		87,156,547

Comparison of the revenue of 42,320,607 yen of the Monopoly Bureau with its expenditures of 22,354,052 yen, indicates the large net income from the five monopolies. The railways also were important net revenue producers, their revenue being 22,727,812 yen (including revenue from bus service). Expenditures were 11,970,417 yen for railways, and 575,994 yen for bus service. Extraordinary expenses of 2,429,961 yen for railway improvement, and perhaps part of the 1,867,992 yen budgeted for construction on the main highways should be offset against this. Even so, it may be noted that net income from transport facilities and monopolies was nearly twice as large as revenue derived from taxes. This points to financial difficulties which the Government of Taiwan might encounter should revenues from these sources decline. Especially it may be noted that revenues would fall heavily should the Government not operate the present monopolies.

3. EXTRAORDINARY EXPENDITURES. In 1940-41 extraordinary expenditures amounted to 36,421,000 yen for Government enterprises, 9,316,000 yen for repairs, 1,697,000 yen for inspection, 17,664,000 yen for subsidies, 7,410,000 yen for encouragement of industry, and 23,362,000 yen transferred to the Special Defense Account. Details for these expenditures are likewise not available, but in 1934-35 the expenditures for government enterprises consisted of allotments for railway, highway, port, river and irrigation developments; those for repairs of expenditures for government buildings, telegraph lines, and a broadcasting station; those for investigations of and experiments with such projects as the census, geological surveys, a land tax survey, and other surveys of Government programs. Subsidies went to shipping, to highways and private railways, to water and irrigation projects, to oil field exploration, and to local government offices, presumably to be distributed by them.

While only 23,000,000 yen was budgeted directly for military expenditures, this is far from representing the extent of these expenditures. Appropriations for additional railway construction, port facilities, highways, aviation facilities, radio stations, and appropriations for development of strategic industries, including petroleum, carbon black, alcohol, and other products cannot be considered otherwise than as expenditures designed to improve the island as a military and naval base.

4. IMPORTANCE OF PUBLIC FINANCE IN TAIWAN. The Government-General has had a record of sound finance for many years. For the first few years after annexation to Japan, Taiwan received a grant from the Tokyo Government, but its financial condition soon improved to such an extent that after 1905 it did not need this grant. Since that time the financial position of the Government-General has been very sound, and it has expanded its activities to such an extent that the budget is of great importance in the economic life of the people. The island's prosperity depends in large measure (assuming that crops of rice and sugar are good) upon the amount and use made of the appropriations. Some

minor items from the 1939-40 budget will indicate the variety and scope of Government activities in the island —appropriations of 145,000 yen for conversion of motors to gasoline substitutes; 30,000 yen to encourage the use of natural gas as fuel for automobiles; 35,000 yen for placer gold production; 96,000 yen for manufacture of leather goods from fish skins (because of the leather shortage); 140,000 yen for adjustment of supply and demand of commodities; 67,500 yen for price control; and 121,000 yen for wood pulp experiments. (A list of some of the appropriations of the Government-General for economic or semi-economic activities is given in the "Appendix," Table 59.) Add to these 118,000 yen for experiments for production of carbon black from natural gas; 770,000 yen for highways; 150,000 yen for the Pescadores; 105,000 yen for various developments at the port of Karenko; 184,000 yen to improve aviation facilities; 150,000 yen for radio stations; and finally, greater appropriations for public benefits such as a shipping subsidy of 1,300,000 yen, and 3,000,000 yen for construction of the port at Gosei.

Profits from the control of rice exports were expected to provide funds for encouraging hemp and cotton cultivation, as well as flax and castor beans, and for regulation of the sugar industry. These supplement funds from the profitable monopolies, and from railroads.

5. RECENT BUDGETS. Table 69 in the "Appendix" indicates budgets for recent years. Although the budget of Korea much more than doubled from 1937 to 1941, as did that of Japan Proper, the increase in the Taiwan budget was somewhat more moderate. There was some increase in taxes, and considerable increase in revenue from Government enterprises. In 1940 and 1941 less surplus remained to be utilized in succeeding years, and some borrowing was done. Some additional revenue was secured through introduction of consumption and other wartime taxes—profits' distribution tax, tax on interest on bonds, transit tax, entrance tax, building tax, amusement tax, and tax on certain commodities. In 1940-41 these were to produce 2,134,986 yen of revenue. This was supplemented by 3,761,546 yen from governmental units for public works. Receipts from the issue of public loans were to provide 1,596,600 yen in addition to the 6,000,000 yen of special loans.

Significant ordinary expenses other than those listed, included 3,605,725 yen for Taihoku Imperial University. This was half again as large as the appropriation received by the Keijo Imperial University in Korea, although the latter had more than twice as many students. Taihoku Imperial University had two faculty members for each student. (*Japan—Manchukuo Year Book*, 1938.) As indicated above, its faculty studied intensively various technical problems of development and exploitation of the South Seas, including the Philippines, the Netherlands East Indies, Indochina, Thailand, and other areas. Social works received 881,209 yen, the Meteorological Station, 428,724 yen, and contributions for pensions, 5,477,522 yen. The sum of 6,681,371 yen was transferred to the special account for national bond readjustment.

Of miscellaneous extraordinary expenditures, the largest appropriation was that made for air raid defense, 2,392,120 yen. Some other appropriations were made for wartime economic control and for reconstruction after storm damages.

Broadcasts report that the 1944-45 budget for Taiwan is to be 613,371,000 yen, or nearly double the 1941-42 budget. This is a larger percentage increase than that in the Korean budget in the same period. It is evident from this and other indications that particular attention is being given to Taiwan. Although the broadcast reports indicated that 4,900,000 yen were approved for scientific research projects in Taiwan, and that studies of tropical medicine, dietetics, and marine products, together with fuel resources of the occupied areas, would be emphasized, it seems probable that the greatest use of funds in Taiwan (as in the past) would be in the expansion and improvement of the ports, transportation facilities, defensive installations, and other works on the island.

6. PUBLIC DEBT. Credit position of the Taiwan Government-General is probably as strong as that of any part of the Japanese Empire. Due to the revenue produced by the railways and the Government monopolies, resort to borrowing was negligible for a number of years prior to 1940, in spite of large expenditures for harbors, railways, highways, and encouragement of specific industries needed in wartime. The public debt in 1940, about 130,000,000 yen, was only about half as much as the budget for that year, and a fraction of the island's income. (*Japan Year Book*, 1940-41.) National income of the island must have been about one billion yen in 1940, and average per capita income thus over 150 yen. No reliable estimates of national income are available for any of the Japanese dependencies. Even figures of value of output have not been given for some industries since 1937.

Purposes for which the debt was increased were chiefly construction and improvement of railways, construction of harbors, irrigation projects, land tax survey and adjustment, and establishment of the Government monopoly of alcoholic beverages. Bond issues planned in the 1939-40, 1940-41, and 1941-42 budgets were moderate, but, of course, additional borrowing has probably been made necessary by the increased budgets since 1942.

XIII.

SUMMARY

1. GENERAL. This economic survey of Taiwan has described, as far as available information permits, the economy of the island before the outbreak of war, and more recent developments. Secrecy concerning many activities has always been maintained by the Government-General, and information is fragmentary; but certain conclusions can be stated with some assurance.

The island's primary role in Japan's southern expansion has been as a base for naval and air communications, and for a concentration of military power.

2. RICE AND SUGAR. Taiwan's economy is based upon rice and sugar. These are the two main crops of a predominantly agricultural island. Other products such as tea, sweet potatoes, and tropical fruits, as well as camphor, lumber, and marine products, are definitely of secondary importance. The government has encouraged sugar production, making the island the source of nearly all Japan's supply. Rice has slightly less value as an export, but it—rather than sugar—is the island's most important crop, for only about half of it is exported, and the remainder consumed on the island. Rice and sugar cane are competing crops, much land being suitable for either. They thus afford alternatives for the farmers—rice being a preferred crop to which farmers can turn if the great sugar companies force sugar cane prices too low. About 1,000,000 tons of sugar constitutes 40 to 45 percent of the total value of exports, while about half of the nearly 50 million bushels of brown rice produced annually are exported, constituting about 30 percent of the total value of exports.

Looking ahead to the period of military occupation, as well as to relief and rehabilitation problems, attention focuses upon the probable surpluses of these crops. Cut off from normal markets in Japan, rice and sugar growers would be deprived of their accustomed livelihood. Left with little cash income, most Formosans could probably continue to raise enough to eat and to have a place of shelter. The problem will exist in this form, of course, only if there is no substantial curtailment of crops as a result of military operations.

Specialization upon sugar and rice has been accentuated by Japanese requirements, and—in the case of sugar—by the tariff protection which Japan has afforded. In open trade, before the war, Taiwan would scarcely have been able to meet the competition of lower cost sugar from Java. After the war, the Philippine produce may also compete more strongly in Far Eastern countries, especially if it no longer has its pre-war access to the American market. The future of Taiwan's sugar industry will probably depend most largely, therefore, upon the possibilities for expanding markets in North China and Manchuria.

3. AGRICULTURAL NEEDS. In 1939 visiting Japanese bankers concluded that conditions of Taiwan's farmers were better than those of Manchuria or Korea. Comparison with Korea indicates that the value of crops per acre is half again as high in Taiwan, percentage of tenant farmers is lower (and there are no such "fire-field" families as are found in Korea), and consumption of rice, nearly as high as consumption of all grains by tenant farmers in Korea, is supplemented by sweet potatoes. Soil is fairly good, and two crops of rice are grown annually, which is not common in other rice-producing countries, except in Tonkin in Indochina and in the better rice areas in China. For the last four years, however, there has been a shortage of needed fertilizer. Although irrigation facilities are fairly well developed, more are needed, irrigation projects being one of eight recommendations made in 1939 for further development. Improvements in agricultural methods, implements, machinery, and facilities will be a prime consideration if and when further development and improvement of the island's economy are possible.

4. DIFFICULTIES FACING INDUSTRIALIZATION. Difficulties face any attempt to industrialize Taiwan, especially with heavy industry, although some plants have been erected as part of Japan's wartime program. Resources of the island other than agricultural resources are generally not important. Electric power is an exception, the swift streams providing a potential 2,500,000 kilowatts. Coal production amounts to 2,500,000 tons annually. The island produces some gold, chiefly at the Kinkaseki and Zuiho mines, a few miles east of Keelung. Copper production of the Kinkaseki mine is important, especially in wartime, and is no doubt much larger than the 7,350 tons reported in 1936. Other mineral resources are small, and although much effort has gone into drilling of oil wells, petroleum production supplies only about one-tenth of local needs. Many wells produce only natural gas. Deposits of iron, zinc, lead, ferro-alloying metals, and other minerals essential to modern or heavy industry are negligible.

Least disruption of Taiwan's economy during the period of postwar adjustment would probably result were emphasis continued upon rice, sugar, tea, and perhaps fruits, with some attempt to establish light industry. The area is at present self-sufficient in basic foodstuffs; but if it is to purchase necessary imports it will require markets for its sugar, perhaps for rice, and for tea, camphor, and other products.

5. TRADE: FOODSTUFF EXPORT SURPLUS VERSUS IMPORTS OF TEXTILES, METALS, FERTILIZER. Taiwan has been the source of 85 percent of the sugar of the Japanese Empire, and it has an exportable surplus of the other crops mentioned above. Pork, chief meat item of the Formosan diet, is plentiful enough to provide for normal consumption of over ½ pound per week per person. The principal foodstuff of which there is a net import is fish—sizable quantities of dried and salted fish having been imported from Japan. Many other foodstuffs, of course, are imported, but few are essentials in the diet of most of the population.

Textiles, textile raw materials, petroleum, metals (especially iron), vehicles, machinery, fertilizer, cement, and manufactured consumer goods are other imports which are also essential to maintenance or improvement of living standards.

6. LABOR, CAPITAL, AND MANAGEMENT. A further obstacle to continued development is the probable lack of necessary capital, managerial ability, and skilled labor. Labor resources of the island have never been satisfactory to the capitalists engaged in its development. There has been a shortage, particularly, of skilled labor, and efficiency of labor has been lowered by the movement of labor to farms in busy seasons.

Capital and managerial ability have been supplied by Japanese, or through Japanese effort. Capital has been accumulated on the island by the sugar companies, but additional capital would be needed, as would skilled workmen and operators of essential services such as railroads, if Japanese in large numbers should return to their homeland.

7. POPULATION PROBLEMS. It may thus be seen that the Japanese, numbering somewhat over 300,000 (exclusive of military forces), will present particular problems. Resumption of industrial production presents, in addition to problems of ownership, the problem of replacement of skilled workers and managers.

A question is also raised by the 150,000 aborigines, who have been hostile both to the Chinese and the Japanese, and for whom an aboriginal administration will continue to be necessary.

8. GOVERNMENT AS AN ECONOMIC FACTOR. Extensive government control over the economy, as in Japan Proper, has been supplemented in Taiwan by the Government-General's active participation in the actual conduct of commerce and industry. Its ownership and administration of transportation and communication facilities, of forests, and of the monopolies of alcoholic beverages, tobacco, salt, camphor, and opium, supplemented by its generally pervading control of the economy, have made it the strongest directing force in the economy of the island. Continuing performance of these functions is essential. This will involve problems of personnel, who have been chiefly Japanese in important posts, and of ownership and management to provide efficient service.

9. TRANSPORT AND COMMUNICATIONS. Even now transport facilities are not entirely adequate, even by Japanese standards. Light rails, short crossing loops, and small capacity of freight cars limit the traffic which the railroads can accommodate. The first recommendations made by visiting Japanese bankers, in 1939, for further economic development were completion of the double-tracking of the main railway, and replacement of the present rails by a heavier type. Improvement of port facilities at Karenko on the isolated east coast, and at Gosei on the west coast, has been carried forward, although it is improbable that these can ever compare with the two older ports, Keelung and Takao.

10. HEALTH. No survey of Taiwan can omit reference to health conditions on the island. Prevalence of disease and unsanitary conditions, in spite of improvements under the Japanese, presents a serious problem. Various forms of dysentery, intestinal parasites, and other afflictions due to soil and water pollution; malaria and other mosquito-borne diseases; and the venereal, respiratory, and other infections are commonly encountered.

XIV.
APPENDIX

Table 36. Distribution of Landowners by Size of Holdings, 1930.

	Size of Landholdings (in ko)				
	0-0.49	*0.5-0.99*	*1.0-4.99*	*5.0 or over*	*Total*
Number of landholders (in 1,000's)	172.9	86.7	122.4	23.1	405.1
Percentage	42.7	21.4	30.2	5.7	100.0
Area (in 1,000 *ko*)	41.0	62.5	258.6	359.2	721.3
Percentage	5.7	8.7	35.8	49.8	100.0
Average landholding (in *ko*)	0.24	0.72	2.1	15.5	1.78
Average landholding (in acres)	0.58	1.73	5.0	37.2	4.26

Table 37. Distribution of Farmers and Land Tilled, 1930.

	Size of Farms (in ko)					
	Less than 0.5 ko	*0.5-0.99 ko*	*1.0-1.99 ko*	*2.0-4.99 ko*	*5 ko and over*	*Total*
Number of farmers (in 1,000s)	128.0	96.9	100.4	78.9	19.0	423.2
Percentage	30.3	22.9	23.7	18.6	4.5	100.0
Area of land tilled (1,000 *ko*)	33.7	69.7	143.2	236.1	208.6	691.3
Percentage	4.9	10.1	20.7	34.2	30.1	100.0
Average (*ko* per farmer)	0.26	0.72	1.43	2.99	10.98	1.63
Average (acres per farmer)	0.62	1.71	3.39	7.11	26.15	3.87

Source: Grajdanzev, A. J., *Formosa Today*. New York, Institute of Pacific Relations, 1942, from *Nogyo nenkan*, 1939-40.

Table 38. Important Japanese Companies.

(June 30, 1939)

Company	*Authorized Capital (1,000 yen)*	*Paid-up Capital (1,000 yen)*	*Total Number Shares*	*Available Significant Data on Ownership*			
				Yen	*Shares*	*Percent of Paid-up Capital*	*Owned by*
Taiwan Development Co	30,000	18,750	600,000	15,000,000	480,000	80	Government-General of Taiwan
				375,000	12,000	2	Mitsui Gomei
				375,000	12,000	2	Mitsubishi
				10,000	400	8	Taiwan Development Co.
Taiwan Marine Transport Co	250	125	5,000	2,500	200	6⅔	Taiwan Development Co.
Taito Development Co	150	37.5	3,000	25,000	1,000	10	Taiwan Development Co.
Taiwan Kokusan Motor Car Co	500	250	10,000	69,000	4,600	5.11	Taiwan Development Co.
Nanko Konsu	450	135	9,000	250,000	5,000	100	Taiwan Development Co.
Hoshi Quinine Industry Co	250	250	5,000	62,500	5,000	50	Taiwan Development Co.
Taiwan Wild Silk Co	500	125	10,000		500	¼	Taiwan Develo.ment Co.
Taiwan Pulp Industry Co	10,000	2,500	200,000	837,000	67,000	67	Taiwan Development Co.
Taiwan Livestock Industry Co	5,000	1,250	100,000	413,000	33,000	33	Nippon Marine Products (Nissan)
				750,000	60,000	100	Taiwan Development Co.
Taiwan Raw Cotton Co	3,000	750	60,000			52	Nippon Marine Products (Nissan)
Takao Ice Mfg. Co	500	125	10,000	350,000	14,000	50.02	Yasuda Hozen-sha
Taiwan Hemp Mfg. Co	1,400	700	28,000	1,200,000	24,000	100	Asano Dozoku
Taiwan Real Estate	1,200	1,200	24,000				
Taiwan Salt	2,500	2,000	50,000	990,000	24,765	49.5	Nisso
Taiwan Hemp Fiber	2,000	1,200	40,000	360,000	12,000	30	Nomura Gomei Kaisha
Keelung Coal Mining Co	7,000	7,000	140,000	2,150,000	43,000	30.71	Mitsui Mining Co.
Nitto Development Co	10,500	9,500	210,000	8,740,000	193,200	92	Mitsui Trust
Japan Aluminum Co	30,000	20,000	600,000	3,244,000	86,500		Mitsubishi Mining
				1,134,000	34,000	5.67	Furukawa
				300,000	9,000	1.5	Yasuda
Taiwan Chemical Industry Co	10,000	2,500	200,000	1,875,000	150,000	75	Nissan Chemical Industry Co.
Taiwan Fertilizer	1,000	839	20,000	439,000	10,473	52.36	Nissan Chemical Industry Co.
Taiwan Electric Power Co	45,750	45,750	915,000	12,000,000		26.23	Government-General of Taiwan
				499,000	10,000	1.09	Mitsui Gomei Kaisha
Taiwan Mining Co	30,000	30,000					Nissan
Takao Alcohol Co	300	300	6,000				Dai Nippon Celluloid, Mitsui subsidiary

For data relating to sugar companies, see Table 68 below.

Table 39. Chief Sugar Mills.

NOTE: The following list indicates the most important sugar mills of Taiwan as of 1939, with their locations, capacities, and other data. Cane crushing capacity is given in tons of 2,000 pounds. Sugar content percentages are given only when they were 12 percent or over in 1939. Number of workers is given when known to be over 300. Sources of data: *Sugar Yearbook*, 1940 (in Japanese); consular reports; Japanese General Staff Maps of Formosa (1:200,000, 14 sheets). The equivalents of terms used in locations are as follows: *gai*-town; *shi*-city; *sho*-station, village; *gun*-county; *shu*-province.

Name of Factory	*Location*	*Available Data*
A. MILLS BELIEVED TO PRODUCE ALCOHOL.		
	Taiwan Sugar Manufacturing Company	
Ako	Heito-shi, Heito-gun, Takao-shu.	Largest sugar mill in Taiwan with daily cane crushing capacity of 3,000 tons. Daily alcohol capacity 5,712 gallons (1934). New dry alcohol plant erected, annual capacity 50,000 *koku* (2,383,000 gallons). Electric power plant; coal and bagasse burned for fuel. Railways extend 130.47 miles.

Name of Factory	*Location*	*Available Data*
Kyoshito No. 1 and No. 2	Nanshi-sho, Okayama-gun, Takao-shu.	Daily cane crushing capacity, 1,128 tons (total of 2 mills). Sugar content 12.54 percent. New absolute alcohol plant annual capacity 36,300 *koku*. Own power plant. Railways extend 44.18 m. These were first factories to install equipment for production of absolute alcohol in accord with 1937 plan for increasing output.
Sankanten	Eiko-sho, Niitoyo-gun, Tainan-shu.	Daily cane crushing capacity 952 tons; sugar content 12.14 percent. Grinds yearly from September until March, 30,000 metric tons of sugar each season. Own power plant with bagasse for fuel. Railways extend 38.63 m. Cane is grown on land owned by company, and farmers are paid per ton of cane. Nearly half of sugar white enough to be sent to Japan for consumption without refining.
Wanri No. 1 and No. 2	Zenka-sho, Shinka-gun, Tainan-shu.	Combined daily cane crushing capacity 1,202 tons. Railways extend 49.37 m. Own power plant. May produce considerable amount of alcohol. Had 441 workers in 1935. Sugar content 12.21 percent.
Kibi	Kizan-gai, Kizan-gun, Takao-shu.	Daily cane crushing capacity 1,344 tons. Own power plant. Railways extend 63.09 m. Its sugar largely consumed in Taiwan.
	Dai Nippon Sugar Manufacturing Company	
Kobi No. 1 and No. 2	Kobi-gai, Kobi-gun, Tainan-shu.	Daily cane crushing capacity 3,584 tons (total of 2 mills). Sugar content about 12½ percent. Daily alcohol production capacity 5,003 gallons in 1934. New dry alcohol plant was to be completed in October, 1939, capacity 50,000 *koku* annually. With this, annual capacity 85,000 *koku*. Electric power generators. Coal and bagasse burned for fuel. Railways extend 112.4 m. Employed 558 workers in 1935.
Kagi	Tairin-sho, Kagi-gun, Tainan-shu.	Daily cane crushing capacity 1,344 tons. Sugar content 12.08 percent. Own power plant. Railways extend 56.88 m. May produce alcohol.
Hokko	Hokko-gai, Hokko-gun, Tainan-shu.	Daily cane crushing capacity 2,240 tons. Own power plant. Railways extend 64.67 m. May produce alcohol. Employed 461 workers in 1935.
	Meiji Sugar Manufacturing Company	
Nansei	Mizukami-sho, Kagi-gun, Tainan-shu.	Daily cane crushing capacity 2,240 tons. Sugar content 12.25 percent. Daily alcohol production capacity in 1934, 5,712 gallons. With new dry alcohol plant scheduled for completion in October, 1939, annual capacity estimated at 85,500 *koku* (about 4,000,000 gallons). Own power generator. Coal and bagasse burned for fuel. Railways extend 60.29 m.
Keiko	Keiko-gai, Inrin-gun, Taichu-shu.	Daily cane crushing capacity 1,680 tons. Daily alcohol production capacity 1,811 gallons in 1934. Own power plant. Railways extend 60.48 m.
Nanto	Nanto-gai, Nanto-gun, Taichu-shu.	Daily cane crushing capacity 840 tons; sugar content about 12 percent. Daily alcohol production capacity 2,049 gallons in 1934. Electric power plant. Railways extend 27.88 m.
Santo	Rokkyaku-sho, Toseki-gun, Tainan-shu.	Daily cane crushing capacity 2,200 tons. Sugar content about 12 percent. Daily alcohol production capacity 1,239 gallons in 1934. Own power generators. Railways extend 66.73 m.
Soya	Mato-gai, Sobun-gun, Tainan-shu.	Daily cane crushing capacity 1,000 tons. Sugar content about 12 percent. Daily alcohol production capacity 2,240 gallons in 1934. Own electric power plant. Railways extend 27.01 m.
	Ensuiko Sugar Manufacturing Company	
Shinei No. 1 and No. 2	Shinei-gai, Shinei-gun, Tainan-shu.	Combined daily cane crushing capacity 2,464 tons. Employed 370 workers in 1935. New dry alcohol plant was to be completed in 1940 with annual capacity of 50,000 *koku*. Own power plant, bagasse and coal burned for fuel. Railways extend 58.94 m.
Gannai No. 1 and No. 2	Ensui-gai, Shinei-gun, Tainan-shu.	Combined daily cane crushing capacity 1,350 tons. Employed 562 workers in 1935. Own electric power plant. Railways extend 57.13 m.
Keishu	Keishu-sho, Hokuto-gun, Taichu-shu.	Daily cane crushing capacity 2,184 tons. Own electric power plant. Railways extend 65.26 m. May produce alcohol.
	Mills formerly operated by Teikoku Sugar Manufacturing Company (reported merged with Dai Nippon Sugar Mfg. Co. in 1941)	
Shinchiku	Shinchiku-shi, Shinchiku-shu.	Daily cane crushing capacity 728 tons. Sugar content 12.30 percent. Daily alcohol production capacity 1,191 gallons in 1934. Own electric power plant. Railways extend 14.22 m.

Name of Factory	*Location*	*Available Data*
Taichu No. 1 and No. 2	Taichu-shi, Taichu-shu.	Combined daily cane crushing capacity 1,050 tons. Daily alcohol production capacity 3,574 gallons in 1934. Own electric power plant. Coal and bagasse burned for fuel. Railways extend 85.20 m., including those for Tanshi plant.

B. MILLS NOT KNOWN TO PRODUCE ALCOHOL.

Taiwan Sugar Manufacturing Company

Kohekirin	Near Ogori-sho or Shoko-sho, Hozan-gun, Takao-shu.	Daily cane crushing capacity 1,000 tons. Railways extend 35.52 m. Sugar content 12.34 percent. Employed 386 workers in 1935.
Toko	Toko-gai, Toko-gun, Takao-shu.	Daily cane crushing capacity 700 tons. Railways extend 37.68 m.
Sharoken	Nintoku-sho, Niitoyo-gun, Tainan-shu.	Daily cane crushing capacity 1,200 tons. Railways extend 55.26 m. Had 387 workers in 1935.
Hori	Hori-gai, Noko-gun, Taichu-shu.	Daily cane crushing capacity 336 tons. Railways extend 7.13 m. Sugar content 13.42 percent.
Taihoku	Taihoku-shi, Taihoku-shu (Manka district).	Daily cane crushing capacity 560 tons. Sugar content 12.22 percent.
Koshun	Koshun-sho, Koshun-gun, Takao-shu.	Daily cane crushing capacity 392 tons.

Dai Nippon Sugar Manufacturing Company

Toroku	Toroku-gai, Toroku-gun, Tainan-shu.	Sugar content 12.65 percent. Daily cane crushing capacity 560 tons. Railways extend 20.67 m.
Ujitsu	Ujitsu-sho, Taichu-shu.	Daily cane crushing capacity 504 tons. Railways extend 30.18 m.
Getsubi	Taichu-shu (near Kori, on railroad just south of border between Taichu and Shinchiku Provinces).	Daily cane crushing capacity 750 tons. Railways extend 47.13 m.
Shoka	Shoka-shi, Taichu-shu.	Daily cane crushing capacity 840 tons. Railways extend 69.68 m.
Ryugan	Doko-sho, Kobi-gun, Tainan-shu.	Daily cane crushing capacity approximately 1,100 tons.

Meiji Sugar Manufacturing Company

Shoro	Kari-gai, Hokumon-gun, Tainan-shu.	Daily cane crushing capacity 840 tons. Sugar content 12.25 percent.
Ujurin	Koheki-sho, Shinei-gun, Tainan-shu (near the Nansei mill, northeast of Shinei).	Daily cane crushing capacity 840 tons. Sugar content 12.12 percent. Railways extend 52.66 m.

Ensuiko Sugar Manufacturing Company

Karenko No. 1 and No. 2	Kotobuki-sho, Karen shi-cho, and Yamato-sho, Horin shi-cho.	Combined daily cane crushing capacity 1,176 tons. Railways extend 55.33 m.

Mills formerly operated by Teikoku Sugar Manufacturing Company
(reported merged with Dai Nippon Sugar Mfg. Co. in 1941)

Chikunan	Chikunan-sho, Chikunan-gun, Shinchiku-shu.	Daily cane crushing capacity 616 tons. Sugar content 12.92 percent. Railways extend 10.89 m.
Kanshikyaku	Toen-gai, Toen-gun, Shinchiku-shu.	Daily cane crushing capacity 840 tons. Railways extend 1.05 m. Sugar content 13.26 percent; new mill, built in 1939.
Tanshiken	Tanshi-sho, Toyohara-gun, Taichu-shu.	Daily cane crushing capacity 840 tons. Sugar content 12.21 percent.

Plants formerly operated by Showa Sugar Manufacturing Company, now presumably operated by Dai Nippon Sugar Manufacturing Company

Giran No. 1 and No. 2	Giran-gai, Giran-gun, Taihoku-shu.	Daily cane crushing capacity 1,288 tons. Railways extend 25.46 m.

Name of Factory	*Location*	*Available Data*
Tamai	Tamai-sho, Shinka-gun, Tainan-shu.	Daily cane crushing capacity 1,008 tons. Sugar content 12.81 percent.
Byoritsu	Byoritsu-gai, Byoritsu-gun, Shinchiku-shu.	Daily cane crushing capacity 1,008 tons.
Sharoku	Sharoku-gai, Taiko-gun, Taichu-shu.	Daily cane crushing capacity 336 tons.

Taito Sugar Manufacturing Company

Taito No. 1 and No. 2	Taito-gai, Taito-cho.	Daily cane crushing capacity 560 tons. Railways extend 11.64 m.

Sango Sugar Company

Gensei	Vicinity of Nirin-gai, Hokuto-gun, Taichu-shu.	Daily cane crushing capacity 392 tons. Railways extend 13.66 m.

Shinko Sugar Manufacturing Company
(Reported merged with Taiwan Sugar Mfg. Co. in 1941)

Sangocho	Tairyo-sho, Hozan-gun, Takao-shu.	Daily cane crushing capacity 952 tons. Railways extend 18.14 m.

Takao Alcohol Company

Takao	Takao-shi, Takao-shu.	Not a sugar mill, but produced 5,712 gallons of alcohol daily in 1934 from sugar cane and sweet potatoes. Started a plant in 1938 to produce 36,000 *koku* (1,715,000 gallons) of dry and industrial alcohol annually.

Table 40. Principal Varieties of Citrus Fruits.

Ponkan (Citrus nobilis, Lour, var. Poonensis, Hayata)
Tankan (Citrus Tankan, Hayata)
Sekkan (Citrus senensis, Osbeck form Sekkan, Hayata)
Buntan (Citrus grandis, Osbeck form Buntan, Hayata)
Zabon (Citrus Sabon, Sieb.)
Lemon (Citrus, Limon, Burn f.)
Valencia (Citrus sinensis Osbeck)

Table 41. Principal Fish.

Sea catch:
- Chidai (Evynnis cardinalis)
- Guchi (Sciaena schlegelii)
- Eso (Sauride argyrophanes)
- Bonito
- Tunny
- Swordfish
- Sardines
- Shark
- Sea-bream
- Frigate-mackerel

Fish Hatcheries:
- Sabahii (Charos chanos)
- Oysters
- Grey mullet
- Tsauhii (Ctenopharyngodon idellus)
- Renhii (Hypothphthalmichthys moritrix)
- Kenhii (Labes knotius)
- Carp

Table 42. Principal Trees.

- Oak
- Keyaki (Zelkowa formosana, Hay.)
- Benihi (Chamaecyparis formosensis, Mats.)
- Kosan (Cunninghamia lanceolata, Hook.)
- Asan (Taiwania cryptomerioides, Hay.)
- Taiwan Tsuga (Tsuga chinensis Pritzel.)
- Ryukyumatsu (Pinus luchuensis, Mayer.)
- Taiwan-akamatsu (Pinus Massoniana Lamb.)
- Camphor trees
- Akashia (Acacia confusa, Merr.)
- Sissonoki (Dalbergia Sissoo Roxb.)

Table 43. Supplementary Data on Larger Power Plants.

NOTE: Data on equipment of power plants in Taiwan are available in only a few cases. Cooperation in the preparation of this section has been received from the Far Eastern Division, Office of Strategic Services, particularly on Japanese language material. Sources here cited omit those given in the footnote to Table 71, to which reference is also made for the locations of plants of less than 1,000 kilowatts capacity.

Equivalents of terms used in giving locations are as follows:

cho	district (or, in an urban address, a subdivision of a city)
gai	town
gun	county (subdivision of a *shu*)
ku	ward (subdivision of a ***shi***)
shi	city
shicho	(subdivision of a *cho*, or district)
sho	village or station (subdivision of a *gun*)
shu	province
kei	stream or river

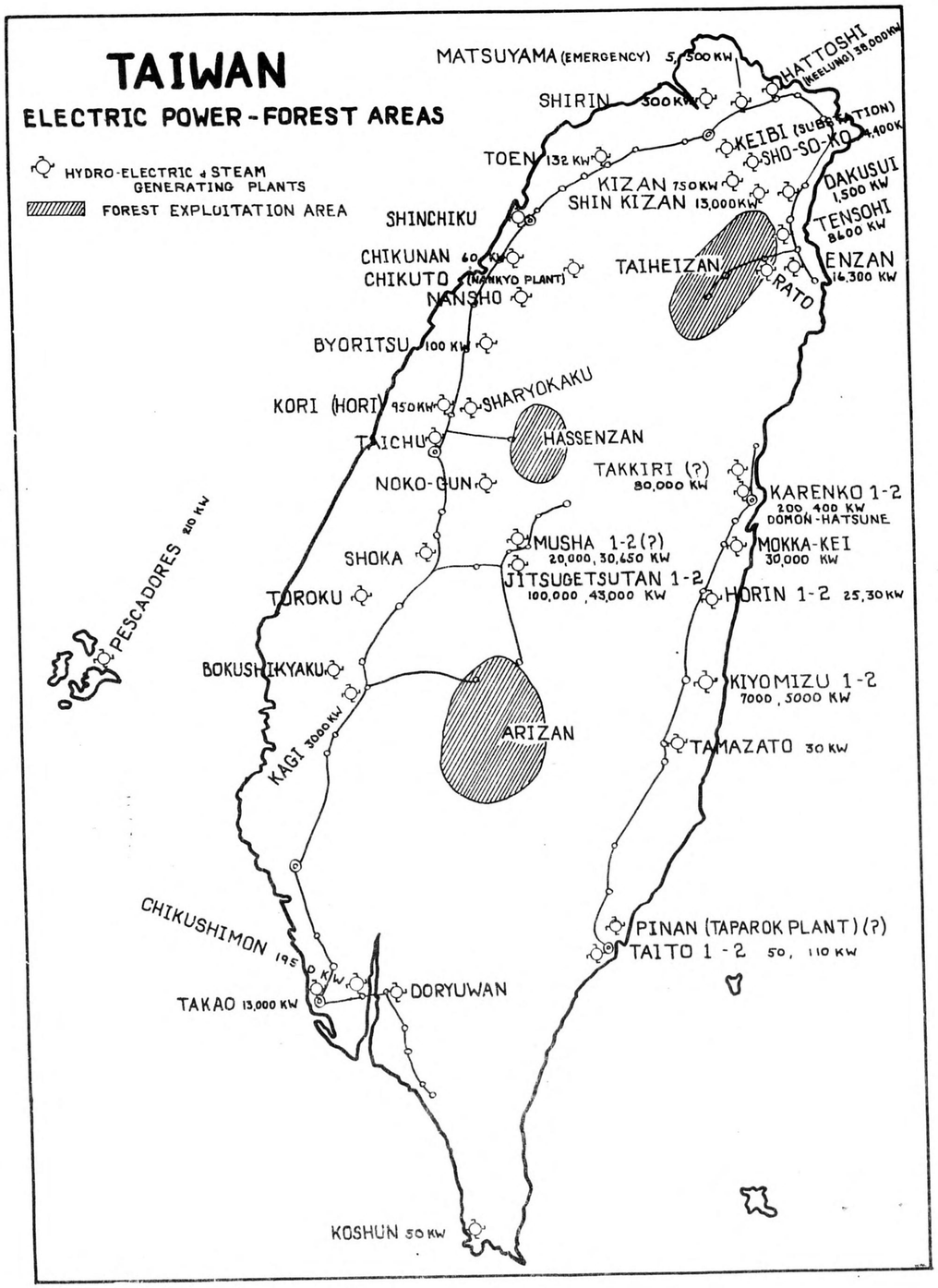

FIGURE 4

A. Taiwan Electric Power Company (Taiwan Denryoku Kabushiki Kaisha).

(1) *Chikushimon Hydroelectric Plant*

Chikushimon, Ninbu-sho, Hozan-gun, Takao-shu; approximately 22° 45′ N., 120° 30′ W.

Capacity commonly in use, 1,950 kw., as of June, 1939.

Source of power believed to be Shimotamsui-kei (Shimo Tansui-kei).

In operation as early as December, 1934, and as recently as June, 1940.

Sources: *Kabushiki Kaisha Nenkan*, 1941, p. 204; *Kokumin Dai Hyakka Jiten*, 1936, Vol. 10.

(2) *Dakusui Hydroelectric Plant*

Rato-gun, Taihoku-shu, exact location unknown.

Capacity commonly in use, 1,500 kw., as of June, 1939.

Source of power, Dakusui-kei.

In operation as early as December, 1934, and as recently as June, 1940.

Sources: *Kabushiki Kaisha Nenkan*, 1941, p. 204; *Kokumin Dai Hyakka Jiten*, 1936, Vol. 10.

(3) *Dorowan Hydroelectric Plant*

Dorowan, Rokki-sho, Kizan-gun, Takao-shu; approximately 23° 02′ N., 120° 35′ E.

Capacity commonly in use, 3,100 kw., as of June, 1939.

Source of power believed to be Shimotamsui-kei (Shimo Tansui-kei).

In operation as early as December, 1934, and as recently as June, 1940.

Sources: *Kabushiki Kaisha Nenkan*, 1941, p. 204; *Kokumin Dai Hyakka Jiten*, 1936, Vol. 10.

(4) *Enzan Hydroelectric Plant* (sometimes referred to as "Maruyama Plant")

Believed to be in Enzan-sho, Giran-gun, Taihoku-shu; approximately 24° 48′ N., 121° 45′ E.

Capacity commonly in use, 16,300 kw. (presumably in operation).

Source of power, Dakusui-kei.

Construction was begun in 1939 and completion was scheduled for October, 1941.

Sources: *Toyo Keizai Shimpo*, September 27, 1941, p. 39; *Taiwan Keizai Nempo*, 1941, p. 257.

(5) *Hokuzanko Hydroelectric Plant*

Hokuzanko, Kokusei-sho, Notaka-gun, (Noko-gun), Taichu-shu; approximately 23° 59′ N., 120° 52′ E.

Capacity commonly in use, 1,800 kw., as of June, 1939.

Source of power believed to be Nanko-kei.

In operation as early as December, 1934, and as recently as June, 1940.

Sources: *Kabushiki Kaisha Nenkan*, 1941, p. 204; *Kokumin Dai Hyakka Jiten*, 1936, Vol. 10.

(6) *Jitsugetsutan No. 1 Hydroelectric Plant*

On the Suiri-kei at Mompaitan, Shushu-sho, Niitaka-gun, Taichu-shu; approximately 23° 51′ N., 120° 52′ E.

Dams: Bukai Dam, about 15 km. northeast of Jitsugetsutan Lake; Suisha and Tosha Dams at the lake.

Capacity commonly in use, 100,000 kw.

Plant can provide about 515,000,000 kwh per annum operating with a 58.8 percent load factor.

Source of power, Dakusui-kei.

Construction was begun in October, 1931, and partly completed in 1934; plant was in full operation in June, 1940.

Regular capacity (minimum dependable generating capacity, available on all but the driest ten days of the year) 71,500 kw.

Aqueduct-type layout with Lake Jitsugetsutan as storage reservoir.

Effective head 1035.2 feet; flow 41.53 cubic meters per second.

Bukai Dam 293.64 feet long at top, 156.59 feet high, of concrete construction, gravity-type with 6 tainter gates. Suisha and Tosha dams of earthen construction.

Effective capacity of reservoir 14,200,000 cubic meters.

Tunnel and open ditch 50,000 feet long from intake to Jitsugetsutan Lake, and 9,800-foot tunnel from lake to plant.

Penstocks—5 @ 2,000 feet long.

Turbines—5 @ 33,000 horsepower, Pelton-type, horizontal-shaft, Voith make.

Generators—5 @ 22,222 kilovolt-amperes, 3-phase, 11,000 volts, 300 revolutions per minute, 60 cycles, GE make.

Transformers—15 @ 7,400 kilovolt-amperes, single phase, 11/89 kilovolts, D-Y connection, water-cooled, core-type, GE make.

Arc suppressors for transmission lines— 1 @ 16,465 kilovolt-amperes, and 1 @ 14,062 kilovolt-amperes.

Exciters—5 @ 125 kw.

Sources: *Ohm*, December, 1932, p. 650; July, 1933, p. 360; December, 1933, p. 724; January, 1934, front cover and p. 5; August, 1934, pp. 526, 596; September, 1934, p. 685; October, 1934, p. 761; November, 1934, p. 882; March, 1935, p. 299; December, 1935, p. 1146; January, 1938, p. 97; June, 1941, p. 449; *Denki Gakkai Zasshi*, December, 1935, pp. 1062, 1068; *Shibaura Review*, December, 1933, p. 606; March, 1937, pp. (1) and 99 ff.; *Kabushiki Kaisha Nenkan*, 1941, p. 204; *Ohm-Sha Guide*, 1933, p. 1; *Kokumin Dai Hyakka Jiten*, 1936, Vol. 10; *World Power Conference*, 1936, Section V, Paper 13.

(7) *Jitsugetsutan No. 2 Hydroelectric Power Plant*

At the tail race of the Jitsugetsutan No. 1 Plant, at Suiriko in Shushu-sho, Niitaka-gun, Taichu-shu; approximately 23° 49′ N., 120° 51′ E.
Dam at Mompaitan, Shushu-sho, Niitaka-gun, Taichu-shu.
Capacity commonly in use, 43,500 kw., as of December, 1937.
Plant can produce about 470,000,000 kwh. per annum operating with a 90 percent load factor.
Source of power: Dakusui-kei and the discharge from the Jitsugetsutan No. 1 Hydroelectric Plant.
Construction was begun December, 1935, and completed in August, 1937.
Regular capacity (minimum dependable generating capacity, available on all but the driest ten days of the year), 24,640 kw.
Regular peak capacity, 43,500 kw.
Aqueduct-type layout with Lake Jitsugetsutan as storage reservoir.
Effective head 399.32 feet; flow 41.6 cubic meters per second.
Fixed part of dam 8.08 feet high, 66.22 feet wide; movable part, 4.13 feet high with 9 gates. Dam of concrete construction.
Intake 9.69 feet wide and 5.49 feet high.
Aqueducts—intake to forebay, 13,973 feet tunnel, 193.8 feet aqueduct bridge, and 106.6 feet intake; forebay to plant, 45.2 feet intake and 1585.9 feet tunnel.
Forebay 110 cubic meters capacity.
Surge tank 29.1 feet inner diameter, 75.9 feet meters high, cylindrical.
Penstocks—2 @ 933.5 feet long.
Plant is of reinforced concrete, 2 and 3 stories high.
Turbines—2 @ 30,000 horsepower, Francis-type, vertical-shaft, Voith make.
Generators—2 @ 23,300 kilovolt-amperes, 3-phase, 11,000 volts, 360 revolutions per minute, 60 cycles, AEG make.
Transformers—2 @ 23,300 kilovolt-amperes, 3-phase, 11/154/3.3 kilovolts, D-Y connection, self-cooled, core-type, Shibaura make.
Exciters—2 @ 110 kw., AEG make.
Tail race, 491.0 feet long.
Sources: *Ohm*, December, 1932, p. 650; October, 1934, p. 761; March, 1935, p. 299; December, 1935, p. 1138; December, 1937, front cover and pp. 1375, 1446; January, 1938, p. 97; May, 1940, p. 402; *Kabushiki Kaisha Nenkan*, 1941, p. 204; *World Power Conference*, 1936, Section V, Paper 13.

(8) *Jitsugetsutan No. 3 Hydroelectric Power Plant*

At the tail race of the Jitsugetsutan No. 2 Plant, Shushu-sho, Niitaka-gun, Taichu-shu; approximately 23° 50′ N., 120° 47′ E.
Planned capacity commonly in use, 23,100 kw.
Source of power, Dakusui-kei and the discharge from the Jitsugetsutan No. 2 Plant.
Planned in December, 1935, but no evidence available that construction was begun.
Sources: *Ohm*, December, 1935, p. 1146; *World Power Conference*, 1936, Section V, Paper 13.

(9) *Kagi Steam Plant*

Kagi-shi, Tainan-shu.
Installed capacity 3,000 kw. as of 1935.
In operation as early as December, 1934, and as recently as June, 1939.
Sources: *Kokumin Dai Hyakka Jiten*, 1936, Vol. 10.

(10) *Keelung Steam Plant*

Hattoshi, Keelung-shi, Taihoku-shu; approximately 25° 09′ N., 121° 47′ E.
Installed capacity, 38,000 kw., as of June, 1939.
Construction was begun in February, 1937, and completed in March, 1939.
Plant of reinforced concrete, 5 stories high (about 100 feet) with 2 or 3 tall chimneys. Area 2,660 square yards.
Uses coal from Zuiho coal mine which is delivered via a 10,336 feet cable line @ 70 metric tons per hour capacity; 8,000 metric tons coal storage capacity.
Boilers—2 of B & W type.
Turbines—believed to be 2 @ 17,500 kw., AEG make, and 1 @ 3,000 kw., AEG make (house unit).
Generators—believed to be 2 @ 17,500 kw., 3-phase, and 1 @ 3,000 kw., 3-phase (house unit).
Sources: *Ohm*, November, 1938, p. 1166; *Kabushiki Kaisha Nenkan*, 1941, p. 204; *Taiwan Keizai Nempo*, 1941, p. 256.

(11) *Matsuyama Steam Plant*

Matsuyama-sho, Shichisei-gun, Taihoku-shu; approximately 25° 03′ N., 121° 33′ E.
Installed capacity, 5,500 kw., as of June, 1939.
In operation as early as May, 1939, and as recently as June, 1940.
Sources: *Kabushiki Kaisha Nenkan*, 1941, p. 204; *Kokumin Dai Hyakka Jiten*, 1936, Vol. 10.

(12) *Musha No. 1 Hydroelectric Plant*

Musha, Notaka-gun (Noko-gun), Taichu-shu; approximately 23° 57′ N., 121° 05′ E.
Planned capacity commonly in use, 21,400 kw.
Sources of power, Dakusui-kei and Bukai-kei.
Construction was planned in 1935 for completion in 1943, but no information has been received of actual construction.
Regular capacity (minimum dependable generating capacity, available on all but the driest ten days of the year), 10,900 kw.
Aqueduct-type layout.

Effective head, 252.6 feet; flow, 33.5 cubic meters per second.
Upper Bukai-kei and Dakusui-kei to be impounded to form reservoir with 3,200,000,000 cubic feet capacity.
Aqueduct 2,261 feet from reservoir to plant.
Sources: *World Power Conference*, Section V, Paper 13; *Toyo Keizai Shimpo*, September 27, 1941, p. 39.

(13) *Musha No. 2 Hydroelectric Plant*

At the tail race of the Musha No. 1 Plant at Musha, Notaka-gun (Noko-gun), Taichu-shu; approximately 23° 55′ N., 121° 03′ E.
Planned capacity commonly in use, 27,100 kw.; another source places it at 30,650 kw.
Sources of power: Dakusui-kei, Bukai-kei, and the discharge from the Musha No. 1 Plant.
Under construction in September, 1938, and completion scheduled for end of 1943; no information has been received of actual completion.
Regular capacity (minimum dependable generating capacity, available on all but the driest ten days of the year), 13,800 kw.
Aqueduct-type layout.
Effective head, 319.8 feet; flow, 33.5 cubic meters per second.
Upper Bukai-kei and Dakusui-kei impounded to form reservoir with 3,200,000,000 cubic feet capacity.
Aqueduct 21,641 feet long.
Sources: *World Power Conference*, Section V, Paper 13; *Toyo Keizai Shimpo*, September 27, 1941, p. 39.

(14) *Shin Kizan Hydroelectric Plant*

Kizan, Shinten-sho, Bunzan-gun, Taihoku-shu; approximately 24° 55′ N., 121° 30′ E.
Capacity commonly in use, 13,000 kw., as of January, 1941.
Source of power believed to be branch of Shinten-kei.
Construction was begun in 1939 and completed in March, 1941.
Effective head, 174.4 feet.
Turbines—2 @ 7,500 kw., Francis-type, vertical-shaft, Hitachi make.
Generators—2 @ 7,500 kilovolt-amperes, 3-phase, 300 revolutions per minute, 60 cycles, Hitachi make.
Sources: *Hitachi Hyoron*, January, 1939, pp. 7, 10; January, 1940, pp. 4, 6, 7; January, 1941, p. 5; *Toyo Keizai Shimpo*, September 27, 1941, p. 39; *Taiwan Keizai Nempo*, 1941, p. 257.

(15) *Shosoko Hydroelectric Plant*

Shinten-sho, Bunzan-gun, Taihoku-shu; approximately 24° 58′ N., 121° 27′ E.
Capacity commonly in use, 4,400 kw., as of June, 1939.
Source of power, Shinten-kei.
Completed in 1930.
Turbines—1 @ unknown capacity, vertical-shaft, Dengyosha make; at least one additional unit in operation.
Generators—1 @ 1,250 kilovolt-amperes, 3-phase, 11,000 volts, 450 revolutions per minute, 60 cycles, Shibaura make; at least 1 additional unit in operation.
Sources: *Shibaura Review*, January, 1931, p. 3; *Kabushiki Kaisha Nenkan*, 1941, p. 204; *Kokumin Dai Hyakka Jiten*, 1936, vol. 10.

(16) *Takao Steam Plant of Asano Cement Co.*

Den-cho, 3-chome, Takao-shi, Takao-shu; approximately 120° 16′ 30″ N., 22° 38′ E.
Installed capacity, 4,500 kw., as of 1939.
Plant in operation as early as 1939 and as recently as March, 1940.
Uses waste gas from cement kilns for fuel.
Boilers—unknown number of Edgemoor water tube type.
Turbines— 1 @ 1,000 kw., Parsons type, additional units in operation.
Generators—1 @ 1,000 kw., 3-phase; additional units in operation.
Sources: *Directory of Japanese Portland Cement Manufacturers*, 1929.

(17) *Takao No. 2 Steam Plant*

Sankaisaku, Takao-shi, Takao-shu.
Installed capacity, 13,000 kw., as of September, 1934.
Plant completed in May, 1923, with No. 1 unit of 1,000 kw.; No. 2 unit of 2,000 kw. added in December, 1927; No. 3 unit of 10,000 kw. added in January, 1931.
Plant 3 stories high with 1 chimney and 2 smokestacks.
Boilers—Units Nos. 1 and 2—2 @ B & W type, 14 kilograms per square centimeter, 332 square meters, B & W make.
Unit No. 3—2 @ B & W type, 24.6 kilograms per square centimeter, 592.25 square meters, B & W make.
Turbines—Unit No. 1—1 @ 1,000 kw., impulse-type, horizontal-shaft, GE make.
Unit No. 2—1 @ 2,000 kw., Zoelly type, horizontal-shaft, EW make.
Unit No. 3—1 @ 10,000 kw., Curtis type, horizontal-shaft, AEG make.
Generators—Unit No. 1—1 @ 1,250 kilovolt-amperes, 3-phase, 2,300 volts, 3,600 revolutions per minute, 60 cycles, GE make.
Unit No. 2—1 @ 2,500 kilovolt-amperes, 3-phase, 3,300 volts, 3,600 revolutions per minute, 60 cycles, SS make.
Unit No. 3—1 @ 12,500 kilovolt-amperes, 3-phase, 11,500 and 10,500 volts, 3,600 revolutions per minute, 60 cycles, AEG make.
Transformers—4 @ 1,800 kilovolt-amperes, 3-phase, 3.3, 2.2/ 19.94, 19.07, 18.2, 17.32 kilovolts, D-Y connection, self cooled, shell-type, Mitsubishi make.

Other equipment—1 asynchronous phase advancer @ 5,000 kilovolt-amperes, 3,300 volts, 900 revolutions per minute, 60 cycles, Shibaura make; 2 surface condensers; 4 superheaters, including 2 @ 157.92 square meters and 2 @ 51.1 square meters; compartment chain-grate stokers; 4 economizers; 3 exciters, including 1 @ 70 kw., 1 @ 18.5 kw., and 1 @ 13.5 kw.

Sources: *Ohm*, May, 1931, p. 223; September, 1934, p. 648; *Shibaura Review*, May, 1931, front page; *Kabushiki Kaisha Nenkan*, 1941, p. 204; *Kokumin Dai Hyakka Jiten*, 1936, Vol. 10; *Ohm-sha Guide*, 1933, p. 47.

(18) *Tenrei Hydroelectric Plant*

Planned installed capacity, 98,000 kw.

This plant was planned in 1939, and completion was expected in 1945; but no information is available concerning progress in its construction.

Source of power, Taiko-kei.

Sources: *Toyo Keizai Shimpo*, September 27, 1941, p. 39.

(19) *Tensobi Hydroelectric Plant*

Believed to be in Giran-gun, Taihoku-shu; approximately 24° 45′ N., 121° 45′ E.

Capacity commonly in use 8,600 kw., as of June, 1939.

Source of power believed to be Dakusui-kei.

In operation as early as December, 1934, and as recently as June, 1940.

Sources: *Kabushiki Kaisha Nenkan*, 1941, p. 204; *Kokumin Dai Hyakka Jiten*, 1936, Vol. 10.

(20) *Toyohara Hydroelectric Plant*

Toyohara-gai, Toyohara-gun, Taichu-shu; approximately 24° 15′ N., 120° 40′ E.

Planned installed capacity, 70,700 kw.

Source of power, Taiko-kei.

Plant was planned in 1939 for completion in 1945, but no information as to progress in its construction is available.

Sources: *Toyo Keizai Shimpo*, September 27, 1941, p. 39.

B. East Coast Power Plants.

(Planned to be under control of the East Taiwan Electric Power Co., but the Mokka River Plants serving the Karenko factory of the Nippon Aluminum Co. may be under direct control of that company).

(21) *Domon Hydroelectric Plant*

Domon, Karen-shicho, Karenko-cho; approximately 23° 58′ N., 121° 29′ E.

Capacity commonly in use, 23,200 kw.

Source of power, Mokka-kei.

Plant was under construction in December, 1938, at which time completion was scheduled for 1940.

Effective head 555.6 feet.

Turbines—3 @ 9,300 kw., Francis type, vertical-shaft, Hitachi make.

Generators—3 @ 10,000 kilovolt-amperes, 3-phase, 600 revolutions per minute, 60 cycles, Hitachi make.

Sources: *Ohm*, December, 1937, p. 1458; December, 1938, p. 1231; *Hitachi Hyoron*, January, 1940, pp. 4, 7.

(22) *Hatsune Hydroelectric Plant*

Hatsune, Karen-shico, Karenko-cho, approximately 23° 57′ N., 121° 31′ E.

Capacity commonly in use, 1,600 kw. as of December, 1938. Another source estimated capacity at 1,770 kw.

Source of power, Mokka-kei.

Construction was begun in October, 1938. Reported in operation in 1940.

Turbines—1 @ est. 2,000 kw., Kaplan type, Mitsubishi make.

Generators—1 @ 2,500 kilovolt-amperes, 3-phase, Mitsubishi make.

Sources: *Ohm*, December, 1937, p. 1458; August, 1938, front cover; December, 1938, p. 1231.

(23) *Kiyomizu No. 1 and Kiyomizu No. 2 Hydroelectric Plants*

Karen-shicho, Karenko-cho; approximately 23° 58′ N., 121° 33′ E.

Capacity commonly in use, No. 1 Plant, 7,000 kw.; No. 2 Plant, 5,000 kw.

Sources of power, Mokka-kei and Kiyomizu-kei.

No. 1 Plant was under construction in October, 1937; 2,000 kw. planned to go into operation at the end of 1938 and additional 5,000 kw. to be completed in 1939; plant probably in full operation now; No. 2 Plant was under construction at the end of 1938 and completion was scheduled for 1940; plant probably in operation.

Sources: *Ohm*, December, 1937, p. 1458; December, 1938, p. 1231.

(24) *Takkiri-kei Hydroelectric Plants*

Kenkai-shicho, Karenko-cho.

Planned installed capacity, 80,000 kw.

Source of power, Takkiri-kei.

As of early 1940, no construction work was in progress, and it is doubtful that these plants have been completed. Terrain is very difficult.

Sources: *Ohm*, May, 1940, p. 402.

Table 44. Power for Various Areas.

NOTE: The following table is set up, on the assumption that Jitsugetsutan and other large power plants are not in operation, to indicate available power under such conditions.

Area	*Power Plants*	*Source of Power*	*Capacity in Kilowatts*
Giran-Rato-Suo	Enzan, near Rato	Water	16,300
	Dakusui, near Tensobi, Giran	Water	1,500
		Water	6,600
Keelung	Hattoshi	Coal	38,000
Taihoku	Shin Kizan	Water	13,000
	Matsuyama	Coal	5,500
	Shosoko	Water	4,400
	Kizan	Water	750
	Shirin	Water	500
Toen	Toen	Coal	132
Shinchiku	Chikunan	Diesel	60
Byoritsu	Byoritsu	Diesel	100
Taichu	Kori	Water	950
	Hokusanko	Water	1,800
Kagi	Kagi	Coal	3,000
Tainan	no power plants known		
Pescadores	Hoko (Mako)	Diesel	210
Takao	Takao	Coal	13,000
	Dorowan	Water	3,100
	Chikushimon	Water	1,950
Taito	Taito No. 1	Diesel	50
	Taito No. 2	Diesel	110
Tamasato	Tamasato	Gas engine	30
Karenko	Domon (Mokka River)	Water	23,200
	Kiyomizu No. 1	Water	7,000
	Kiyomizu No. 2	Water	5,000
	Hatsune	Water	1,600
	Karenko No. 1	Water	200
	Karenko No. 2	Water	400
	Horin No. 1	Water	25
	Horin No. 2	Diesel	30
Koshun	Koshun	Diesel	50

NOTE: Three hydroelectric plants believed to be in existence have not been located; they were reported to be at Nankyo, Sharyokaku, and Taparoku, with capacities of 200, 900, and 110 kilowatts respectively.

Table 45. Analysis of Coal Deposits in Taihoku Province.

	Gaimokusan	*Denryoko*	*Sekit*	*Shikyakutei*	*Sankashi*	*Sanshikyaku (dust coal)*	*Kansai (Shinchiku Province)*
Water content	2. 78	3. 42	3. 54	1. 78	3. 4	4. 16	4. 52
Colatility	64. 78	39. 50	42. 16	41. 07	36. 87	32. 16	37. 79
Carbon fixation	22. 20	54. 98	49. 52	57. 15	57. 57	47. 44	48. 44
Properties of coke	Sticky, hard	Slightly sticky, hard	Slightly sticky, hard	Slightly sticky, hard	Slightly sticky, hard	Slightly sticky, hard	Slightly expansive, sticky, hard
Ash Content	1. 24	2. 12	4. 78	3. 77	2. 16	16. 24	9. 25
Ash Color	Light Red	Brown	Light Brown	Light Brown	Grey	Light Brown	Blue-Black
Calories	6, 930	7, 425	7, 371	7, 480	7, 150	6, 564	6, 160
Specific gravity	----	1. 27	1. 28	----	----	1. 30	1. 36
Coal strata thickness (shaku)	3	3	3	3. 3	3	2	2
Formation of strata	Lower	Middle	Middle	Middle	Middle	Middle	Upper

Reproduced from Report No. 20198, American Consulate, Tahoku, Taiiwan, dated September 16, 1939.

Table 46. Supplementary Labor Statistics.

a. *Fishermen.*

Japanese		*Formosan-Chinese*		*Total*	
Full-time	*Part-time*	*Full-time*	*Part-time*	*Full-time*	*Part-time*
4,651	394	29,795	52,543	34,586	53,131*

* This total illustrates the difficulties in handling Japanese statistics. It is impossible to say which figures are in error. About 70 percent of all fishermen are in Taihoku and Takao Provinces and the Pescadores.

b. *Jinrikisha men.* Jinrikisha men numbered 5,000 at one time, but by 1935 their number had declined to 3,912, about two-thirds of them Formosan-Chinese, and nearly one-third Chinese; most of them are in Taihoku Province. Additionally, there were 4,168 sedan chair carriers, chiefly in Taichu and Tainan Provinces.

c. *Lighterage men.* Lighterage men numbered 781 in Takao, 532 in Taihoku, 254 in Taito, 198 in Taichu, 155 in Tainan, 99 in Karenko, 33 in the Pescadores, and 24 in Shinchiku, a total of 2,076, all but 10 of them being Formosan-Chinese.

d. *Coal miners.*

	Men	*Women*	*Total*
Japanese	163	2	165
Formosan-Chinese	14,748	1,588	16,336
Total	14,911	1,590	16,501

e. *Government Factory Workers.*

MONOPOLY BUREAU
(Opium workers omitted)

1935

	Formosan-Chinese	*Japanese*	*Total*
Tobacco factories	649	205	854
Camphor factories	85	104	189
Salt factories	91	8	99
Liquor factories	930	434	1,364
Totals	1,755	751	2,506

July, 1937

	Formosan-Chinese	*Japanese*	*Total*
Tobacco factories	679	194	873
Camphor factories	83	108	191
Salt factories	87	8	95
Liquor factories	941	448	1,389
Totals	1,790	758	2,548

f. *Technical Workers in the Government Railway Bureau.*

Taihoku Railway Shop	1,017
Takao Railway Shop	284
Karenko Repair Shop	101
Total	1,402

g. *Government Weights and Measures Offices.*
25 Japanese and 135 Formosan-Chinese

h. *Camphor Workers and Foremen.*

December 31, 1935

	Formosans	*Japanese*	*Total*
Camphor workers	8,086	13	8,099
Camphor foremen	246	11	257
Totals	8,332	24	8,356

July 31, 1937

	Formosans	*Japanese*	*Total*
Camphor workers	8,195	13	8,208
Camphor foremen	243	11	254
Totals	8,438	24	8,462

i. *Miscellaneous.* There were also (1933) 229 Japanese and 361 Formosan oil well workers, 38,433 Government officials and employees, and 2,181 physicians and dentists.

j. *Farm Labor by Age Grouping.**

	11-15 yrs.	*16-19*	*20-49*	*50-59*	*Total*
Men	78,000	126,000	290,000	11,000	505,000
Women	56,000	78,000	243,000	17,000	394,000
Totals	134,000	204,000	533,000	28,000	899,000

* Estimated on the basis of population ratios of 1930. Includes part-time farm laborers, but excludes farm owners and their families.

Table 47. Daily Wages in Taiwan Cities.

July 1, 1938
(In yen)

Occupation	*Taihoku*	*Shinchiku*	*Taichu*	*Tainan*	*Takao*
Railway stevedore	1.00	1.10	1.20	---	0.98
Truck stevedore	1.00	1.10	---	1.00	0.95
Carpenter	2.30	1.60	2.50	1.50	2.00
Type-setter	1.80	0.80	1.00	1.10	1.60
Miner	1.30	---	---	---	---
Tea worker (refining)	0.80	1.10	---	---	---
Tea sorting (females)	0.27	0.50	---	---	---
Rice field workers	1.40	1.35	0.70	0.60	1.00
Rice huskers	1.00	1.10	0.80	0.70	0.90

It will be noted by comparison with Table 70 that there was only a relatively small change in wage rates from 1936 to 1938. While there has no doubt been an increase in wages since then, due to the shortage of labor and wartime price increases, it may be noted that the index of wholesale prices in Taihoku, based upon June, 1937, as 100, was 150 in June, 1942, and 146.9 in October, 1942. This suggests that wartime increases in prices and presumably wages were not excessively great to that time. See also Table 70, "Wages, 1936."

Table 48. Wholesale Commodity Prices in Taihoku.
(December 31, 1938, and December 31, 1939)

Commodity	*Unit*	*Price in Yen* *December 31, 1938*	*December 31, 1939*
Rice (husked):			
Southern 2nd crop ex Takao	100 kin*	11. 15	10. 80
**North Horai ex Keelung	100 kin	12. 10	11. 95
**North glutinous round ex Keelung	100 kin	13. 61	12. 74
South glutinous long ex Takao	100 kin	12. 75	11. 53
Rice (unhusked):			
South (ex stations in north)	1, 000 kin	79. 00	78. 25
Horai (ex stations in north)	1, 000 kin	83. 00	87. 90
Glutinous round (ex stations in north)	1, 000 kin	98. 00	93. 90
Sliced dried sweet potatoes (ex each station in producing district)	100 kin	3. 50	3. 42
Rice flour	100 kin	19. 00	23. 00
Sugar:			
Plantation white	100 kin	24. 60	24. 60
Centrifugal	100 kin	21. 00	21. 00
Native brown	100 kin	15. 00	14. 80
Bananas (auction price in Kobe)	basket (45 kg.)	6. 40	9. 35
Dried bonito	10 kwan***	70. 00	120. 00
Canned pineapples:			
Spiral sliced (delivered warehouse in Japan)	3 dozen	12. 10	15. 50
2nd grade (delivered warehouse in Japan)	3 dozen	12. 00	no fig. published
Miso (bean paste)	10 kwan	5. 50	6. 50
Dried bamboo shoots	100 kin	27. 00	39. 00
Peanuts (round)	100 kin	14. 50	26. 30
Peanut oil	100 kin	27. 00	50. 00
Pork	100 kin	38. 00	49. 17
Beef (yellow cattle)	100 kg.	53. 00	60. 00
Chicken	100 kin	70. 00	93. 00
Chicken eggs	1, 000	57. 00	60. 00
Duck	100 kin	-----	56. 00
Duck eggs	1, 000	38. 00	46. 00
Bricks (1st grade)	10, 000	280. 00	260. 00
Cement, Asano	bale (50 kg.)	1. 22	1. 22
Lumber ("benihi", a kind of cypress)	cubic meter	67. 80	67. 80
Coal (f. o. b. Keelung) (official prices):			
Screened (1st grade)	Ton	20. 00	17. 00
Unscreened (1st grade)	Ton	18. 00	15. 00
Dust (1st grade)	Ton	16. 00	14. 00
Charcoal	100 kin	3. 50	4. 40
Firewood	100 kin	1. 60	2. 30
Tea (crude)			
Oolong high grade	100 kin	65. 00	80. 00
Oolong medium grade	100 kin	47. 00	70. 00
Oolong low grade	100 kin	36. 00	60. 00
Pouchong high grade	100 kin	52. 00	60. 00
Pouchong medium grade	100 kin	36. 00	50. 00
Pouchong low grade	100 kin	30. 00	-----

* 100 kin equal 132.277 pounds.
** 1939 figures ex Taihoku Freight Station.
*** 10 kwan equal 82.67 pounds.

Table 49. Capital Invested in Industry.

(By size of firm, by industry, and average by industry)
A. *Firms Classified by Size.*
1938

Size of Firm	*Number of Companies*	*Percent of Total*	*Total Paid-up Capital (in 1,000 yen)*	*Percent of Total*
Less than 10,000 yen	50	14.9	253	0.1
10,000 yen to 49,000 yen	111	33.1	1,922	1.0
50,000 yen to 99,000 yen	34	10.2	1,276	0.7
100,000 yen to 109,000 yen	48	14.3	3,020	1.6
200,000 yen to 499,000 yen	40	11.9	4,878	2.5
500,000 yen to 999,000 yen	20	6.0	4,694	2.5
1,000,000 yen to 4,999,000 yen	25	7.5	24,077	12.6
5,000,000 yen to 9,999,000 yen	2	0.6	5,700	3.0
Over 10,000,000 yen	5	1.5	145,316	76.0
Totals	335	100.0	191,136	100.0

It should be noted in the above table that the small firms of less than 100,000 yen capital each, constituting over 55 percent of the total number of firms, had less than 2 percent of the total paid-up capital. On the other hand, 5 large firms, only 1½ percent of the total number of firms, had 76 percent of all paid-up capital.

B. *Capital Invested in Industry, by type.*

1937

(In millions of yen)

Branch of Industry	*Corporations*	*Limited Partnerships*	*Unlimited Partnerships*	*Total*
Textiles	2.7	0.1	0.1	2.9
Machinery	3.9	0.9	0.1	4.9
Ceramics	3.3	0.2	0.1	3.6
Chemicals	9.6	0.3	0.2	10.1
Lumber	1.5	1.1	0.1	2.7
Foodstuffs	113.1	4.6	0.4	118.1
Printing	0.5	0.1	—	0.6
Gas and Electricity	47.0	--	--	47.0
Others	1.0	0.3	0.3	1.6
Totals	182.6	7.6	1.3	191.5

C. *Average of Paid-up Capital Per Enterprise.*

1937

(In 1,000 yen)

Branch of Industry	*Corporations*	*Limited Partnerships*	*Unlimited Partnerships*
Textiles	671	60	120
Machinery	353	38	45
Ceramics	276	21	33
Chemicals	387	37	115
Lumber	163	93	23
Foodstuffs	1,509	78	44
Printing	101	12	--
Gas and Electricity	7,836	10	--
Others	76	13	68
Average, all industry	1,127	51	54

Table 50. Private Railway and Pushcar Statistics.

A. *Private Railways (1937):*

Public freight carried	842,155 metric tons
Public freight receipts	1,861,702 yen
All passengers carried	4,196,773
Passenger receipts	544,352 yen

B. *Pushcar lines (1937):*

Length of lines	645 miles
Number of pushcars	3,906
Passengers carried	3,302,125
Passenger receipts	327,381 yen
Freight carrier	457,149 metric tons
Freight receipts	958,246 yen

Table 51. Highway Budget for Fiscal Year Ending March 31, 1937.

Government-General	*Yen*
Ordinary Expenditures:	
Maintenance of Suo-Karenko highway	44,408
Extraordinary Expenditures:	
Repairs to Suo-Karenko highway necessitated by typhoons and floods	25,000
Reconstruction of main highway	1,037,318
Construction of highway between Fuko and Daibu	363,630
Paving of Keelung-Taihoku road	348,417
Construction work on Shinten-Shokei road	310,260
Subsidies to provincial governments for improvement of designated highways	513,716
Total for Government-General	2,642,749
Provincial Governments	*Yen*
Ordinary Expenditures	542,455
Extraordinary Expenditures	1,720,181
Total (not incl. subsidy from Gov't.-Gen.)	2,262,616

NOTE: As with many Japanese statistics, complete accuracy, especially with respect to expenditures of the provincial governments, is not possible, but it is believed the above represents the approximate expenditures.

Table 52. Government Standards for Reconstruction of Highways.

(Standards as of January 24, 1936)

Width of Road: 9 meters, reduced to 4 meters in special places in mountains.

Grade: 1 in 25 maximum; 1 in 15 in special places; 1 in 10 in the mountains (not to exceed 72 meters).

Curves: Radius over 55 meters normal minimum; 11 meters in special places.

Depth of ditches: 30 centimeters; edge of road to be at least 30 centimeters above high water level in ditch.

Surface: At least 5 meters broad gravel center with medium thickness of 9 centimeters.

Bridges: effective width 5 meters; strength 8 tons minimum.

Tunnels: at least 6 meters effective width and at least 4 meters high.

Table 53. Chief Roads and Trails.

ROADS

From	*To*	*Via*	*Remarks*
		North Taiwan	
Tamsui	Keelung	Sekimon and Kimpori	Wide earth road, covered with sand and pebbles, Kimpori to Keelung; concrete on steep slopes. Sekimon section recently constructed industrial road.
*Taihoku	Kantau, near Tamsui		Macadam; narrow bridges.
Kimpori	Hokuto	Shinhokuto	Shinhokuto is a hot springs resort.
*Taihoku	Keelung		Concrete; nearly finished in 1939.
Taihoku	Urai	Shinten	Earth or sand and pebbles.
Shinten	Sanshorei	Shinko and Sekitei	Via the Sekitei Colliery; this road not indicated on 1938 maps, but is probably constructed.
Shinko	Toi	Heirin	Mercury was mined at Heirin.
Keelung	Zuiho		Sand and pebbles.
Zuiho	Suo	Koryo	Around the coast of the island; main route to Suo prior to construction of Shinten-Shokei road.
Rato	Sansei		Perhaps continued as far as Dakusui.
*Shinten	Shokei		Under construction in 1939; to be completed in 1942; motor road, of gravel.
Tamsui River	Yobai	Chikui, Daien, Kanon	Tamsui River to Chikui and Kanon to Yobai sections were formerly poor; road is little used.
Tamsui River	Okaseki	Shinsho and Itahashi	Little used.
Toen	Okaseki		Earth; sand and pebbles near Okaseki.
Chikui	Toen		These three roads connect small towns on the northwest coast to the main road.
Daien	Toen		
Kanon	Chureki		
Taihoku	Shinchiku	Toen, Chureki, Yobai	Northern section of the main motor road to Takao.
Toen	Chikunan	Taikei, Ryutan, Kwansai, Shinpo, Chikuto, and Nansho.	Shinpo to Chikuto not indicated on older maps; near Nansho formerly trail only.
(Also branches Chikuto to Hoppo, Chikuto to Shinchiku, Chikuto to Johei and Shinpo to main road just north of Shinchiku).			
		East Coast	
*Suo	Karenko		Distance of 36 miles is cut from face of cliff.
Karenko	Bakon	Along the coast	Formerly trail only, Karenko to nearly Koshiritsu.
*Bakon	Taito	Along the coast	Formerly poor road near Bakon.
*Bakon	Mataan		Formerly poor road.
*Karenko	Mataan	Paralleling the railroad	Partly paved and partly earth; two concrete tracks, 4 feet apart and each 3 feet wide, for motor traffic.
Mataan	Tamazato		Same as Karenko to Mataan.
Tamazato	Taito		Taisho to Taito via Hashiko is sand, stone, and earth.
*Taito	Daibu (Rokakei)		Condition poor from Chihon south.
Taito	Chihon		Earth.

Table 53. Chief Roads and Trails—Continued.

From	To	Via	Remarks
		Western Plain	
		(Shinchiku to Takao and Heito)	
•Shinchiku	Takao		Generally paralleling the railroad; main highway, motor traffic possible all the way.
•Takao	Heito		Continuation of above; bridge over Shimotamsui is very long.
Chikunan	Nanoden	Paralleling the inland railroad.	
Chusho	Dora		
Byoritsu	Musha	Taiko, Takuran, Kokusei, Hori	Section from Taiko to Kokusei, formerly trail only.
Chohun	Nansho		Coal mine at Nansho.
•Sharoku	Toyohara		Was to be paved with asphalt, end of 1940.
Taichu	Sharoku		Earth.
Taichu	Kiyomizu		Earth.
Toyohara	Tosei		
Kokusei	Soton		
Taichu	Nisui	Soton, Nanto, Nama	
Nanto	Hori	Shushu	
Shoka	Rokko		Paving begun May 1, 1938.
Rokko	Toroku	Keiko, Inrin, Tanaka, Nisui	Presumably still necessary to ford the Dakusui River south of Nisui.
Soasua	Hokuto	Nirin	
Shido	Tairin	Toroku and Koume	
Kagi	Takezaki		Takezaki and Koume are connected by trail.
Tonan	Hokko	Kobi	
Hokko	Shinko		
Shinko	Ronpai	Kaiko and Bakuryo	Indicated as poor road on older maps.
Ronpai	Hokumon	Hokko and Ensui	
Ensui	Hotei		
Kagi	Toseki	Bokushi	Kagi to Bokushi, recent construction, macadam.
Hokumon	Main road, north of Tainan	Kari	
Kari	Kwanden		
Tamai	Kwanbyo and to Shinshi	Shinka	Shinshi to Kwanbyo built some time ago; rest recent, if at all.
Kosen	Nanshi	Kizan	
Kizan	Kibi		Involves bridge over Nanshisenkei, which may not be built.
Kibi	Mino		
Heito	Rokki	Kibi	Long ford south of Rokki.
Riko	Road to Rokki		May not connect unless bridge built over Ronokei.
Riko	Road to Nanshi		Ferry crosses the Shimotamsui.
Riko	Heito		

Table 53. Chief Roads and Trails—Continued.

From	To	Via	Remarks
		Southwest Taiwan	
Heito	Kato	Naiho, Choshu, Shinpi	
Heito	Toko		
Choshu	Toko		
Hozan	Choshu	Bantan (Mandan)	Sand, gravel, and earth. Involves fording Shimotamsui.
Hozan	Rinhen		Sand, gravel, and earth.
Hozan	Rinhen	Dairinpo (Hobi)	
Takao	Kominato		Planned to continue this road to Toko, as a short connection between it and Takao; but crossing the Shimotamsui River delta is a major difficulty.
Toko	Fuko	Boruo	
		South Taiwan	
Fuko	Rokakei (Daibu)		New road completing the circuit of the island and reducing scheduled bus time, Choshu to Taito, to 5 hours.
Fuko	Garanbi	Koshun, Daibanretsu	All of these roads are either earth or sand and earth.
Koshun	Rokakei (Daibu)	Manshu	
Kontei	Manshu		
		TRAILS	
		North Taiwan	
Urai	Gaogan		Also a trail from Kwansai to Gaogan.
Johei	Dakusui	Gaogan	Also connection to Taiko.
		Central Mountain District	
Musha	Dakusui	Shikayo	
Tosei-Kokusei road	Shikayo		Also connection to Taiko.
Nansho	Taiko		
Korosha	Sendansha		Some maps indicate this connecting with another trail from Daidakusui to the Musha-Dakusui trail.
Trail up the Takkiri River			Connects with the Musha-Karenko trail.
Musha	Karenko		Survey completed in 1940 for 5-year construction to convert to road; Hori-Karenko trip would then require about 5 hours. It is unlikely, with pressure of more urgent needs, that this project has been completed.
Hori	Tamasato	Mizuho	
Keito	Tamasato		
Keito	Mt. Arisan, Taban, and Mt. Niitaka.		May connect through to Musha.
Kosen	Up the Nanshisen River		Also trails from Rokki to Ikegamai and Rokki to Hashiko.
		South Taiwan	
Shinpi	Taikei		
Bozan	Daibu		

Sources:—Consular reports, Japanese General Staff Maps of Taiwan, and other studies. First-class and second-class roads are included; asterisks indicate important roads.

Table 54. Bank of Taiwan.

A. *Condensed Balance Sheet as of December 31, 1941.*

(in 1,000 yen)

Assets	
Cash	
On hand	49,107
At banks	88,271
Bullion	967
Bills discounted, loans, etc.	445,405
Interest Bills, bills bought, and export advances	59,501
Acceptances and guarantees	3,642
Government bonds	224,094
Due from correspondents	3,650
Bank premises, real estate, etc.	6,988
Capital uncalled	3,750
	885,375*
Liabilities	
Capital subscribed	30,000
Reserve funds	15,100
Notes in circulation	252,845
Deposits, etc.	548,505
Bills payable	24,908
Bills rediscounted	72
Acceptances and guarantees	3,642
Due to correspondents	3,907
Dividends unclaimed	11
Profit and loss:	
Brought forward	2,801
Profit for current terms	3,586
	885,377*

* Note: There is evidently an error of 2,000 yen in this balance sheet, perhaps due simply to necessary rounding off of the figures.

B. *Branches in 1942.*

Japan:
Kobe: Osaka, Yokohama, Hakodate.

Taiwan:
Keelung, Taichu, Shoka, Kagi, Tainan, Takao, Giran, Tamsui, Toen, Shinchiku, Nanto, Heito, Taito, Karenko, Mako, Gosei.

Kwantung:
Dairen:

China:
Shanghai, Hankow, Foochow, Amoy, Swatow, Canton.

Hainan Island:
Hoihow, Yulin, Kachek, and one other place.

Philippine Islands:
Manila, Davao, Cebu, Baguio, Hacobal.

Java:
Surabaya, Semarang, Batavia.

Others: Borneo, Celebes, Hong Kong, and Singapore.

Table 55. Bank of Taiwan Interest Rates.

	December 1939 Maximum	December 1939 Minimum	December 1938 Maximum	December 1938 Minimum
Per Y100 a year—Fixed deposits	3.4%	3.4%	3.5%	3.5%
Per Y100 a day—Current account deposits	0.1%	0.1%	0.1%	0.1%
Special current account deposits	0.5%	0.5%	0.5%	0.5%
Loans against promissory notes, etc.	2.0%	1.1%	2.1%	1.2%
Discounts	2.0%	1.2%	2. %	1.2%
Overdrafts	2.0%	1.3%	2.1%	1.3%

Table 56. Bank Deposits and Loans.

A. *Total deposits and loans at all banks in Taiwan.*

	December 31, 1939	December 31, 1938
Deposits	321,193,000 yen	249,168,000 yen
Loans	362,420,000 yen	307,066,000 yen

B. *Bank Loans for Important Products.*

(In yen)

	Loans by all Taiwan banks on important products		Outstanding loans by all banks on important products	
	December 1939	December 1938	December 31, 1939	December 31, 1938
Sugar	34,934,000	31,359,000	50,920,000	42,558,000
Rice	45,542,000	37,941,000	40,861,000	32,121,000
Tea	1,446,000	1,154,000	3,244,000	1,929,000
Camphor	10,000	------	10,000	3,000
Alcohol	399,000	------	399,000	------
Gold	1,174,000	906,000	1,635,000	514,000
Coal	2,982,000	1,666,000	3,424,000	2,249,000
Total	86,487,000	73,026,000	100,493,000	79,374,000

Table 57. Deposits and loans at Cooperative Credit Associations.

(In yen)

	Urban		Rural	
	December 1939	December 1938	August 1939	August 1938
Loans and discounts	21,078,000	19,456,000	85,677,000	81,852,000
Deposits by these associations	17,498,000	10,826,000	50,467,000	20,777,000
Total	38,576,000	30,282,000	136,144,000	102,629,000
Paid in capital	3,591,000	3,398,000	13,792,000	12,850,000
Surplus	655,000	652,000	2,771,000	2,496,000
Reserves	3,540,000	3,172,000	12,214,000	11,507,000
Deposits of members or non-members	34,661,000	26,228,000	115,921,000	75,069,000
Borrowings	165,000	161,000	18,212,000	21,779,000
Total	42,612,000	33,611,000	162,910,000	123,701,000

Table 58. Financial Statistics for Taiwan 1937-1943.

(in 1,000 yen, except for last column)

Year and Month	Bank of Taiwan Notes Issued Average	Bank of Taiwan Notes Issued End of Period	Subsidiary Money in Circulation	All Banks Bank Deposits	All Banks Loans and Discounts	Postal Savings	Bill Clearings	Taihoku Wholesale Prices June 1937 = 100
1937	83,569	112,033	8,634	186,890	300,533	25,447	412,786	----
1938	110,853	140,018	11,732	249,168	307,066	31,660	500,776	----
1939	143,069	171,169	14,596	321,193	362,420	40,603	657,034	119.78
1940	175,016	199,685	17,892	361,877	457,649	51,268	917,444	135.05
1941	199,472	252,845	19,677	420,625	518,479	64,375	1,001,929	141.69
1941 December	233,900	252,845	19,677	420,625	518,479	64,375	110,917	145.44
1942 June	241,025	250,429	19,837	484,657	532,050	73,989	93,854	150.00
1942 December	272,771	289,274	20,054	522,425	612,275	85,200	136,644	150.51
1943 January	279,986	282,368	19,978	519,943	593,555	----	81,886	150.22
1943 February	284,789	286,980	19,793	549,839	605,652	----	82,301	150.18

Table 59. Government Assistance to Economy.

NOTE: The following list of appropriations from the 1938-39 and 1939-40 budgets presents some of the items to indicate the character of expenditures of the Government in giving assistance to the economy of the island. Budget totals are given in Table 69, and the following list only attempts to indicate the character and extent of Government assistance to the economy.

A. ITEMS FROM BUDGET FOR 1939-40 FISCAL YEAR.

Items	Yen
(1) *Expenses for education and culture:*	
Establishing shrines for soldiers killed or who died at the front	110,000
Youth drills and training	103,690
Expenses for guiding Youth Training Schools	5,000
Increased subsidy to Youth Training Schools	1,788
National spiritual mobilization	60,000
Establishing medical chair in Taihoku Imperial University	165,986
Expenses for operating hospital attached to the Medical Department of the Taihoku Imperial University	247,828
Establishing new classes in College of Agriculture and Forestry of the University	99,037
Exchange of students between Japan and Italy	5,000
Increased expense for purchase of foreign books and publications due to exchange fluctuations	20,000
Increase of classes in normal schools	115,518
Increase of classes in high schools	154,928
Establishing night courses in Taihoku Technical School	69,244
Establishing new business schools	40,301
Increased subsidy to promotion of primary education	123,552
Increased subsidy for propagation of primary education	70,000
Increased expenses for text books	107,887
Increased subsidy to spread and encouragement of use of the national language (Japanese)	80,000
(2) *Expenses for public health:*	
Manufacture of medicines for and treatment of malaria	104,014
Subsidy to medical treatment of teachers of primary schools	15,600
Establishing new Harbor Office in Karenko	16,462
Special hospital instruments for government hospitals	30,000
Subsidy to associations combating tuberculosis	5,000
Expenses for completion of tuberculosis hospital buildings	91,199
Additions to leper hospital buildings	32,806

Table 59. Government Assistance to Economy—Continued.

Items	Yen
(3) *Police expenses:*	
Strengthening air defense	3,199,526
Strengthening maintenance of peace and order	87,611
Economic police expense	316,840
Expenses in connection with elections in provinces, cities, towns and villages (assembly elections)	30,905
Guidance for young men of "Takasago race" (aborigines)	6,120
New Water Police Station in Karenko	6,757
Establishing guards for watch of rivers and streams	4,714
Patrol boat expenses for Keelung Water Police Station	70,628
(4) *Expenses connected with judiciary:*	
Establishing Department of Judicial Affairs	36,064
Increase in the number of judges and procurators for prevention of economic crimes	23,907
Expenses connected with election of members of assemblies of provinces, cities, towns and villages	10,000
Extraordinary prison expenses	109,650
Increase in output of prison products	27,942
(5) *Expenses connected with finance:*	
Transfer of fund to special account of extraordinary military expenses	16,224,508
Expenses for establishing building tax	170,509
Expenses for strengthening control of foreign exchange	22,419
Expenses for enforcing laws regarding import and export control	7,995
Expenses for adjustment of difficulties connected with public land opened up and developed without permission	73,452
Expenses for adjusting land registers	30,000
Expenses for establishing Karenko Branch Customs	45,758
Increase in amount of transfer to sinking fund	991,591
Increase of interest and expenses in connection with issue of public loans	48,750
Increase in contribution to pension fund	224,305
Increase in second reserve fund	500,000
Increase in various payments	2,749
(6) *Expenses connected with forests and plains:*	
Increased production of pulp materials	1,098,641
Cultivation and use of tropical plants	127,142
Highway construction for facilitating transportation of mountain products	83,844
Expenses for enabling fuel change on locomotives used in lumber transportation	16,000
Forestry and riparian works	177,789
Forestry enterprise	156,120
Afforestation of coastal forests	32,667
Inspection of protection forests	20,061
(7) *Industrial encouragement, and economic expenses:*	
Expenses for promoting export trade	115,276
Subsidy for encouraging exports	240,000
Adjusting supply and demand for commodities	139,480
Developing fuel resources	1,961,771
Encouraging placer gold production	35,000
Encouraging change of fuel for motors	145,000
Encouraging use of natural gas for running automobiles	30,000
Encouraging production of fish skins, and experiments in manufacture thereof	96,014
Expenses of organizations for collection of wastes of important supplies and materials, and for encouraging use of substitutes	11,460
Adjusting supply and demand of labor	86,901
Expenses for enforcement of national registration	100,337
Adjusting prices of commodities	67,530
Encouraging horse raising	87,236
Encouraging stock-farming	293,114
Encouraging wild silk worms	20,701
Enlarging Industrial Research Institute	123,549
Semi-industrial experiments in wood pulp	121,226
Experiments in manufacture of carbon black	118,396
Experiments in increased planting of and encouraging planting of special medicinal plants	39,984
Subsidy to special industries	32,000
Expenses for having industrial experiments done outside of Taiwan	15,000
Subsidy to reconstruction of important industrial highways	100,000
Expenses for training mining experts	4,240
Establishing stock exchange	7,213
Developing industrial and general conditions in the Pescadores	150,000
Expenses for facilities and institutions in existing Japanese immigrant villages (3 or 4 now exist)	179,500
Bringing in fishing immigrants	40,985
Expenses in connection with increased demand for weights and measures	62,936
Standardizing sales prices of weights and measures	7,997
Establishing plant quarantine station at Karenko	16,851
Subsidy to land reclamation in coastal shallows	25,000
Increased subsidy for establishment of Colonial Encouragement Hall	6,000

Table 59. Government Assistance to Economy—Continued.

Items	Yen
(8) *Expenses regarding railways:*	
Railway improvements	3,400,000
Building railway extension to Shinchiku Aviation Ground	200,000
Enlarging railway compound of Shin-ei railway station	200,000
Expenses for opening traffic on new lines	144,032
Promotion of railway projects	1,027,666
Expenses for railway improvements	68,608
Additional amount for railway construction expenses	300,000
Increase in various refunds and advances of railways	5,140,813
(9) *Expenses for communications:*	
Expansion of aviation projects	184,129
Increase in air mail charges	178,409
Aviation ground maintenance expense	4,316
Enlarging radio communication facilities	150,000
Construction and improvement of telegraph and telephone facilities	508,763
Promotion of telephone projects	110,817
Subsidy to shipping	1,308,500
Equipping and enlarging weather organizations	71,609
Promotion of simple postal life insurance	120,933
Expenses necessary for encouraging saving	69,861
Improvement of communication lines between Heito and Takao	3,171
Establishing a Karenko branch office of Marine Bureau	2,999
(10) *Expenses connected with monopoly enterprises:*	
Establishing Salt Experiment Station	30,290
Promotion of monopoly enterprises	3,186,241
Increasing production of tobacco leaf	374,770
Expansion of camphor manufacturing work	200,161
(11) *Expenses for public works:*	
Port construction in Central Taiwan (Gosei, Taichu Province)	3,000,000
Riparian work at Hokkokei and Hasshokei (Tainan Province)	488,250
Subsidy to riparian work at Akoten Dei (river) (Tainan Province)	300,000
Reconstruction of highway between Takao and Okayama	200,000
Reconstruction and maintenance of highway between Fuko and Rokakei (Takao Province)	270,000
Subsidy to reconstruction of designated highways	211,000
Subsidy to city planning	280,000
(12) *Expenses regarding rice control:*	
Transfer to rice control special account	2,000,000
Encouraging cultivation of hemp	278,045
Encouraging cotton cultivation	100,000
Encouraging planting of special crops on irrigated rice land	163,750
Regulation of sugar industry	45,000
Improving tenant farming	75,314
Preparations for enforcement of laws and regulations concerning land improvement	7,488
Investigation of irrigation control	73,611
Increase in subsidy for voluntary control of rice (different from the new rice control)	157,322
Increase of personnel for enforcement of control of rice exports to Japan	16,655
(13) *Expenses for miscellaneous items:*	
Subsidy to enterprises for support of military affairs (care of soldiers' families, wounded or sick soldiers, etc.)	309,258
Expenses of extraordinary national census-taking in 1939	149,637
Building a new tug for Takao harbor use	250,000
Expenses connected with use of tug boat by Takao Provincial Government Harbor office	4,000
Repair of damages from typhoons and floods	180,000
Administration of wharf at Karenko	17,094

B. Items from Budget for 1938-39 Fiscal Year.

(1) *Education and Reform:*	
Increase of classes in medical department	328,286
Maintenance of hospital attached to medical department	448,032
Increase of classes in normal schools	70,193
Additional expense for purchase of foreign publications due to exchange fluctuations	20,000
Establishing new high schools	93,397
Increase of classes in various high schools	141,573
Sending teachers to primary schools maintained by Japanese residents in the South Seas	113,418
Increase of subsidy for promotion of elementary education	131,744
Increase of subsidy for propagation of primary education	70,000
Increase of subsidy for simple vocational education	168,375
Enforcement of national spiritual mobilization	60,000
Appointment of physical culture officers	9,020

Table 59. Government Assistance to Economy—Continued.

Items	*Yen*
Establishment of halls for national culture and reform	6,934
Education of sentiments *(joso)* of the islanders	10,000
Increased subsidy for propagation and encouragement of national language	200,000
Increased subsidy to youth drill organizations	3,288
Purchase of text books for Japanese primary schools, and for compiling and publishing text books for primary schools for Formosan-Chinese	108,043
(2) *Expenses for public health:*	
Researches in means of safeguarding public health and combating diseases	
Manufacture of serum and preparations for prevention of epidemics	115,408
Special items in Tropical Disease Laboratory	29,400
Purchase of special medical instruments	30,000
Completion of buildings for leper hospital	31,402
Reduction of expenses by alteration of organization of the Taihoku Hospital (decrease)	340,957
Subsidy for building Taiwan branch hospital of Japan Red Cross Society	100,000
(3) *Police expenses:*	
Control of arms, ammunition and explosives	4,567
Increased expense for confiscating hidden rifles	7,660
Increase of hospitals in savage districts	5,052
Increased subsidy to Taito Prefectural Government	14,000
Establishment of Heito Police Station	70,000
Building residential quarters, etc. of police officers	100,000
(4) *Expenses connected with judiciary:*	
Establishing branch court at Taiko	2,741
Expenses attending increase of prisoners	15,493
New buildings and repairs of residential quarters of prison officers	50,000
(5) *Expenses connected with Finance Department:*	
Extraordinary adjustment of economics	12,020
Adjusting land register	15,354
Lease and use of warehouses of Takao Customs	8,475
Increase in amount of transfer to sinking fund	988,848
Increase in share of pension fund	102,414
(6) *Expenses connected with forestry:*	
Exploration of utility of broad-leaved tree forests	33,252
Cultivating coast forests	84,930
Second forestry plan undertakings	60,984
Enforcement of forestry plans	95,052
Advancement of riparian work	8,798
Advancement of lumbering operations at Taiheizan	38,431
(7) *Expenses of industrial encouragement:*	
Establishing Industrial Research Institute	929,014
Subsidy to establishment of industrial zone facilities in Takao	1,000,000
Promoting pulp industry	153,439
Encouraging and assisting special industries	32,000
Experiments in manufacture of a gas, which is a raw material for synthetic kerosene	253,459
Subsidy for construction of gold selection mills and refineries	320,000
Increase in expenses for machinery, etc., required in natural gas researches	208,454
Subsidy to experiments in electrical manufacturing of iron and steel	100,000
Encouragement of oil borings	604,320
Compensation for oil holdings	29,495
Subsidy for reclamation work on coast	80,000
Inviting and bringing in new immigrants (from Japan Proper)	258,610
Irrigation facilities for immigrant villages already established	179,500
Bringing in fishermen immigrants	98,685
Encouragement of castor oil, ramie and jute planting	407,578
Encouragement of cotton planting	110,437
Experimental cultivation of land in mountains	30,000
Encouragement of tea industry	78,692
Establishing tropical plant experimental station	106,280
Encouragement of horse raising	137,403
Subsidy (export bounty) for canned pineapples	30,000
Inspection of canned agricultural products	4,961
Encouraging construction of large type fishing vessels	127,249
Expenses attending advance of classes of fishery school	57,511
Ocean investigations	76,036
Subsidy for construction of breakwater and pier at Kei port	40,000
Exploring fishing grounds in South China Sea	99,636
Encouraging and assisting Japanese enterprises in South China and the South Seas	100,000
Establishing Industrial Encouragement Divisions in the Taito and Karenko Prefectural Government	15,328

Table 59. Government Assistance to Economy—Continued.

Items	*Yen*
Preparing for establishment of stock exchange	8,546
Increase of subsidy for establishment of Colonial Encouragement Hall	4,000
Increased production of weights and measures	87,926
Subsidy to meat industry	100,000
Adjusting and investigating important industries	50,000
(8) *Expenses concerning railways:*	
Double-tracking between Shoka and Tainan, and Takao and Heito	700,000
Additional expenses for improving Taihoku and Takao Stations	300,000
Additional expenses for railway construction between Keishu and Boryo	219,500
Railway improvements	3,755,603
Training railway employees	18,928
Increase in and advancement of railway enterprises	1,328,178
Enforcing law governing small forwarding companies and agents	20,031
Establishing railway parcel offices in Taihoku, Tainan and Takao	22,255
Double-tracking in front of Takeda Station	46,576
Expenses attending railway improvements, facilities, etc.	149,241
Increase of railway refunds and advances	1,537,811
Increase of expenses for materials for railway bus service	73,505
(9) *Expenses connected with postal service:*	
Increase of subsidy to air transportation between Fukuoka and Taihoku	260,000
Increase of subsidy to air transportation in Taiwan	280,000
Subsidy for construction of airfield at Taito	44,800
Subsidy to aviation	10,000
Increase of personnel in aviation	30,880
Increase of aviation postal charges	135,042
Weather observation for circuit air route in Taiwan	32,517
Improving Taiwan Weather Bureau	28,051
Establishing weather bureau in Kotosho	25,006
Enlarging and improving telegraph and telephone facilities	634,950
Increase of expenses for improving and adjusting long distance telephone lines	300,000
Installing radio telegraph and telephone	139,954
Expenses for maintenance and management of enlargement and improvement work on telegraph and telephone facilities	55,640
Supervision and control of installation of radio telephone	48,459
Investigating water power resources	45,725
Shipping subsidy	1,182,500
Lighthouse equipment	14,431
Increase and advancement of communication enterprises	119,716
Increase and advancement of simple life insurance enterprises	162,716
Extraordinary control of shipping	5,142
(10) *Expenses connected with Monopolies:*	
Experiments in synthetic camphor	49,615
Experiments in camphor distillation	11,546
Felling of camphor trees in privately afforested forests and for camphor production with privately owned camphor trees	141,851
Mechanization of camphor production system in mountains	18,750
Expenses of increasing tobacco leaf (yellow leaf) production	97,394
Monopoly of absolute alcohol	262,098
Improving monopoly factories	168,816
Enlarging salt factories	79,600
(11) *Expenses for public works:*	
Port investigations	50,000
Maintenance of Takao Port	99,539
Maintenance and control of Shimo Tansui River	218,171
Highway construction between Fuko and Rokakei (Daibu) (Southern end of Taiwan)	371,439
Increased subsidy to reconstruction of designated highways	520,000
1. Under plans already decided Yen 350,000	
2. New appropriations 170,000	
Subsidy to city planning	403,421
Subsidy to water work construction	250,269
(12) *Expenses for buildings:*	
New buildings for a joint office building at Karenko wharf housing numerous government offices under one roof	246,202
New buildings	800,000
Repairs of buildings	100,000
(13) *Expenses regarding miscellaneous items:*	
Establishing Foreign Affairs Bureau (or Department)	12,489
Transfer to general accounts	11,672,521

Table 60. Taiwan Imports of Drugs, Chemicals, and Medicines, 1934-37.

One kin = 1.32277 pounds; one sho = 3.18 pints; one momme = 0.00827 pounds; one kilogram = 2.2046 pounds.

	1934		1935		1936		1937	
	Quantity (Kin)	Value (Yen)	Quantity (Kin)	Value (Yen)	Quantity (Kin)	Value (Yen)	Quantity (Kin)	Value (Yen)
Total, all sources	----	7, 273, 991	----	8, 883, 070	----	10, 169, 715	----	11, 529, 472
From Japan	----	5, 376, 418	----	6, 452, 634	----	7, 527, 336	----	9, 079, 855
Soda, all kinds	----	480, 211	----	518, 959	----	667, 370	----	930, 994
Purifications	235, 090	97, 147	470, 054	145, 427	----	----	----	----
Carbide (cans)	108, 039	255, 967	87, 512	193, 212	94, 577	215, 482	80, 727	180, 453
All other drugs	----	4, 543, 093	----	5, 595, 036	----	6, 644, 484	----	7, 968, 408
Other Countries	----	1, 897, 573	----	2, 430, 436	----	2, 642, 379	----	2, 449, 617
All kinds of soda	----	----	----	----	----	----	----	----
Drugs, chemicals	----	1, 897, 573	----	2, 430, 436	----	2, 642, 379	----	2, 449, 617
Chinese drugs								
Liquorice	179, 733	48, 992	248, 243	67, 225	263, 370	71, 071	245, 120	85, 435
China	179, 733	48, 992	245, 361	66, 529	----	----	----	----
Manchukuo	----	----	2, 882	696	----	----	----	----
Ginseng	22, 442	120, 400	27, 004	111, 813	23, 900	128, 647	20, 660	172, 907
China	38	401	----	----	----	----	----	----
Manchukuo	17, 261	82, 341	19, 764	68, 003	----	----	----	----
Kwantung Prov	----	----	144	1, 503	----	----	----	----
United States	5, 143	37, 658	7, 096	42, 307	----	----	----	----
Cassia and cinnamon bark	102, 121	60, 529	108, 708	68, 833	176, 985	74, 707	181, 424	51, 495
China	92, 455	56, 675	101, 857	64, 351	----	----	----	----
British India	2, 480	413	4, 870	1, 274	----	----	----	----
Fr. Indochina	7, 186	3, 441	1, 981	3, 208	----	----	----	----
Rhubarb	35, 476	18, 049	43, 196	18, 392	38, 313	17, 412	49, 531	30, 554
China	35, 476	18, 049	43, 196	18, 392	----	----	----	----
Nard, spikenard	5, 496	6, 087	4, 998	5, 994	11, 569	14, 350	12, 720	14, 063
China	5, 496	6, 087	4, 998	5, 994	----	----	----	----
Cloves	7, 271	4, 116	5, 678	3, 143	4, 646	2, 310	6, 609	4, 244
British India	5, 736	3, 228	3, 812	1, 922	----	----	----	----
British Malaya	155	82	----	----	----	----	----	----
Neth. E. Indies	1, 139	672	450	310	----	----	----	----
Fr. Indochina	105	56	----	----	----	----	----	----
China	----	----	138	96	----	----	----	----
Siam	136	78	1, 278	815	----	----	----	----
Agal- or aloes-wood	8, 428	28, 460	11, 209	34, 891	12, 264	38, 944	15, 334	47, 461
China	----	----	45	13	----	----	----	----
British India	316	1, 037	552	1, 251	----	----	----	----
Fr. Indochina	171	556	998	3, 560	----	----	----	----
Siam	7, 941	26, 867	9, 614	30, 067	----	----	----	----
Sandal-wood	103, 748	55, 701	113, 431	75, 054	122, 072	69, 069	135, 002	74, 264
British Malaya	----	----	207	213	----	----	----	----
Fr. Indochina	----	----	2, 481	1, 479	----	----	----	----
Siam	103, 748	55, 701	106, 669	70, 979	----	----	----	----
Australia	----	----	4, 074	2, 383	----	----	----	----
Mangrove bark	46, 694	2, 883	76, 272	6, 463	29, 958	2, 846	37, 912	3, 576
China	----	----	----	----	----	----	----	----
British Malaya	5, 998	532	17, 655	1, 643	----	----	----	----
Fr. Indochina	4, 320	245	13, 210	974	----	----	----	----
Siam	36, 376	2, 106	45, 407	3, 846	----	----	----	----
Catechu and other tanning extracts	95, 823	21, 074	118, 295	35, 791	146, 491	39, 456	99, 420	40, 020
China	794	115	3, 454	463	----	----	----	----
British Malaya	71, 407	15, 671	103, 645	31, 936	----	----	----	----
Neth. E. Indies	2, 300	453	----	----	----	----	----	----
Fr. Indochina	16, 083	3, 624	8, 295	2, 510	----	----	----	----
Siam	5, 239	1, 211	2, 901	882	----	----	----	----
Atractylodes alba	81, 820	26, 317	99, 738	26, 980	101, 231	21, 999	75, 982	29, 575
China	81, 820	26, 317	99, 738	26, 980	----	----	----	----
Atractylodes rubra	5, 710	1, 198	6, 018	1, 226	13, 333	1, 791	15, 387	2, 514
China	5, 710	1, 198	6, 018	1, 226	----	----	----	----
Putchuk	16, 272	33, 259	16, 629	32, 471	24, 438	36, 950	28, 907	50, 838
China	11, 911	4, 450	13, 055	6, 515	----	----	----	----
British India	3, 759	24, 620	3, 149	22, 889	----	----	----	----
British Malaya	48	333	----	----	----	----	----	----
Siam	554	3, 856	425	3, 067	----	----	----	----
Scutellaria viscidula	95, 565	19, 462	131, 311	22, 878	120, 814	14, 047	68, 720	15, 510
China	95, 565	19, 462	131, 311	22, 878	----	----	----	----
China roots	200, 926	54, 367	94, 061	27, 646	295, 711	74, 719	146, 738	45, 095
China	200, 236	54, 214	94, 061	27, 646	----	----	----	----
Fr. Indochina	690	153	----	----	----	----	----	----
Conioselium univitatum	110, 793	58, 983	115, 624	67, 588	142, 414	65, 968	102, 984	57, 388
China	110, 793	58, 983	115, 624	67, 588	----	----	----	----
Bupllenrum cotradiatum	105, 089	37, 618	178, 309	64, 497	189, 226	47, 987	119, 696	39, 962
China	105, 089	37, 618	178, 309	64, 497	----	----	----	----
Ligusticum (Aralia edulis)	169, 916	132, 447	160, 369	124, 388	159, 032	129, 342	198, 229	338, 548
China	169, 916	132, 447	160, 369	124, 388	----	----	----	----
Rhemannia Chinensis	237, 916	42, 892	265, 349	43, 156	254, 205	35, 736	144, 387	35, 799
China	237, 916	42, 892	265, 349	43, 156	----	----	----	----
Apricot kernels and bitter almond kernels	82, 231	31, 412	84, 212	28, 115	89, 333	27, 096	129, 680	43, 354
China	49, 345	18, 433	54, 787	18, 332	----	----	----	----
Manchukuo	32, 886	12, 979	29, 425	9, 783	----	----	----	----
Cow bezoar (in mommes)	281	448	127	210	----	----	----	----
China	160	152	47	114	----	----	----	----
British India	----	----	80	96	----	----	----	----
Fr. Indochina	121	296	----	----	----	----	----	----

Table 60. Taiwan Imports of Drugs, Chemicals, and Medicines, 1934-37—Continued.

One kin = 1.32277 pounds; one sho = 3.18 pints; one momme = 0.00827 pounds; one kilogram = 2.2046 pounds.

	1934		1935		1936		1937	
	Quantity (Kin)	Value (Yen)	Quantity (Kin)	Value (Yen)	Quantity (Kin)	Value (Yen)	Quantity (Kin)	Value (Yen)
Uvalaria grandiflora	15, 180	53, 798	22, 425	77, 183	30, 575	58, 133	27, 426	64, 776
China	15, 180	53, 798	21, 926	75, 416	----	----	----	----
Manchukuo	----	----	499	1, 767	----	----	----	----
Campanumaes pilosula	31, 201	24, 395	51, 616	42, 488	78, 758	46, 213	41, 632	40, 000
China	31, 201	24, 395	51, 616	42, 488	----	----	----	----
Paeonia albiflora	104, 105	42, 801	131, 681	46, 266	149, 156	47, 636	103, 561	41, 937
China	104, 105	42, 801	131, 681	46, 266	----	----	----	----
Aconitum variegatum	30, 205	11, 125	18, 353	5, 679	12, 091	5, 360	8, 705	6, 108
China	30, 205	11, 125	18, 353	5, 679	----	----	----	----
Ciptis root	2, 927	14, 994	4, 847	24, 600	7, 673	30, 593	7, 027	32, 172
China	2, 927	14, 994	4, 847	24, 600	----	----	----	----
All other drugs, chemicals, and medicines	----	741, 249	----	812, 740	----	1, 226, 509	----	884, 354
China	----	625, 165	----	701, 199	----	----	----	----
Manchukuo	----	23, 091	----	16, 339	----	----	----	----
Kwantung Prov.	----	47	----	83	----	----	----	----
Hongkong	----	----	----	380	----	----	----	----
British India	----	7, 675	----	9, 856	----	----	----	----
British Malaya	----	1, 984	----	2, 251	----	----	----	----
British Borneo	----	169	----	248	----	----	----	----
Neth. E. Indies	----	10, 288	----	512	----	----	----	----
Fr. Indochina	----	13, 727	----	15, 997	----	----	----	----
Philippines	----	----	----	65	----	----	----	----
Asiatic Russia	----	----	----	132	----	----	----	----
Siam	----	24, 177	----	24, 361	----	----	----	----
Iran	----	1, 494	----	3, 047	----	----	----	----
United Kingdom	----	2, 835	----	697	----	----	----	----
France	----	----	----	----	----	----	----	----
Germany	----	21, 872	----	16, 719	----	----	----	----
Holland	----	----	----	----	----	----	----	----
Spain	----	7, 000	----	11, 758	----	----	----	----
United States	----	----	----	6, 745	----	----	----	----
Australia	----	----	----	56	----	----	----	----
Other countries	----	1, 468	----	2, 295	----	----	----	----
Bonded Mfg. warehouse	----	257	----	----	----	----	----	----
All other compounds or preparations of drugs, chemicals, and medicine	----	39, 990	----	64, 288	----	70, 837	----	38, 152
China	----	18, 535	----	15, 391	----	----	----	----
Hongkong	----	1, 057	----	877	----	----	----	----
British India	----	17, 930	----	234	----	----	----	----
British Malaya	----	1, 089	----	46, 398	----	----	----	----
United Kingdom	----	1, 191	----	678	----	----	----	----
France	----	132	----	638	----	----	----	----
Germany	----	17	----	----	----	----	----	----
Switzerland	----	10	----	----	----	----	----	----
United States	----	21	----	72	----	----	----	----
Australia	----	8	----	----	----	----	----	----
All other drugs, chemicals, medicines, and compounds, or preparations thereof from Japan	----	4, 543, 093	----	5, 595, 036	----	6, 644, 484	----	7, 968, 408

Table 61. Taiwan Exports of Drugs, Chemicals, and Medicines, 1934-37.

	1934		1935		1936		1937	
	Quantity (Kin)	Value (Yen)	Quantity (Kin)	Value (Yen)	Quantity (Kilo)	Value (Yen)	Quantity (Kilo)	Value (Yen)
Exports to countries other than Japan	----	3,448,323	----	3,596,389	----	3,137,210	----	2,253,470
Camphor (crude)								
China	----	----	8	8	----	----	----	----
Kwantung Prov					31	79		
United Kingdom	123,500	177,950	80,000	128,100	128,100	292,528	391,340	895,089
France	146,500	193,200	100,500	157,640	48,360	125,005	49,380	140,320
Germany	1,700	2,720	----	----	----	----	----	----
Italy	17,000	27,455						
U. S.	1,744,200	1,980,621	1,423,300	1,752,593	1,009,500	2,096,430	386,160	824,527
Total	2,032,900	2,391,946	1,603,808	2,038,341	1,185,991	2,514,042	826,880	1,859,936
Japan	536,600	499,775	912,765	1,036,650	619,806	1,147,496	541,320	1,031,179
Camphor (refined)								
China	5	10	1	5	----	----	----	----
Unclassified					31	79		
Japan	1,350,919	1,675,974	913,928	1,323,814	689,472	1,671,444	657,720	1,584,550
Camphor Oil								
China								
Japan	2,024,365	821,359	2,221,546	1,037,917	1,005,882	853,088	1,191,592	1,011,108
Camphor oil, refined white oil								
China								
Japan	923,625	268,021	831,687	258,247	563,830	312,353	521,867	322,564
Brown oil								
Unclassified					73,280	119,910	197,700	284,539
Japan	680,393	216,405	641,451	279,516	406,620	421,002	328,633	328,022
Ho oil								
France	607	678						
Unclassified			----	----	111,130	260,460	41,570	96,770
Japan	564,139	574,400	526,164	583,927	290,331	615,259	321,784	924,295
Green oil								
Japan	130,010	21,848	87,416	16,811	36,231	12,609	33,529	11,804
Alcohol (in sho = 3.18 pints)								
China	20,000	8,000	59,000	21,757	9,770	3,013		
Manchukuo	6,000	1,820	34,800	12,285	36,900	12,293	----	----
Kwantung Prov	25,000	10,000	1,110,280	368,115	513,000	147,841	615,500	193,250
Hongkong			50,000	17,500	25,200	8,189	9,600	3,294
Macao	2,130	831	101,300	32,831	102,340	31,702	----	----
Total	53,130	20,651	1,355,380	452,488	687,210	203,038	625,100	196,544
Japan	9,828,572	5,256,358	12,415,870	5,083,463	12,039,611	4,132,404	14,172,250	5,568,867
Denatured alcohol (in sho)								
China	15,040	8,281	14,811	7,090	----	----	Included in alcohol	
Kwantung Prov	----	----	30,000	9,083	----	----	Included in alcohol	
Total	15,040	8,281	44,811	16,173	37,770	10,696		
Japan	3,242,680	1,694,565	4,361,740	1,683,702	4,764,200	1,505,518	4,764,723	1,860,700
Ginseng								
China	12,299	48,152	3,940	21,573	----	----	----	----
Hongkong	7,023	41,206	5,418	39,400	----	----	----	----
British Malaya	479	4,088	667	2,575	----	----	----	----
Neth. E. Indies	20	20	----	----	----	----	----	----
Fr. Indochina	73	801	----	----	----	----	----	----
Macao	----	----	160	2,069	----	----	----	----
Total	19,894	94,267	10,185	65,617	6,541	31,494	4,150	27,844
Japan	----	----	----	----	----	----	----	----
Jintan								
China	----	37	----	59	----	----	----	----
Hongkong	----	50	----	----	----	----	----	----
Total	----	87	----	59	----	----	----	----
Japan	----	----	----	----	----	----	----	----
All other drugs, chemicals, medicines, and compounds or preparations thereof and explosives								
China	----	136,465	----	143,516	----	----	----	----
Manchukuo	----	376	----	46	----	----	----	----
Kwantung Prov	----	217	----	1,370	----	----	----	----
Hongkong	----	4,578	----	5,885	----	----	----	----
Macao	----	70	----	730	----	----	----	----
British Malaya	----	1,142	----	2,005	----	----	----	----
British Borneo	----	94	----	90	----	----	----	----
Neth. E. Indies	----	1,765	----	2,259	----	----	----	----
Fr. Indochina	----	207	----	36	----	----	----	----
Philippines	----	159	----	----	----	----	----	----
United States	----	22,517	----	52,775	----	----	----	----
Other countries	----	----	----	----	----	----	----	----
Other	----	167,590	----	208,712	----	178,055	----	86,793
Japan	----	476,781	----	444,449	----	377,527	----	464,179

Table 62. Chief Exports of Taiwan.

Commodity	Unit of quantity	QUANTITIES 1933	1934	1935	1936	1937	VALUES IN $1,000 1933	1934	1935	1936	1937
Total		—	—	—	—	—	63,445	90,907	100,688	112,591	126,731
Rice	1,000 lbs.	1,199,038	1,603,198	1,354,890	1,515,709	1,516,412	16,518	30,287	30,309	36,077	36,334
Bamboo sprouts, dried	Metric tons	791	916	729	876	978	80	152	139	145	109
Sweet potatoes, dried	Metric tons	19,263	38,275	26,680	35,576	65,466	267	558	372	613	849
Bananas	Metric tons	125,961	123,171	135,952	136,132	156,781	2,109	2,618	2,940	3,240	3,551
Oranges	Metric tons	6,754	11,460	8,405	8,980	7,122	178	311	240	321	264
Tea, Oolong	Metric tons	4,004	3,048	3,980	2,804	1,926	741	929	1,098	859	734
Tea, Pouchong	Metric tons	2,429	3,093	3,095	2,647	2,547	494	838	870	721	752
Tea, black	Metric tons	823	3,302	1,954	3,470	5,809	302	137	652	1,157	2,029
Sugar	Short tons	636,983	730,654	1,007,172	970,041	1,009,843	30,438	36,384	43,501	48,210	55,148
Molasses	Short tons	35,239	4,684	35,396	47,123	49,795	220	63	367	416	449
Fresh fish and shellfish	Metric tons	5,705	7,354	6,302	7,512	7,076	549	783	731	951	941
Salted and dried fish	Metric tons	2,536	7,193	7,604	2,605	811	154	444	460	166	38
Cuttle fish, dried	Metric tons	417	1,042	554	173	62	50	163	108	39	15
Pineapple, canned	1,000 dozen	2,506	2,333	527	173	3,697	1,315	506	319	102	655
Salt	Metric tons	111,494	96,097	111,160	119,960	117,222	328	325	380	417	408
Hides or skins, undressed	Metric tons	620	656	581	512	712	63	80	60	60	99
Camphor	Metric tons	2,363	2,352	2,058	2,495	2,026	1,057	1,354	1,265	1,548	1,289
Camphor oil, refined	Metric tons	2,431	2,594	2,584	1,481	1,445	1,473	2,974	2,077	1,995	1,567
Alcohol	Koku [1]	142,174	131,394	181,778	174,910	195,621	1,473	2,974	2,077	1,995	2,196
Matches	Gross	416,449	1,396,380	1,417,160	229,399	1,951	54	203	207	96	—
China grass	Metric tons	130	144	144	266	473	16	45	30	42	95
Cotton fabrics	1,000 yards	1,619	2,240	490	4,739	7,078	93	314	598	262	371
China grass and hemp fabrics	1,000 yards	295	4,960	11,490	1,530	2,467	17	57	24	67	168
Hats and caps	Thousands	10,336	767	289	5,809	5,415	658	1,173	871	712	942
Coal	Metric tons	330,510 [2]	12,962	6,777 [3]	241,510	407,715	696	667	598	654	1,132
Cement	Metric tons	9,690	264,827 [3]	226,640 [3]	16,186	5,554 [4]	35	98	150	67	33
Ores	Metric tons	146,459	25,643	34,801 [3]	231,810 [3]	135,554 [4]	1,369	2,227	2,823	4,538	3,200 [4]
Lumber	1,000 bd. ft.	17,382	140,032	176,548 [3]	12,504	10,538	609	715	435	602	615
Other commodities	—	—	27,487	12,521	—	—	2,960	4,837	6,786	6,370	11,728

In this and the following five tables,
N.A. indicates figures not available because of strategic character of commodity.
Dash indicates zero, or less than one unit; it is also used when quantity figures are not available.
Exchange rates (in cents per yen):
1933—25.540
1934—29.715
1935—28.707
1936—29.022
1937—28.791
1938—28.451
1939—25.963

[1] A koku equals 47.65 gallons.
[2] Exports to countries outside Japanese Empire given simply in "tons"; kind of tons not specified.
[3] To Japanese Empire only.
[4] To Japanese Empire only, and for first seven months only.
Source for this table and for Tables 35, 36, 37, 38, and 39, following:
1933–1937, Annual Returns of the Trade of Taiwan (Formosa).
1938–1939, Consular Annual Reviews of Commerce and Industry, Formosa.
Notes: This table has not been continued beyond 1937 because available returns for 1938 and 1939 omit many items and give only partial figures (i.e., exports to certain areas only) for others.

Table 63. Chief Exports to Japan Proper, Chosen, Karafuto, and the Japanese Mandated Islands.

Commodity	Unit of quantity	QUANTITIES 1933	1934	1935	1936	1937	1938	1939	VALUES IN $1,000 1933	1934	1935	1936	1937	1938	1939
Total	—	—	—	—	—	—	—	—	58, 933	83, 027	90, 198	104, 159	118, 118	119, 524	132, 345
Rice	1,000 lbs.	1, 195, 584	1, 598, 246	1, 351, 969	1, 515, 603	1, 516, 317	1, 430, 695	1, 251, 959	16, 414	30, 255	30, 299	36, 077	36, 326	36, 050	32, 529
Sweet potatoes, dried and sliced	Metric tons	19, 265	38, 269	26, 544	35, 565	65, 271	70, 433	11, 513	267	557	370	613	847	1, 160	214
Bananas	Metric tons	116, 492	105, 052	117, 306	122, 238	141, 954	123, 174	126, 872	2, 017	2, 418	2, 720	3, 072	3, 379	3, 658	4, 289
Tea, black	Metric tons	316	461	469	422	504	720	871	159	278	224	235	334	424	580
Sugar	Short tons	650, 300	729, 144	940, 457	944, 092	985, 556	1, 009, 086	1, 271, 976	30, 294	36, 348	41, 906	47, 450	54, 411	50, 528	59, 521
Molasses	Short tons	35, 107	4, 679	35, 142	47, 099	49, 792	36, 861	N.A.	219	63	365	416	449	361	315
Fresh fish	Metric tons	5, 450	6, 932	5, 759	7, 150	6, 711	4, 625	5, 479	512	720	638	880	878	564	801
Dried bonito	Metric tons	337	381	234	147	163	62	72[1]	120	132	75	73	59	23	35
Pineapple, canned	1,000 doz.	2, 354	2, 122	3, 204	2, 463	2, 975	2, 624	2, 995	1, 224	1, 348	2, 098	1, 700	2, 188	2,406	2, 911
Salt	Metric tons	103, 390	91, 205	99, 727	110, 188	107, 522	192, 567	92, 290	271	297	281	320	316	496	280
Camphor	Metric tons	606	1, 133	1, 096	1, 309	1, 199	1, 381	1, 778	300	647	678	818	753	897	1, 046
Camphor oil	Metric tons	2, 424	2, 594	2, 580	1, 297	1, 206	1, 320	1, 098	397	565	625	395	457	507	425
Alcohol	Koku[2]	129, 584	130, 713	167, 776	168, 038	189, 370	10, 253, 154[3]	16, 081, 778[3]	1, 393	2, 065	1, 943	1, 636	2, 139	2, 772	4, 291
Paper, European style	1,000 lbs.	N.A.	N.A.	N.A.	5, 838	11, 172	24, 123	35, 080	N.A.	N.A.	N.A.	215	474	1, 119	1, 601
Wall-board	1,000 lbs.	N.A.	N.A.	N.A.	12, 433	12, 140	10, 610	N.A.	N.A.	N.A.	N.A.	236	224	188	247
Hats	1,000's	10, 332	12, 944	6, 742	5, 795	5, 471	4, 502	5, 029	657	1, 170	866	710	941	850	987
Coal	Metric tons	146, 515	105, 350	81, 526	114, 134	270, 159	439, 544	276, 258	305	255	215	301	738	1, 637	1, 165
Ores	Metric tons	146, 430	140, 004	176, 548	231, 810	135, 554[4]	N.A.	N.A.	1, 569	2, 227	2, 823	4, 538	3, 200[1]	N.A.	N.A.
Lumber	1,000 bd. ft.	14, 519	12, 956	9, 087	11, 705	10, 098	13, 529	19, 108	565	553	370	579	593	882	1, 225
Other commodities	—	—	—	—	—	—	—	—	2, 250	3, 129	3, 702	3, 895	9, 412	15, 002	19, 883

[1] Source gave this figure as 7,222; presumably error in decimal.
[2] A koku equals 47.65 gallons.
[3] In gallons.
[4] First seven months only.
For exchange rates and sources, see Table 34, Chief Exports of Taiwan, above.

Table 64. Chief Exports to Foreign Countries.

Commodities	Unit of quantity	QUANTITIES 1933	1934	1935	1936	1937	1938	1939	VALUES IN $1,000 1933	1934	1935	1936	1937	1938	1939
Total	—	—	—	—	—	—	—	—	4,512	7, 880	10, 491	8, 432	8, 613	10, 342	21, 600
Bananas	Metric tons	9, 469	18, 119	18, 646	13, 894	14, 827	10, 199	11, 406	92	200	220	168	172	122	126
China	Metric tons	4, 374	9, 878	9, 623	6, 991	7, 203	4, 214	5, 239	46	117	124	94	89	52	57
Kwantung Leased T	Metric tons	2, 557	4, 797	5, 567	3, 653	4, 142	3, 471	3, 153	22	48	58	38	45	42	34
"Manchukuo"	Metric tons	2, 534	3, 384	3, 056	3, 175	3, 295	2, 514	3, 014	22	34	32	35	35	30	35
Other countries	Metric tons	4	60	400	75	187	—	—	2	1	6	1	3	—	—
Oranges	Metric tons	4, 949	9, 378	6, 582	6, 597	5, 880	6, 023	8, 459	109	222	162	213	153	165	297
Kwantung Lease	Metric tons	3, 478	5, 461	4, 136	5, 581	5, 329	4, 945	7, 492	77	128	102	183	138	129	262
China	Metric tons	1, 221	3, 587	1, 481	510	170	1, 076	960	26	85	38	17	5	36	34
Hong Kong	Metric tons	11	206	953	485	374	1	—	—	5	22	12	10	—	—
Other countries	Metric tons	239	124	12	21	7	1	7	6	4	—	1	—	—	1
Tea, Oolong	Metric tons	4, 006	3, 049	3, 966	2, 801	1, 919	2, 451	2, 460	739	926	1, 095	858	731	823	1, 118
United States	Metric tons	3, 382	2, 617	3, 387	2, 554	1, 734	2, 129	2, 320	571	728	893	714	613	632	1, 012
Great Britain	Metric tons	539	381	511	233	146	274	125	151	178	178	137	102	172	97
Other countries	Metric tons	85	51	68	14	39	48	15	17	20	24	7	16	19	9
Tea, Pouchong	Metric tons	2, 207	2, 811	2, 767	2, 344	2, 269	2, 987	3, 903	464	785	808	662	704	976	2, 164
Neth. E. Indies	Metric tons	907	742	475	249	201	156	144	211	237	180	95	77	61	54
Kwantung Lease	Metric tons	85	501	716	516	686	1, 841	2, 725	17	158	227	174	257	587	1, 642
Thailand	Metric tons	192	447	492	547	479	54	85	42	108	136	151	145	19	31
Fr. Indochina	Metric tons	205	413	358	340	260	68	41	41	96	85	77	61	20	11
Straits Settle	Metric tons	192	347	455	403	228	6	—	32	79	116	96	59	1	—
"Manchukuo"	Metric tons	198	154	59	115	224	717	230	42	34	14	31	54	239	114
Other countries	Metric tons	428	207	212	174	191	145	678	79	43	50	38	51	49	312
Tea, black	Metric tons	507	2, 841	1, 485	3, 048	5, 305	4, 130	4, 298	143	859	428	922	1, 695	1, 168	1, 422
Great Britain	Metric tons	113	891	337	412	540	504	34	36	261	99	114	176	148	7
United States	Metric tons	89	717	486	799	2, 045	733	2, 164	25	213	129	198	632	199	746
Australia	Metric tons	118	352	87	132	280	224	167	29	104	31	48	111	75	49
Iran	Metric tons	42	209	153	543	256	36	17	13	68	55	208	108	16	6
"Manchukuo"	Metric tons	21	140	92	171	272	798	292	8	36	23	50	80	203	88
Kwantung Lease	Metric tons	22	14	118	12	196	1, 044	503	9	6	29	6	64	295	184
Other countries	Metric tons	102	518	212	979	1, 716	791	1, 121	23	171	62	298	525	232	342
Sugar	Short tons	6, 683	1, 510	61, 715	25, 949	24, 287	89, 297	174, 581	144	36	1, 595	760	737	3, 318	7, 938
China	Short tons	5, 338	1, 101	40, 612	8, 825	5, 755	17, 500	83, 243	114	26	1, 029	260	171	691	3, 694
Kwantung Lease	Short tons	792	217	6, 679	9, 082	11, 103	49, 591	62, 153	17	5	174	258	346	1, 841	2, 779
Hong Kong	Short tons	—	126	8, 570	3, 794	2, 591	—	—	—	3	235	121	80	—	—
"Manchukuo"	Short tons	33	66	592	2, 987	4, 606	22, 206	29, 185	1	1	14	81	133	786	1, 464
Macao	Short tons	520	—	5, 262	915	—	—	—	12	—	143	29	—	—	—
Other countries	Short tons	—	—	—	336	222	—	—	—	1	—	11	7	—	1
Fish, dried and salt	Metric tons	2, 536	7, 194	7, 604	2, 605	810	282	2, 390	154	444	460	166	58	15	214
China	Metric tons	2, 457	6, 225	6, 328	2, 343	706	279	2, 390	149	390	385	151	50	15	214
Hong Kong	Metric tons	77	968	1, 119	262	103	—	—	5	54	69	15	7	—	—
Other countries	Metric tons	2	1	157	—	1	3	—	—	—	6	—	1	—	—
Cuttlefish	Metric tons	417	1, 042	553	173	62	6	728	50	163	108	39	15	2	206
Pineapple, canned	1, 000 dozen	152	211	323	710	722	524	6, 374[1]	91	158	221	402	467	556	553
Kwantung Lease	1, 000 dozen	72	94	142	231	173	156	1, 545[1]	40	62	91	147	141	169	169
United States	1, 000 dozen	—	65	77	287	284	—	1, 427[1]	—	60	59	148	145	—	57
"Manchukuo"	1, 000 dozen	6	22	24	30	53	100	1, 662[1]	3	14	14	19	39	108	188
China	1, 000 dozen	12	12	6	7	10	255	1, 174[1]	7	7	4	4	8	270	113
Other countries	1, 000 dozen	62	18	74	155	202	13	566[1]	41	15	53	84	134	9	26
Camphor	Metric tons	1, 757	1, 219	962	1, 186	827	385	470	757	707	585	730	536	260	514
United States	Metric tons	1, 431	1, 047	852	1, 010	386	284	398	595	589	503	608	237	186	426
France	Metric tons	218	88	60	48	49	46	29	105	57	45	36	40	35	34
Great Britain	Metric tons	106	74	48	128	391	53	43	55	53	37	85	258	39	54
Other countries	Metric tons	2	10	—	—	—	2	—	2	8	—	1	1	—	—
Kerosene etc. (re-expts)	Gallons	370, 540	1, 779, 805	3, 014, 360	1, 057, 633	82, 115	7, 813	140, 687	37	182	287	100	9	1	29
Alcohol	Koku[2]	12, 590	681	14, 002	6, 872	6, 251	37, 642[3]	18, 720[3]	80	9	134	59	57	9	10
Kwantung Lease	Koku[2]	7, 529	250	11, 403	5, 130	6, 155	36, 691[3]	N.A.	46	3	109	43	56	9	N.A.
Other countries	Koku[2]	5, 061	431	2, 599	1, 742	96	951[3]	N.A.	34	6	25	16	1	—	N.A.

Table 64. Chief Exports to Foreign Countries.—Continued.

Commodities	Unit of quantity	QUANTITIES 1938	1934	1935	1936	1937	1938	VALUES IN $1,000 1939
Matches (re-exports)	Gross	416,449	1,396,380	1,417,160	2,229,389	1,951	1,700	260[1]
Cotton cloth (re-ex)	1,000 sq. yds.	1,619	4,960	11,490	4,739	7,078	61	17
China	1,000 sq. yds.	1,618	4,783	5,868	4,231	2,032	36	11
Hong Kong	1,000 sq. yds.	—	87	3,980	243	4,236	—	—
Other countries	1,000 sq. yds.	1	90	1,642	265	810	25	6
Wool cloth (re-exports)	1,000 sq. yds.	147	214	476	305	100	4	352
Coal	Metric tons	183,995[1]	159,477[1]	145,114[1]	127,376	137,756	147,206	291,670
Hong Kong	Metric tons	102,848[1]	105,638[1]	85,825[1]	90,565	99,042	32,772	4,804
China	Metric tons	67,263[1]	53,439[1]	57,280[1]	35,014	24,214	114,434	286,866
Other countries	Metric tons	13,884[1]	400[1]	2,000[1]	1,797	14,500	—	—
Cement	Metric tons	9,067	25,030	31,800	14,751	9,009	134	954
China	Metric tons	3,155	8,218	4,042	205	—	134	N.A.
Kwantung Lease	Metric tons	—	5,201	13,902	4,064	—	—	N.A.
Hong Kong	Metric tons	5,912	11,611	13,831	10,482	8,988	—	N.A.
Other countries	Metric tons	—	—	25	—	21	—	N.A.
Lumber	1,000 bd. ft.	2,863	14,531	3,434	799	460	1,420	5,560
Other commodities		—	—	—	—	—	—	—

[1] Metric tons.
[2] A koku equals 47.65 gallons.
[3] In gallons.
[4] Figures given in "tons"; kind of ton not specified.

For exchange rates and sources, see Table 34, Chief Exports of Taiwan, above.

Table 65. Chief Imports of Taiwan.

Commodity	Unit of quantity	QUANTITIES 1933	1934	1935	1936	1937	VALUES IN $1,000 1933	1934	1935	1936	1937
Total	—	—	—	—	—	—	47,348	63,894	75,534	84,943	92,743
Wheat	Metric tons	16,654	16,889	16,668	9,460	10,858	442	509	566	403	516
Soybeans	Metric tons	39,418	38,868	43,825	41,910	43,434	846	865	1,319	1,416	1,619
Wheat flour	Metric tons	16,729	21,874	27,877	28,276	22,902	692	1,014	1,301	1,600	1,464
Sugar, refined	Short tons	2,867	3,780	4,384	3,631	3,032	211	291	380	331	275
Confectionery	—	—	—	—	—	—	425	503	593	713	750
Ajinomoto	—	—	—	—	—	—	380	641	722	889	1,030
Soy	1,000 gallons	714	928	995	1,127	1,078	199	275	280	348	364
Fish, salted and dried	Metric tons	20,385	23,777	28,640	27,750	27,291	966	1,297	1,553	1,601	1,612
Cuttle, dried	Metric tons	2,320	2,811	1,346	636	857	278	487	271	196	229
Shrimps and prawns, dried	Metric tons	1,195	940	1,639	1,522	1,491	188	209	294	304	291
Condensed milk	1,000 dozen	365	365	420	435	462	360	393	411	455	579
Other canned foods	—	—	—	—	—	—	417	627	765	898	854
Sake	1,000 liters	2,333	2,865	2,738	3,488	3,186	638	913	903	1,169	1,140
Beer	1,000 cases[1]	116	114	118	142	145	481	547	580	707	791
Cigarettes	Millions	898	891	1,059	984	1,052	493	547	2,083	1,939	2,278
Mineral oil, heavy[2]	1,000 gallons	9,321	7,564	9,619	7,528	N.A.	277	314	377	279	N.A.
Gasoline[2]	1,000 gallons	1,348	2,491	3,208	2,919	N.A.	206	450	500	441	N.A.
Kerosene and light oils	1,000 gallons	5,254	5,800	7,115	4,829	N.A.	537	625	683	465	N.A.
Lubricating oil	1,000 gallons	1,617	1,723	1,965	2,153	N.A.	245	334	374	440	N.A.
Other mineral oils[2]	1,000 gallons	195	1,740	3,299	9,580	N.A.	45	254	375	912	N.A.
Soaps	—	—	—	—	—	—	285	429	519	674	773
Matches	1,000 cases[3]	124	195	223	142	87	280	506	570	392	327
Yarn and thread	—	—	—	—	—	—	505	683	598	569	599
Jute	Metric tons	2,513	1,135	1,563	2,371	2,016	157	71	109	174	178
Cotton and silk fabrics	—	—	—	—	—	—	3,865	5,128	5,818	5,609	6,229
China grass and hemp fabrics	—	—	—	—	—	—	113	118	150	149	138
Wool fabrics	—	—	—	—	—	—	577	764	586	587	514
Gunny bags	Thousands	14,912	18,457	17,054	15,680	15,351	1,330	1,922	1,909	1,700	1,673
Underwear, knitted	—	—	—	—	—	—	456	602	589	732	895
Paper	—	—	—	—	—	—	1,023	1,351	1,458	1,576	1,835
Cement	Metric tons	95,512	95,623	142,919	180,963	207,100	605	709	964	1,073	1,207
Iron	Metric tons	67,371	69,925	102,031	111,281	N.A.	2,864	3,655	4,605	4,875	N.A.
Copper	Metric tons	983	529	749	926	N.A.	263	152	187	250	N.A.
Lead	Metric tons	1,304	1,453	1,347	1,557	N.A.	74	117	114	167	N.A.
Iron manufactures	—	—	—	—	—	—	249	345	406	409	587
Construction materials	—	—	—	—	—	—	332	407	262	716	530
Railway cars and parts	—	—	—	—	—	—	38	172	411	415	460
Bicycles and parts	—	—	—	—	—	—	599	826	858	1,019	1,143
Automobiles and parts	—	—	—	—	—	—	440	1,083	1,459	1,588	N.A.
Sugar machinery	—	—	—	—	—	—	33	56	88	332	77
Lumber	1,000, bd. ft.	109,076	114,846	162,592	204,320	185,705	1,675	2,196	2,982	3,654	3,900
Wheat bran	Metric tons	44,684	47,318	40,238	75,220	42,605	530	736	705	1,284	872
Bean oil cake	Metric tons	189,711	226,840	211,831	199,004	152,601	2,961	3,650	4,203	4,339	3,925
Ammonium sulfate	Metric tons	98,263	135,510	148,770	174,355	190,314	2,396	3,913	4,691	5,311	5,776
Other fertilizers	—	—	—	—	—	—	1,467	2,724	3,518	4,170	5,745
Other commodities	—	—	—	—	—	—	15,905	20,484	23,445	27,672	41,568

[1] A case contains 4 dozen bottles.
[2] It may be noted that the official figures indicate that all imports of heavy mineral oil and gasoline came from foreign countries. However, imports from Japan classified as "other mineral oils," which were small in 1933 (only 195,000 gallons) rose to 1,740,000 gallons in 1934, 3,300,000 gallons in 1935, and 9,580,000 gallons in 1936.
[3] A case contains 200 dozen boxes.

Note: This table has not been carried beyond 1937 because available returns for 1938 and 1939 omit many items and give only partial figures (i.e imports from Japan and not those from other countries or vice versa) for others.

For exchange rates and sources, see Table 34, Chief Exports of Taiwan, above.

Table 66. Chief Imports from Japan Proper, Chosen, Karafuto, and the Japanese Mandated Islands.

Commodities	*Unit of quantity*	QUANTITIES *1933*	*1934*	*1935*	*1936*	*1937*	*1938*	*1939*	VALUES IN $1,000 *1933*	*1934*	*1935*	*1936*	*1937*	*1938*	*1939*
Total	—	—	—	—	—	—	—	—	38, 288	52, 593	62, 622	70, 765	80, 009	93, 305	92, 846
Wheat	Metric tons	13, 506	13, 739	16, 662	7, 278	10, 710	10, 889	9, 332	377	436	566	332	511	526	505
Wheat flour	Metric tons	16, 729	21, 874	27, 877	28, 276	22, 902	27, 539	28, 744	692	1, 014	1, 301	1, 600	1, 464	1, 796	1, 980
Sugar, refined	Short tons	2, 866	3, 780	4, 384	3, 631	3, 032	3, 197	1, 068	211	291	380	331	275	318	122
Confectionery	—	—	—	—	—	—	—	—	425	502	593	713	750	935	1, 018
Ajinomoto	—	—	—	—	—	—	—	—	380	641	722	889	1, 030	1, 148	1, 139
Soy	1,000 gallons	714	928	995	1, 127	1, 078	1, 114	1, 045	199	275	280	348	364	379	335
Fish, salted, dried	Metric tons	17, 405	19, 005	22, 541	22, 402	23, 002	21, 917	26, 900	903	1, 176	1, 359	1, 423	1, 451	1, 560	2, 426
Cuttlefish	Metric tons	2, 320	2, 811	1, 346	636	857	1, 147	2, 254	278	487	271	196	229	330	642
Condensed milk	1,000 dozen	362	365	420	435	462	573	414	357	393	411	455	579	727	496
Other canned food	—	—	—	—	—	—	—	—	417	627	765	898	854	1, 430	1, 595
Sake	1,000 liters	2, 333	2, 865	2, 738	3, 488	3, 186	1, 244[1]	1, 428[1]	638	913	903	1, 169	1, 140	1, 710	1, 794
Beer	1,000 cases[2]	116	114	118	142	145	187	262	481	547	580	707	791	1, 043	1, 331
Cigarettes	Millions	894	890	1, 051	968	1, 036	784	709	487	542	2, 070	1, 928	2, 260	1, 736	1, 429
Kerosene and light oil[3]	1,000 gallons	3, 956	4, 562	5, 663	3, 571	2, 383	N.A.	N.A.	401	513	569	374	329	N.A.	N.A.
Lubricating oil[3]	1,000 gallons	1, 588	1, 723	1, 927	2, 031	N.A.	N.A.	N.A.	241	334	363	414	319	N.A.	N.A.
Other mineral oils[3]	1,000 gallons	195	1, 740	3, 299	9, 580	N.A.	N.A.	N.A.	45	254	375	912	N.A.	N.A.	N.A.
Soap	—	—	—	—	—	—	—	—	285	429	519	674	773	1, 277	1, 450
Matches	1,000 cases[4]	124	195	223	142	87	47	118	280	506	570	392	327	274	727
Yarn and thread	—	—	—	—	—	—	—	—	504	681	596	568	598	573	676
Cotton and silk fabrics	—	—	—	—	—	—	—	—	3, 858	5, 126	5, 817	5, 608	6, 229	6, 646	5, 128
Wool fabrics	—	—	—	—	—	—	—	—	575	763	586	587	514	1, 001	1, 136
Gunny bags	Thousands	7, 903	9, 788	8, 428	7, 073	8, 303	16, 564	7, 418	636	951	885	725	874	2, 518	1, 404
Underwear, cotton	—	—	—	—	—	—	—	—	455	601	589	731	895	831	858
Paper	—	—	—	—	—	—	—	—	1, 014	1, 342	1, 453	1, 571	1, 825	2, 042	1, 934
Cement	Metric tons	92, 333	95, 604	132, 655	112, 823	196, 495	172, 829	123, 654	588	709	904	702	1, 149	973	668
Iron and steel	Metric tons	62, 088	65, 311	95, 668	104, 495	54, 208[5]	N.A.	N.A.	2, 671	3, 422	4, 416	4, 718	4, 038[5]	N.A.	N.A.
Iron manufactures	—	—	—	—	—	—	—	—	961	1, 283	1, 445	1, 895	2, 024	N.A.	2, 760
Construction material	—	—	—	—	—	—	—	—	332	407	262	716	530	632	540
Insulated wire	—	—	—	—	—	—	—	—	195	413	359	395	494	466	568
Bicycles and parts	—	—	—	—	—	—	—	—	599	826	858	1, 019	1, 143	1, 242	1, 093
Automobiles and parts	—	—	—	—	—	—	—	—	440	1, 076	1, 450	1, 584	1, 093	N.A.	N.A.
Porcelain and Earthenware	—	—	—	—	—	—	—	—	354	406	425	448	447	461	569
Lumber	1,000 bd. ft.	104, 344	112, 813	159, 627	187, 064	176, 451	160, 670	178, 127	1, 603	2, 161	2, 931	3, 468	3, 759	4, 316	4, 930
Ammonium sulfate	Metric tons	58, 114	76, 158	97, 538	139, 279	176, 601	N.A.	N.A.	1, 416	2, 272	3, 208	4, 304	5, 370	N.A.	N.A.
Other fertilizers	Metric tons	96, 041	131, 399	156, 672	172, 749	216, 384	413, 910[6]	333, 547[6]	1, 451	2, 655	3, 329	3, 965	10, 868	12, 768[6]	9, 675
Other commodities	—	—	—	—	—	—	—	—	13, 539	17, 619	20, 512	24, 006	24, 713	43, 647	43, 918

[1] In 1,000 gallons.
[2] A case contains 4 dozen bottles.
[3] See Note 2, Table 37, Chief Imports of Taiwan, above.
[4] A case contains 200 dozen boxes.
[5] First seven months only.
[6] Includes ammonium sulfate.
For exchange rates and sources, see Table 34, Chief Exports of Taiwan, above.

Table 67. Chief Imports from Foreign Countries.

Commodities and chief sources	*Unit of quantity*	QUANTITIES *1933*	*1934*	*1935*	*1936*	*1937*	*1938*	*1939*	VALUES IN $1,000 *1933*	*1934*	*1935*	*1936*	*1937*	*1938*	*1939*
Total	—	—	—	—	—	—	—	—	9, 060	11, 301	12, 912	14, 179	12, 734	11, 013	13, 252
Wheat	Metric tons	3, 148	3, 150	6	2, 182	148	386	777	65	73	—	71	5	14	23
Australia	Metric tons	3, 140	3, 126	—	2, 034	—	—	—	65	73	—	66	—	—	—
Other countries	Metric tons	8	24	6	148	148	386	777	—	—	—	5	5	14	23
Soybeans	Metric tons	36, 787	36, 780	41, 546	38, 839	40, 124	43, 008	42, 055	776	789	1, 224	1, 286	1, 456	1, 441	1, 696
"Manchukuo"	Metric tons	36, 725	36, 127	41, 546	38, 541	40, 060	43, 008	42, 055	774	773	1, 224	1, 275	1, 453	1, 441	1, 696
Other countries	Metric tons	62	653	—	298	64	—	—	2	16	—	11	3	—	—
Fish, salted or dried	Metric tons	2, 980	4, 772	6, 099	5, 348	4, 289	2, 374	1, 046	63	121	194	178	161	111	76
Russia	Metric tons	630	645	1, 977	1, 337	1, 914	2, 369	1, 044	17	27	83	52	79	110	76
Canada	Metric tons	1, 133	—	1, 177	3, 975	2, 355	—	—	21	—	37	124	79	—	—
Other countries	Metric tons	1, 217	4, 127	2, 945	36	20	5	2	25	94	74	2	3	1	—
Leaf tobacco	Metric tons	298	185	258	314	237	—	150	149	118	247	310	260	—	63
United States	Metric tons	236	182	222	307	234	—	—	130	116	229	302	255	—	—
Other countries	Metric tons	62	3	36	7	3	—	150	19	2	18	8	5	—	63
Heavy oil[1]	1,000 gallons	9, 321	7, 564	9, 619	7, 528	4, 218[2]	N.A.	N.A.	277	314	377	279	172[2]	N.A.	N.A.
United States	1,000 gallons	7, 545	5, 407	6, 949	2, 587	2, 597[2]	N.A.	N.A.	205	222	258	178	83[2]	N.A.	N.A.
Netherlands East Indies	1,000 gallons	1, 776	2, 157	2, 670	4, 941	1, 621[2]	N.A.	N.A.	72	92	119	101	89[2]	N.A.	N.A.
Gasoline[1]	1,000 gallons	1, 348	2, 491	3, 208	2, 919	2, 345[2]	N.A.	N.A.	206	450	500	441	360[2]	N.A.	N.A.
United States	1,000 gallons	240	849	1, 327	1, 117	585[2]	N.A.	N.A.	57	153	173	144	81[2]	N.A.	N.A.
Netherlands East Indies	1,000 gallons	1, 108	1, 642	1, 881	1, 802	1, 760[2]	N.A.	N.A.	149	297	328	297	279[2]	N.A.	N.A.
Kerosene and light oil	1,000 gallons	1, 298	1, 238	1, 452	1, 258	1, 089[2]	N.A.	N.A.	136	112	114	91	88[2]	N.A.	N.A.
United States	1,000 gallons	296	462	541	556	407[2]	N.A.	N.A.	47	54	62	50	39[2]	N.A.	N.A.
Netherlands East Indies	1,000 gallons	1, 002	776	911	702	682[2]	N.A.	N.A	89	58	52	41	49[2]	N.A.	N.A.
Lubricating oil	1,000 gallons	29	—	38	122	89[2]	N.A.	N.A.	4	—	11	26	18[2]	N.A.	N.A.
Jute	Metric tons	2, 513	1, 135	1, 563	2, 371	2, 016	3, 202	2, 591	157	71	109	174	178	271	283
British India	Metric tons	2, 083	853	1, 191	1, 550	1, 926	3, 197	2, 591	130	56	87	126	171	270	283
Other countries	Metric tons	430	282	372	821	90	5	—	27	15	22	48	7	1	—
Hemp cloth (from China)	1,000 sq. yds.	630	465	504	667	433	—	—	46	41	46	43	30	—	—
Gunny bags	Thousands	7, 009	8, 669	8, 626	8, 607	7, 048	6, 127	5, 075	694	971	1, 024	975	799	743	703
British India	Thousands	3, 560	4, 732	5, 445	6, 731	5, 548	5, 191	5, 075	395	560	700	791	646	638	703
Other countries (Chiefly China & Kwantung Lease)	Thousands	3, 449	3, 937	3, 181	1, 876	1, 500	936	—	299	411	324	184	153	105	—
Packing mats (from China)	1,000 sheets	5, 317	5, 683	5, 609	5, 831	5, 873	4, 330	4, 433	128	124	136	122	212	151	170
Iron and steel	Metric tons	5, 283	4, 614	6, 363	6, 786	4, 106[2]	N.A.	N.A.	193	233	189	157	125[2]	N.A.	N.A
Germany	Metric tons	1, 853	1, 444	387	455	6[2]	N.A.	N.A.	120	122	20	17	1[2]	N.A.	N.A
"Manchukuo"	Metric tons	2, 942	2, 531	4, 008	4, 169	2, 376[2]	N.A.	N.A.	30	46	55	68	48[2]	N.A.	N.A
United States	Metric tons	71	462	1, 128	410	249[2]	N.A.	N.A.	5	44	89	41	28[2]	N.A.	N.A
Great Britain	Metric tons	415	177	139	959	457[2]	N.A.	N.A.	38	21	18	23	20[2]	N.A.	N.A
China	Metric tons	—	—	700	775	924[2]	N.A.	N.A.	—	—	7	8	21[2]	N.A.	N.A
Other countries	Metric tons	2	—	1	18	93[2]	N.A.	N.A.	—	—	—	—	7[2]	N.A.	N.A
Lumber	1,000 bd. ft.	4, 732	2, 033	2, 965	17, 256	9, 254	909	944	72	35	51	186	141	16	21
China	1,000 bd. ft.	4, 672	1, 998	2, 896	16, 834	8, 290	2	—	70	32	44	168	96	—	—
Other countries	1,000 bd. ft	60	35	69	422	964	907	944	2	3	7	18	45	16	21
Bran	Metric tons	44, 684	47, 318	40, 238	65, 664	38, 934	13, 660	14, 597	530	736	705	1, 113	791	308	330
China	Metric tons	44, 684	47, 318	38, 596	50, 674	21, 996	3, 149	7, 326	530	736	680	864	443	66	158
Kwantung and "Manchukuo"	Metric tons	—	—	1, 632	14, 990	16, 938	10, 511	7, 271	—	—	25	249	348	242	172
Soybean cake	Metric tons	189, 711	225, 233	211, 463	198, 080	152, 017	163, 490	176, 333	2, 961	3, 626	4, 195	4, 293	3, 908	4, 178	5, 278
"Manchukuo"	Metric tons	189, 703	225, 216	211, 357	151, 762	106, 040	105, 707	105, 279	2, 961	3, 626	4, 193	3, 234	2, 692	2, 673	3, 118
Kwantung Leased Ter	Metric tons	8	17	106	42, 209	45, 947	57, 783	71, 054	—	—	2	951	1, 216	1, 505	2, 160
Other countries	Metric tons	—	—	—	4, 109	—	—	—	—	—	—	108	—	—	—
Sulfate of Ammonia	Metric tons	40, 149	59, 352	51, 232	35, 076	13, 713	17, 368	12, 376	980	1, 641	1, 483	1, 007	406	569	380
Germany	Metric tons	—	30, 768	27, 413	3, 645	—	—	—	713	849	781	122	—	—	—
"Manchukuo"	Metric tons	11, 484	10, 753	16, 904	25, 958	11, 163	10, 811	6, 259	267	302	514	747	331	360	194
Kwantung Leased Ter	Metric tons	—	—	1, 708	4, 457	2, 550	6, 556	6, 117	—	—	60	105	75	209	186
Other countries	Metric tons	28, 665	17, 831	5, 207	1, 016	—	—	—	—	490	128	33	—	—	—
Other commodities	—	—	—	—	—	—	—	—	1, 623	1, 846	2, 307	3, 427	3, 624	3, 211	4, 229

[1] See Note 2, Table 37, Chief Imports of Taiwan, above.
[2] First seven months only.
For exchange rates and sources, see Table 34, Chief Exports of Taiwan, above.

Table 68. Taiwan's Sugar Companies and Sugar and Molasses Production.

Company	Paid-up Capital June 30, 1940 (In 1,000 yen)	Reserves	Date of Establishment	Chief Shareholders	Other related Activities	Sugar Production 1938–1939 (In short tons)	Molasses Production 1938–1939 (In short tons)	No. of Mills in Taiwan	Head Office	Landholdings in Taiwan (in ko)[1]
Taiwan Seito Kabushiki Kaisha	43,080	69,415	1900	Japanese Imperial Household Mitsui Mitsubishi Naikoku Chokin (Savings) Bank	Railways Alcohol Refineries in Japan	362,347	87,064	13	Takezono-cho, Heito-shi, Takao-shu, Taiwan	46,630
Dai Nippon Seito K. K.	66,708[2]	47,030[2]	1896	Toyama, Meiji, Tokyo, Kaijo, and Nippon Life Insurance Cos. (Meiji Life Insurance Co. is a Mitsubishi subsidiary).	Railways Alcohol Refineries in Japan	355,605	85,112	9	Showa Building, Marunouchi, Tokyo, Japan	17,900
Meiji Seito K. K.	45,200	47,352	1906	Daiichi Life Insurance Co.	Railways Alcohol Beet sugar in Hokkaido Confectionery Pulp Rubber	339,780	69,887	7	Mato-gai, Sobun-gun, Tainan-shu, Taiwan	13,569
Ensuiko Seito K. K.	36,938	6,983	1907	Shinei Sangyo Meiji Life Insurance Co.	Railways Alcohol Pulp	217,950	56,484	7	Shinei-gai, Shinei-gun, Tainan-shu, Taiwan	----
Teikoku Seito K. K.	22,050[3]	9,248[3]	1910	Yamaguchi Nippon and Meiji Life Insurance Cos. merged with Dai Nippon Seito K.K. presumably in 1941[4].	Railways Alcohol Yeast Busses	131,195	29,717	6	Tagasago-cho, Taichu-shi, Taichu-shu, Taiwan	3,274
Showa Seito K. K.	12,500[3]	2,015[3]	1927	Merged with Dai Nippon Seito K.K. in 1940[5]	Railways Alcohol Forestry Colonization	65,969	18,281	5	Byoritsu-gai, Byoritsu-gun, Shinchiku-shu, Taiwan; also given as Goketsu-sho, Rato-gun, Taihoku-shu, Taiwan	------
Taito Seito K. K.	2,063	1,507	1913			14,695	3,142	2	Baran, Taito-gai, Taito-cho, Taiwan	6,325
Shinko Seito K. K.	1,200[6]	N.A.	1908	Was to be absorbed by Taiwan Seito in September, 1941[7]		19,932	6,120	1	Taiyyo-sho, Hazan-gun, Takao-shu, Taiwan	N.A.
Sango Koshi (Gensei Seito)	3,550[6]	N.A.	1934			7,134	1,576	1	Nirim-sho, Hokuto-gun, Taichu-shu, Taiwan	N.A.
Other Improved Mills	----	----	----	----------	----------	27,193	----	7[8]		
Primitive Mills	----	----	----	----------	----------	22,067	----	75[8]		
TOTALS	----	----	----	----------	----------	1,563,867	357,383	133		

[1] A *ko* equals 2.397 acres.
[2] Paid-up capital of Dai Nippon Sugar Mfg. Co. was later increased to 85,082,500 yen, and reserve to 53,676,000 yen, as a result of absorption of Showa and Teikoku Sugar Mfg. Companies.
[3] As of June 30, 1939.
[4] *Oriental Economist*, January 1942, and *Taiwan Jiho*, May, 1941, both note this merger.
[5] *Glimpses of the East*, 1940-41.
[6] At the end of March, 1939.
[7] *Japanese Sugar Production Estimate Shows Further Decline*, Donald W. Lamm, American Vice Consul, Tokyo, June 11, 1941.
[8] In 1936-37.

Sources: *Japan-Manchukuo Year Book*, 1940, 1941; *Japan Year Book*, 1940-41; Grajdanzev, *Formosa Today*, p. 100; *Sugar Year Book*, Tokyo, Japan, 1940; *Japan Trade Guide*, 1940.

Table 69. Revenues and Expenditures, Years Ending March 31

(In 1,000 yen)

	1935	1936	1937 Settled	1938	1939	1940	1941 Budgets	1942
Ordinary revenue:								
Taxes and duties	19,348	21,930	24,713	31,553	34,480	41,941	41,069	46,942
Government enterprises and properties	85,146	94,517	104,876	113,462	132,582	163,532	178,631	196,768
Stamp receipts	4,528	5,107	7,271	7,220	7,653	8,351	6,000	5,362
Miscellaneous receipts	1,593	1,853	1,284	1,221	1,998	2,552	2,629	2,607
Total ordinary revenue	110,615	123,407	138,144	153,456	176,713	216,356	228,326	257,107*
Extraordinary revenue:								
Sale of state property	739	832	833	911	1,075	1,428	1,904	1,664
Public loans	28,592	29,441	32,605	41,853	46,392	50,411	27,517	23,593**
Surplus preceding year	—	—	—	1,670	868	—	—	—
Special Income Tax	—	—	—	—	1,006	768	—	—
China Incident Special Tax	—	—	—	—	4,979	7,213	5,189	8,923
Special Profits Tax	1,664	907	1,376	2,761	2,784	6,379	14,903	19,952
Other extraordinary revenue		1,962	2,814	2,806				
Total extraordinary revenue	31,003	33,142	37,628	49,381	57,104	72,142	54,613	63,932
Total revenue	141,618	156,549	175,772	202,837	233,817	288,498	282,939	321,039
Ordinary expenditures:								
Government-General	2,341	2,702	3,112	3,715	3,672	3,937	4,446	5,548
Judicial expenses	1,306	1,337	1,348	1,416	1,423	1,488	1,585	1,585
Local governments	13,602	13,837	13,595	14,808	14,737	15,475	16,279	16,828
Prisons	1,216	1,264	1,388	1,437	1,489	1,620	1,489	1,620
Education	4,442	4,593	4,854	5,271	5,686	7,268	5,686	7,268
Hospitals	1,229	1,524	1,506	1,323	3,486	3,982	3,033	1,146
Customs-houses	21,759	23,386	26,380	30,585	36,876	44,758	not given	not given
Transportation and communications	24,405	26,450	28,001	31,752	35,944	44,455	54,650	62,484
Monopoly Bureau	3,150	3,229	3,403	3,733	3,769	4,494	45,888	62,484
Forestry	4,203	4,915	4,808	6,888	6,571	not given	not given	not given
Pensions	2,476	2,593	3,261	3,040	6,547	6,495	6,681	6,906
Transfer to National Debt Consolidation Fund Special Account	2,534	2,957	3,263			13,295	19,701	22,714
Other ordinary expenditures	87,269	94,023	98,882	109,274	120,768	140,522	166,796	188,589
Total ordinary expenditures								
Extraordinary expenditures:								
Public works	13,087	12,836	15,127	16,960	18,284	22,135	36,421	45,809
Construction and repairs	1,087	5,831	7,716	6,189	7,352	8,660	9,316	9,179
Subsidies	5,785	5,931	8,357	8,299	10,352	12,809	20,666	23,136
Encouragement of industry	1,580	1,959	2,234	2,509	3,685	4,507	7,410	9,516
Transfer to Special Account for Emergency Military Expenditure	—	—	—	—	14,538	17,658	24,302	24,516
Other extraordinary expenditures	3,380	6,714	5,643	12,904	8,448	111,145	18,216	19,829
Total extraordinary expenditures	24,908	29,921	35,057	47,170	62,639	76,914	115,391	132,450
Total expenditures	112,177	123,944	133,939	156,444	183,407	217,346	281,487	321,039

Source: Fortieth *Financial and Economic Annual of Japan 1940*, and *Orient Year Book*, 1942.
* Figures given are budgeted surplus of 256,639,000 yen.
** Source of this surplus is not clear unless actual revenues were greater (and/or expenditures less) than anticipated.

Table 70. Wages. 1936.

Unit—Yen Per Day.

Industry and Occupation	CITY													
	Taihoku		*Keelung*		*Shinchiku*		*Taichu*		*Tainan*		*Kagi*		*Takao*	
	Japanese	*Formosan-Chinese*	*Japanese*	*Formosan-Chinese*	*Japanese*	*Formosan-Chinese*	*Japanese*	*Formosan-Chinese*	*Japanese*	*Formosan-Chinese*	*Japanese*	*Formosan-Chinese*	*Japanese*	*Formosan-Chinese*
Metal Workers and Machinists:														
Lathe Workers	----	1.30	2.51	1.60	----	1.50	2.00	1.00	2.70	1.60	----	1.20	2.00	1.50
Finishers	1.50	1.20	2.35	1.65	----	1.30	2.00	1.00	2.70	1.60	----	1.20	2.00	1.50
Metal Casters	----	1.50	2.37	1.65	----	1.10	2.00	1.00	2.70	1.60	----	1.20	2.50	1.40
Blacksmiths	----	1.20	2.78	1.35	----	1.20	2.00	1.00	2.50	1.50	----	1.00	2.80	1.50
Mold Makers	2.30	1.50	2.45	1.05	----	----	----	----	----	1.30	----	----	2.60	1.90
Tin Can Makers	----	1.20	2.25	1.50	----	----	2.00	1.50	----	.70	----	1.20	2.00	1.50
Spinning and Weaving:														
Spinners—Female	----	.45	----	----	----	----	----	----	----	.50	----	----	----	----
Weavers—Female	----	----	----	----	----	----	----	----	----	.35	----	----	----	----
Cotton Underwear Knitters	----	.30	----	----	----	.30	----	----	----	.30	----	----	----	----
Ceramics:														
Potters	----	1.00	----	----	----	----	----	----	----	----	----	.70	----	----
Cement Makers	----	----	----	----	----	----	----	----	----	----	----	----	2.40	1.60
Glassmaking:														
Inspectors	----	.70	----	----	----	.90	----	----	----	1.60	----	----	----	----
Blowers	----	1.10	----	----	----	1.10	----	----	----	1.20	----	----	----	----
Brick Makers	----	.80	----	----	----	.75	----	.70	----	1.20	----	.80	----	1.05
Tile Makers	----	1.10	----	----	----	.75	----	.70	----	1.10	----	.90	1.86	1.07
Chemicals and Explosives:														
Drug Making	----	.75	----	----	----	----	----	----	----	.80	----	.80	----	----
Firecrackers	----	.80	----	----	----	----	----	----	----	----	----	----	----	----
Oil Extracting	----	.70	----	----	----	1.00	----	.80	----	1.20	----	.60	----	.98
Leathers and Hides	----	1.10	----	----	----	----	----	----	----	1.00	----	----	----	----
Foodstuffs:														
Flour Making	----	.90	1.00	.85	----	.70	----	.70	----	.90	----	.70	----	----
Vermicelli Making	----	.90	----	.82	----	.65	----	.80	----	.70	----	.80	----	.80
Soy Bean Oil Making	----	.95	----	1.20	1.20	1.00	----	.70	----	.90	----	.65	----	.90
Bean Paste Making	----	1.00	----	1.05	----	----	----	.70	----	1.10	----	.65	----	.90
Sugar Making	2.47	1.57	----	----	2.30	1.20	1.80	1.10	----	.80	----	----	----	----
Rice Huskers	----	1.00	----	----	----	1.00	----	.70	----	.80	----	.80	----	.70
Confectionery Making	1.50	.83	1.40	1.15	1.00	1.00	1.50	.70	1.60	1.20	1.00	.70	1.86	.85
Pineapple Canning	----	----	----	----	----	----	----	----	----	----	1.50	.70	----	.75
Tea Refining	----	1.00	----	----	----	1.10	----	----	----	----	----	----	----	----
Tea Sorting, Female	----	.25	----	----	----	.45	----	----	----	----	----	----	----	----
Tea Picking, Female	----	.40	----	----	----	.45	----	----	----	----	----	----	----	----
Clothes and Accessories:														
Tailors, Foreign Clothes	2.00	1.20	1.80	1.25	2.10	1.60	2.50	1.50	2.20	1.30	1.50	1.00	2.32	1.22
Tailors, Japanese Clothes	1.20	----	1.20	----	1.50	----	3.00	----	2.00	----	----	----	----	----
Tailors, Formosa Clothes	----	1.00	----	1.00	----	1.00	----	.80	----	.80	----	.80	----	.65
Palm Bark Coat Making	----	.60	----	----	----	.90	----	----	----	.60	----	.60	----	----
Coolie Hat Making	----	----	----	----	----	.65	----	----	----	----	----	.30	----	----
Shoe Makers	2.20	.90	1.60	1.20	----	.85	1.80	1.00	2.00	1.30	2.20	.90	1.40	1.00
"Geta" (Clog) Makers	1.20	.70	----	----	1.00	.85	----	.60	1.30	.90	----	.60	----	.83
Gold-and-Silversmiths	1.50	.60	----	.65	2.40	1.70	----	.80	1.80	.80	----	.80	2.46	1.02
Dyers	1.70	1.50	----	----	1.35	1.00	2.50	----	2.00	.90	----	.80	1.70	1.90

Table 70. Wages. 1936.—Continued.

Unit—Yen Per Day.

Industry and Occupation	CITY													
	Taihoku		*Keelung*		*Shinchiku*		*Taichu*		*Tainan*		*Kagi*		*Takao*	
	Japanese	*Formosan-Chinese*	*Japanese*	*Formosan-Chinese*	*Japanese*	*Formosan-Chinese*	*Japanese*	*Formosan-Chinese*	*Japanese*	*Formosan-Chinese*	*Japanese*	*Formosan-Chinese*	*Japanese*	*Formosan-Chinese*
Wood-working and Strawmat Making:														
Lumber Sawyers, Hand	3.50	.80	----	1.30	----	1.40	----	1.20	----	1.50	----	1.20	----	1.50
Lumber Sawyers, Machine	2.00	1.20	1.80	1.50	----	1.40	----	1.20	----	1.50	----	1.20	1.75	1.15
Furniture Makers	1.50	1.00	2.30	1.50	2.40	1.20	2.50	1.80	3.00	1.80	2.50	1.50	1.90	1.30
Door and Screen Making	3.00	2.00	2.30	1.50	2.00	1.30	2.50	1.20	2.50	1.60	2.50	1.50	2.00	1.30
Lacquerware Making	2.00	1.00	----	----	----	----	2.00	1.00	----	----	----	----	2.68	1.72
Bamboo Ware Making	----	.80	----	.70	----	.80	----	.70	----	.70	----	.70	1.80	1.00
Japanese Mat Making	3.00	1.80	2.50	----	2.50	1.50	4.00	2.50	3.20	1.60	2.50	1.50	2.95	1.50
Vehicle Making	----	1.00	----	1.10	----	1.00	----	1.20	----	1.00	----	.80	----	1.25
Tub Making	----	1.00	1.50	1.00	----	1.10	2.50	1.20	2.00	1.50	2.50	1.50	1.20	.90
Straw Matting Making, Female	----	.30	----	----	----	----	----	----	----	----	----	----	----	----
Building and Construction:														
Carpenters	3.50	2.30	3.00	1.70	2.80	1.60	2.70	2.50	2.80	1.50	2.50	2.00	2.55	2.00
Plasterers	3.50	1.60	3.00	1.65	3.00	2.00	2.70	2.00	3.20	1.80	2.50	2.00	2.65	1.80
Stone Cutters	3.50	1.80	3.00	1.70	3.10	1.80	3.00	2.00	3.50	1.80	2.50	2.00	2.55	2.00
Brick Layers	2.80	2.00	3.00	2.00	2.80	1.70	----	2.00	3.50	1.70	2.20	2.00	----	1.80
Tile Layers	3.00	2.30	3.00	2.05	3.00	1.80	----	1.50	3.50	1.70	2.50	2.00	2.60	1.80
Painters	2.50	1.80	2.50	1.70	2.50	1.60	----	1.50	2.50	1.50	1.80	1.50	2.75	1.72
Printing and Binding:														
Type Setters	2.50	1.80	----	1.25	----	.70	1.50	1.00	1.60	1.10	----	.90	----	1.20
Lithographers	2.70	1.30	----	----	----	.80	2.00	1.00	1.80	1.40	----	1.00	----	1.15
Binders	2.40	1.30	1.50	1.20	----	.70	1.70	1.00	----	1.10	----	.80	----	1.45
Miscellaneous:														
Shipbuilders	----	----	2.95	1.75	----	----	----	----	3.20	2.00	----	----	2.70	1.50
Stevedores	1.50	1.20	2.35	1.85	----	1.00	----	----	1.10	1.00	----	1.20	1.30	.95
Longshoremen	----	----	2.35	1.85	----	----	----	----	1.30	1.00	----	----	1.45	1.10
Cart Pullers, Manual	----	1.00	----	1.05	----	1.00	----	1.20	----	.80	----	1.20	----	1.05
Cart Pullers, with Oxen	----	2.00	----	1.65	----	2.00	----	1.00	----	1.30	----	2.00	----	1.70
Paperhangers	2.80	1.50	2.40	1.45	2.80	2.00	3.00	1.50	2.50	1.50	3.00	1.20	2.40	1.40
Sculptors or Carvers	----	.90	----	.85	----	1.50	1.80	1.20	2.20	1.30	----	1.20	2.30	1.20
Electricians	1.69	1.38	1.80	1.65	1.50	1.00	1.50	1.00	1.50	1.20	1.40	1.30	1.80	1.10
Pushcart Men	----	.90	----	1.09	----	.60	----	.70	----	1.00	----	.70	----	----
Car Loaders	1.50	1.00	1.88	1.25	----	1.10	----	1.20	----	1.00	----	1.20	1.38	.98
Fishermen	----	----	1.08	.80	----	----	----	----	----	.60	----	----	1.60	1.15
Miners	----	1.00	----	1.33	----	----	----	----	----	----	----	----	----	----
Farm Laborers, Male	----	1.00	----	.45	----	.90	----	.65	----	.60	----	.80	.90	.75
Farm Laborers, Female	----	.50	----	----	----	.50	----	.40	----	.25	----	.45	----	.45
Rice Farmers, Male	----	1.40	----	.45	----	1.20	----	.70	----	.60	----	.80	----	.90
Rice Farmers, Female	----	.50	----	----	----	.60	----	.45	----	.25	----	.45	----	.50
Gardeners	3.00	2.00	2.00	1.40	----	----	2.00	1.50	2.00	1.30	3.00	1.80	2.50	1.80
Coolies, Male	1.50	.80	1.10	.93	1.60	.85	----	.72	1.80	.90	----	.80	1.10	1.00
Coolies, Female	----	.60	----	.60	----	.55	----	.50	----	----	----	.55	----	.40
Servants: Yen Per Month:														
Male	----	----	----	12.00	----	11.00	----	7.00	----	----	----	----	26.00	10.50
Female	18.00	6.00	11.50	4.00	15.00	8.00	10.00	6.00	15.00	5.00	12.00	8.00	15.50	12.00

Table 71. Power Plants in Taiwan, 1944.

Company and Plant	Capacity[1]	Location	Remarks
Taiwan Electric Power Company			
Jitsugetsutan No. 1	100, 000	Mompaitan, Taichu Province	These two Lake Jitsugetsutan plants serve the entire west coast plain.
Jitsugetsutan No. 2	43, 500	Suiriko, Taichu Province	
Jitsugetsutan No. 3	23, 100	West of Suiriko, Taichu Province	Planned, but no evidence of construction.
Tenrei	98, 000	On Taiko River, Taichu Province	Completion planned for 1944, but no recent information available.
Toyohara	70, 700	On Taiko River, near Toyohara	
Musha No. 1	21, 400[2]	On the upper Dakusui River, in the Musha area, northeast of Lake Jitsugetsutan	Musha No. 2 reported under construction in 1938, and completion planned for 1943, but no recent information is available.
Musha No. 2	27, 100[2]		
Enzan	16, 300	Gyuto, Rato-gun, Taihoku Province	Near Rato; often referred to, in error, as "Maruyama Plant".
Shin Kizan	13, 000	Daisoko, Kizan, Shinten, Taihoku Province	Completed in March, 1941.
Tensobi	8, 600	Near Giran, Taihoku Province	These plants were temporarily closed after the opening of Jitsugetsutan Plant No. 1 in 1934, at which time there was a surplus of electric power; they were, however, kept in readiness for use, and they were reported to be in operation in May of 1939; most of them were reported in operation in 1940.
Shosoko	4, 400	Near Shinten, Taihoku Province	
Dorowan	3, 100	Near Rokki, Takao Province	
Chikushimon	1, 950	Near Riko, Takao Province	
Hokuzanko	1, 800	Southeast of Taichu city	
Dakusui	1, 500	Rato-gun, Taihoku Province	
Kori	950	10 miles north of Taichu city	
Kizan	750	Just south of Shinten, Taihoku Province	
Shirin (Taihoku City)	500	North of Taiwan Shrine	
Taiwan Electric Power Company, thermal (coal) plants			
Keelung	38, 000	Hattoshi, about 4 miles east of Keelung	These plants supplement Jitsugetsutan plants during the dry season, and are also used in emergencies.
Takao	13, 000	Sankaisaku, Takao city (northeast of city)	
Matsuyama	5, 500	2 miles east of Taihoku city	
Total Taiwan Electric Power Co	493, 150		(Of this 252,850 kw. are believed to be in operation, and perhaps also 27,100 kw. at Musha No. 2 plant).
East Taiwan Electric Power Company			
Domon	23, 200	These four plants are located on the Mokka and Kiyomizu Rivers, near Karenko, on the east coast, and supply power to Karenko.	Reported in operation in 1940. Recent information reports their control to be in the hands of Nippon Aluminium Company, the Karenko factory of which consumes much of their power output.
Kiyomizu No. 1	7, 000		
Kiyomizu No. 2	5, 000		
Hatsune	1, 600[3]		
Takkiri River Plants	80, 000	On Takkiri River, north of Karenko	Planned for operation in 1944, but no construction under way in early 1940.
Other plants	90, 000	Unknown	Planned, but no further information.
Total East Taiwan Elec. Power Co	206, 800		(Of this 36,800 kw. are believed to be in operation).
Plants formerly owned by Taiwan Electric Co., Ltd., capital 2,000,000 yen (1935). In 1940 this company was merged with Taiwan Electric Power Company.			
Kagi	3, 000	Kagi city, Tainan Province	Steam (coal).
Nankyo	200	Unknown	Water.
Byoritsu	100	Byoritsu, Shinchiku Province	Diesel.
(This company also had five stations receiving power totaling 2,300 kw. from Taiwan Electric Power Company).			
Plants formerly owned by Taiwan Godo Electric Company, Ltd., capital 2,000,000 yen (1935). In 1940 this company was merged with Taiwan Electric Power Company.			
Sharyokaku	900	Unknown	Water.
Hoko (Pescadores)	210	Mako	Diesel.
Toen	132	Toen, Shinchiku Province	Steam (coal).
Taparoku	110	Unknown	Water.
Taito No. 1	50	Taito, Taito District	Diesel.
Taito No. 2	110	Taito, Taito District	Diesel.
Chikunan	60	Chikunan, Shinchiku Province	Diesel.
(This company also had two stations receiving power totaling 550 kilowatts from the Taiwan Electric Power Company).			
Karenko Electric Co., Ltd.; capital 1,240,000 yen (1935).			
Karenko No. 1	200	Karenko, Karenko District	Water.
Karenko No. 2	400	Karenko, Karenko District	Water.
Horin	30	Horin, Karenko District	Water.
Horin	25	Horin, Karenko District	Water.
Tamasato	30	Tamasato, Karenko District	Gas engine.
Koshun Electric Co., Ltd., capital 100,000 yen (1935)			
Koshun	50	Koshun, Takao Province	Diesel.
Nansho Electric Co., capital 8,500 yen (1935)			
Nansho	7. 5	Nansho, Shinchiku Province	Water.
Total of small plants	5, 614. 5		
Private generating plants		No. Generators	
Asano Cement Works, Takao	4, 500	3	These are generating plants to supply needs of individual plants, Government offices, etc. Data as of 1935. Coal-burning steam engines are the principal motive power employed, although bagasse is also burned. Niitaka Sugar Company, no longer in existence, had its head office at Wami, Taichu Province; it is believed to have been absorbed by Dai Nippon Sugar Manufacturing Co.
Meiji Sugar Manufacturing Co	3, 301	13	
Ensuiko Sugar Manufacturing Co	3, 260	15	
Taiwan Sugar Manufacturing Co	2, 689	25	
Dai Nippon Sugar Manufacturing Co	2, 630	9	
Niitaka Sugar Manufacturing Co	437	9	
Teikoku Sugar Manufacturing Co	391	7	
Government Forestry Bureau	1, 010	3	
Tainan City Office	660	1	
Taihoku City Office	500	1	
Takao City Office	120	1	
Taiwan Hemp Co., Ltd	240	1	
	19, 738		

Sources: This table has been compiled from available consular reports, Japanese publications, and other sources. Details of location and equipment, where available, are given for plants of over 1,000 kw. capacity in the appendix. Except in cases noted (Musha, Taiko River plants, Takkiri and other plants on the East Coast, and Jitsugetsutan No. 3) plants listed are believed to be in operation, or capable of operation. See especially *Rural Electrification in Taiwan*, Edward S. Maney, American Consul, Taikohu, June 24, 1935; *Electric Power in Taiwan*, Gerald Warner, American Consul, Taihoku, September 16, 1938, and *Electric Power Developments in Taiwan*, Gerald Warner, American Consul, Taihoku, June 9, 1939.

[1] In kilowatts. Planned capacity is given for plants not yet reported completed. Capacity commonly in use is given for other hydroelectric plants, and installed capacity for steam plants.

[2] Another source gives capacity of these plants as 20,000 and 30,000 kilowatts respectively.

[3] Another source gives capacity of this plant as 1,770 kilowatts.

Table 72. Directory of Supply and Service Organizations.

The following are some of the organizations whose equipment and experienced personnel may be subject to conscription for use. Outstanding members are elected to direct associations of peoples and companies engaged in similar businesses, and these associations are in effect unions which guarantee fair treatment among members. An order given to the leaders of an organization is transmitted to appropriate members. Although the directorates of many Taiwan enterprises are Japanese, the experienced personnel which provides the actual services is predominantly Formosan-Chinese. The use of (F) or (J) indicates present Formosan-Chinese or Japanese management, where known.

Alcohol			
Meiji Seito K. K	(J)	Mato-gai, Sobun-gun, Tainan Prov.	
Taiwan Seito K. K	(J)	Heito City, Takao Province	
Dai-Nippon Seito K. K	(J)	Kobi-gai, Tainan Province	
Takao Alcohol K. K. manufacturers	(J)	793 Rei-ga-ryo, Takao	
Ensuiko Seito K. K. manufacturers	(J)	18 Irifune-cho, 5-chome, Takao	
Kosei Shoko exporters		21 Minato-cho, 1-chome, Takao	
Shingiko Shoko exporters		6 Kigo-cho, 5-chome, Takao	
Shinnan Koshi exporters		4 Kigo-cho, 4-chome, Takao	
Togen Shoko exporters		1 Kigo-cho, Takao	
Mitsui Bussan Kaisha, Ltd exporters	(J)	51 Shin-Hama-cho, 1-chome, Takao	
Banks			
Sanwa Bank, Ltd	(J)	55 Hon-machi, 2-chome, Taihoku City	
Nippon Kangyo Ginko (Hypothec Bank of Japan)	(J)	2 Omote-cho, 1-chome, Taihoku City (Branches at Taichu City and Tainan City)	
Bank of Taiwan	(J)	1 Sakae-cho, 2-chome Taihoku City	
	(J)	Branches at: Keelung City, Taichu City, Shoka City, Takao City, Kagi City, Tainan City, Shinchiku City, Heito City, Mako City, Giran-gai, Toen-gai	
Bank of Taiwan	(J)	Branches at: Nanto-gai, Taito-gai, Karenko-gai, Gosei-gai	
Kanan Bank (China and Southern Bank, Ltd.)		2 Omote-cho, 2-chome, Taikohu City, Chin, Keiho, Director 338 Rei-ga-Ryo, Takao City	
Shoka Bank Ltd		90–91 Taiheishi, 1-chome, Taikohu City 9 Taisho-machi, 3-chome, Taichu City, Go, Josho, President 221 Tomon (East Gate), Shoka City	
Taiwan Shoko Ginko (Commercial and Industrial Bank, Ltd.)	(J)	1 Yamato-cho, 4-chome, Taihoku City (Branch at 7 Nisshin-cho, 4-chome, Keelung)	
Taiwan Savings Bank	(J)	43 Hon-cho, 1-chome, Taihoku City	
Cement, Bricks and Tiles			
Asano Portland Cement Co., Ltd.	(J)	5 Yamashita-cho, 3-chome, Takao	
Kochito Shoten	(J)	14 Yamashita-cho, 4-chome, Takao	
Shigohatsu Shoko	(J)	2 Tamachi, 4-chome, Takao	
Taiwan Renga K. K	(J)	3 Akashi-cho, 2-chome, Taihoku	
Taiwan Kasei (Cement) Co	(J)	Takao	
Note: There are extensive brick and tile factories at Hokuto, Taihoku Prov., and at Toen, which is the center of the industry. Other kilns are at Nanto, between Kago and Taichu.			
Cereals (*chiefly rice and rice warehousing*)			
Taiwan Cereal Agency Joint Stock Company	(F)	Go, Baisen, Mgr. 1 Izumi-cho, 2-chome, Taihoku	
Annan Shoko, cereal exporters		1 Minato-cho, 1-chome, Takao	
Eiryu Shoko, rice merchants		59 Fukutoku-machi, 1-chome, Keelung	
Giryugo, rice merchants		47 Kogo-cho, 2-chome, Takao	
Kenyu Shoko, rice merchants		8 Tamada-cho, 2-chome, Keelung	
Li Trading Corporation, rice merchants	(F)	808 Bantan, Heito, Takao Prov.	
Takao Branch, Mitsubishi Shoji Kaisha	(J)	32 Horio-cho, 3-chome, Takao	
Mitsui Bussan Kaisha rice merchants	(J)	13 Asahi-machi, 2-chome, Keelung	
Riko Shoko, cereal exporters		21 Minato-cho, 1-chome, Takao	
Taihoku District Rice Merchants' Guild	(F)	55 Eiraki-cho, 2-chome, Taihoku	
Rice Dealers' Association	(F)	Ko Gyokusho, Pres., Toen, Shinchiku Prov.	
Takao Rice and Cereal Dealers' Association		42 Shin-Hama-cho, 1-chome, Takao	
Kainan Flour Mill Co		195 Muho-sho, Daiton-gun; Taichu City, Taichu Prov.	
Taiwan Flour Mills, Ltd		Keelung	
Taiwan Rice Exporters' Assoc	(F)	22 Eiraku-cho, 1-chome, Taihoku	
Tamafuku Shokai, rice merchants		6 Isshin-cho, 3-chome, Keelung	
Toko Shoten, rice merchants		35 Asahi-machi, 2-chome, Keelung	
Zuisho & Co., rice merchants		2 Moto-machi, 1-chome, Keelung	
Communications			
Kokusai Denwa K. K., International telephone and broadcasts	(J)	7 Sakae-cho, 1-chome, Taihoku	
Cold Storage and Ice			
Taihoku Chuo Shijo K. K., general provisioning, ice manufacture, etc.	(J)	5 Kotobuki-cho, 5-chome, Taihoku	
Kizan Ice Manufacturing Co.	(F)	Kizan-gai, Kizan-gun, Takao	
Keelung Reizo K. K., cold storage	(J)	13 Showa-cho, Keelung	
Takao Chuo Oroshi-Shijo K. K., general provisioning	(J)	3 Kitano, 3-chome, Takao City	
Taiwan Ice Manufacturers' Guild		1 Akashi-cho, 2-chome, Taihoku	
Taiwan Electric Light Co., Ltd., ice		25 Shintoma-cho, 7-chome, Kagi City	
Taiwan Electric Power Co., Ltd., ice		1 Shoin-cho, 1-chome, Taihoku	
Karenko Electric Co., Ltd., ice		1 Kurogane-dori, Karenko City	
Drugs and Chemicals			
Taiwan Bakuchiku Kaisha, manufacturers and exporters of fireworks; bird and animal exterminators	(F-C)	Kawai-cho, Taihoku	
Dainichi K. K manufacturer of washing soap and toilet articles; small		2 Irifune-cho, 6-chome, Takao	
Ether Seizo Kaisha manufacturer of ether	(J)	254/3 Kiyomizu, Kiyomizu-gai, Taiko-gun, Taichu Prov.	
Kako Sekken Keshohin Kaisha, manufacturer of toilet washing soap; medium size	(F-C)	83 Umegaya-cho, Taichu	
Kangen Yakko Gentan Seizo Kojo, manufacturer of patent medicines	(F–C)	14 Eiraki-cho, 3-chome, Taihoku	
Kusshin Shi Dai Yakubo, manufacturer of patent medicines, dealer in chemicals and drugs; large	(F-C)	88 Eiraki-cho, 2-chome, Taihoku	
Kyoei Seiyaku K. K manufacturer of Chinese drugs	(F-C)	87 Umegae-cho, Taichu	
Matsuda Yushi Kogyo Goshi Kaisha, small manufacturer of toilet and washing soap	(J)	490 Tama-cho, Tainan	
Nippon Tansan Co., Ltd (Japan Carbonic Acid Co., Ltd.)	(J)	Reigaryo, Takao	
Sekken Genryo K. K. (soap)	(J)	7 Hokumon-cho, Taihoku	
Sekken Hanbai K. K., wholesale dealers in soap	(J)	43 Honmachi, 1-chome, Taihoku	
San Tai Goshi Kaisha, manufacturer of toilet and washing soap; small	(F-C)	270 Toyohara, Toyohara-gai, Toyohara-gun, Taichu Prov.	
Shinchiku Keshohin Goshi Kaisha, small manufacturer of face powder	(F-C)	176 Nanmon, Shinchiku	
Shinno Shi Dai Yakubo, manufacturer of patent medicines; dealer in chemicals and drugs; large	(F-C)	94 Eiraku-cho, 2-chome, Taihoku	
Sugihara Industry Co., Ltd., manufacturers and dealers in fats and oils, chemicals, rice, starch, cement, machinery, etc.		Honmachi, 4-chome, Taihoku; also given as Hokumon-cho, Taihoku. Branch at 14 Minato-machi, 1-chome, Takao. Sub-branches at Taichu, Kagi, Tainan, Karenko, Taito	
Taiwan Kenka K. K., ferrosilicate & nitrogenous lime	(J)	97 Kiyama, Keelung	
Taiwan Fertilizer Co., Ltd		95 Denryo-cho, Keelung	
Taiwan Hoshi Seiyaki K. K., planter of Cinchona, manufacturer of quinine	(J)	7 Yamato-cho, 2-chome, Taihoku	
Taiwan Sekken Goshi Kaisha, medium-sized manufacturer of toilet and washing soaps	(J)	16, 17 Midori-cho, 4-chome, Taihoku	
Taiwan Seiyaku K. K., large planter and manufacturer of coca leaves	(J)	65 Shinei, Shinei-sho, Shinei-gun, Tainan Prov.	
Takasago Koryo K. K., manufacturer of toilet articles and medicinal preparations; large	(J)	10 Ryuampa, Daian, Taihoku	
Toko K. K., large manufacturer of toilet and washing soap	(J)	21 Midori-cho, 3-chome, Taihoku Branch at Tainan	
Tozai Yakubo, manufacturer of patent medicines; dealer in chemicals and drugs; large	(F-C)	49 Eiraku-cho, 3-chome, Taihoku	
Electric Light and Power (see Table 71).			

ELECTRIC MACHINES AND APPLIANCES (MANUFACTURE AND SALE)		
Nippon Electric Co., Ltd	(J)	43 Hon-machi, 1-chome, Taihoku
Tokyo Electric Co., Ltd	(J)	3 Kyo-machi, 1-chome, Taihoku
Moriya Shokai, Ltd	(J)	40 Hon-machi, 1-chome, Taihoku
EXPORTERS (GENERAL MERCHANDISE)		
Mitsui Bussan Kaisha, Ltd	(J)	51 Shin-Hama-cho, 1-chome, Takao
Mitsubishi Shoji Kaisha, Ltd.	(J)	32 Horie-cho, 3-chome, Takao
Kosei Shoko		21 Minato-cho, 1-chome, Takao
Shinnan Koshi		4 Kigo-cho, 4-chome, Takao
Togen Shoko		1 Kigo-cho, 5-chome, Takao
Wahatsu Koshi		12 Kigo-cho, 5-chome, Takao
EXPORTERS, IMPORTERS AND COMMISSION AGENTS		
Abe-Ko Shoten		64 Shin-Hama-cho, 1-chome, Takao
Anglo-American Direct Tea Trading Co.		1 Izumi-cho, 2-chome, Taihoku
Asano Bussan Co., Ltd		7 Hokumon-cho, Taihoku
Hongkong Saneki Koshi		63 Shin-Hama-cho, 1-chome, Takao
Kato & Co., Ltd		7 Suehiro-cho, 5-chome, Taihoku
Lee Tiong Ghee & Co		10 Nisshin-cho, 2-chome, Taihoku
Nosawa & Co		Taisho-cho, 1-chome, Taihoku
Ren Hatsu Shoko		242 Shimo Keifu-cho, 1-chome, Taihoku
Shingiko Shoko		6 Kigo-cho, 5-chome, Takao
Showa Shokai		15 Shin-Hama-cho, 3-chome, Takao
Sugihara Sangyo Kaisha, Ltd.		14 Minato-cho, 1-chome, Takao
Tai & Co., Ltd		22 Minato-cho, 1-chome, Taihoku
Takao Seiton Yushutsu Goshi Kaisha		6 Horie-cho, 1-chome, Takao
Takki Gomei Kaisha		130 Kensei-cho, Taihoku
Towa Shoko		39 Kigo-cho, 2-chome, Takao
Yamaichi Shoko		7 Suehiro-cho, 3-chome, Taihoku
FERTILIZER		
Taiwan Fertilizer Exporters & Importers' Association	(J)	63 Shin-Hama-cho, 1-chome, Takao, Akashi-cho, 2-chome, Taihoku
Taiwan Hiryo K. K	(J)	95 Denryoko, Keelung
Taiwan Seihi K. K	(J)	36 Shin-Hama-cho, 1-chome, Takao
Zuisho & Co		2 Moto-machi, 1-chome, Keelung
Koyu Shoko & Co		45 Moto-machi, 1-chome, Keelung
FRUIT		
Taiwan Fruit and Vegetable Exporters and Importers' Association		15 Shin-Hama-cho, 3-chome, Takao
Takao Fruit Company, Ltd	(F)	Rin, Tokugyoku, President, 700 Manran-sho, Chosu-gun, Takao Province
Nanbu Seika K. K., fruit exporters	(J)	49 Shin-Hama-cho, 1-chome, Takao
Taihoku District Orange Merchants' Guild	(F)	Taihoku
Taihoku District Fruit Exporters' Association	(J)	Taihoku
Taiwan Fruit & Vegetable Exporters' Association	(J)	15 Shin-Hama-cho, 1-chome, Takao
Taiwan Seika K. K., express agents for fruits	(J)	1 Tachibana-cho, 2-chome, Taichu
Takao Fruit & Vegetable Dealers' Guild	(J)	5 Shin-Hama-cho, 3-chome, Takao
Toa Shokai, fruit exporters		16 Minato-cho, 2-chome, Takao
Chinsei Shoten, canned pineapple merchant	(F-C)	16 Yamashita-cho, 1-chome, Takao
Mitsui Bussan Kaisha, Takao Branch	(J)	51 Shin-Hama-cho, 1-chome, Takao
Tawain Consolidated Pineapple Company	(J)	1 Horie-cho, 5-chome, Takao, central office of 77 canneries
Shinko Seikasha, canned pineapple dealer		17 Yamashita-cho, 1-chome, Takao
Yamaguchi Kudamono-Ten, canned pineapple dealer	(J)	5 Entei-cho, 1-chome, Takao
Zutai Shonten		10 Entei-cho, 3-chome, Takao
Note. See also *Pineapples.*		
GAS (*supply*)		
Taiwan Gas Co., Ltd	(J)	13 Hama-cho, 2-chome, Taihoku
HOTEL MANAGEMENT AND PROVISIONING		
Kozan-re	(F)	186 Nisshin-cho, 2-chome, Taihoku
Eiraku Hotel	(F)	1/122 Eiraku-cho, 2-chome, Taihoku
Yorozuya Hotel	(J)	33 Omote-cho, 1-chome, Taihoku
Taiwan Railway Hotels	(J)	37 Hon-cho, 1-chome, Taihoku, Tainan Railway Station
Hinomaru Hotel	(J)	6 Akashi-cho, 2-chome, Taihoku
Daisekai Goshi Kaisha	(J)	87 Taihei-cho, 3-chome, Taihoku
Azuma Hotel	(J)	13 Omote-cho, 2-chome, Taihoku
Taihoku Kita Ku Restaurant Guild	(F)	Taihoku
INSURANCE		
Taisei Fire & Marine Ins. Co.	(J)	11 Omote-cho, 2-chome, Taihoku City; Rin, Yuko, President, 4 Onari-cho, 3-chome, Taihoku City; Rin, Kendo, Director, 195 Muho-sho, Daiton-gun, Taichu Prov.
JUTE CLOTH, GUNNY SACKS, COTTON CLOTH, ETC.		
Taiwan Seima K. K	(F)	14 Toyohara-gai, Taichu Province
Tainan Seima K. K	(J)	57 Sanbunshi-gai, Tainan City
Taiwan Hemp Dressing Co.	(F)	Shoka City, Taichu Prov.
Nisshin Shokai, Ltd	(J)	28 Honmachi, 1-chome, Taihoku
Takekoshi Yoko, manufacturers and exporters of cotton, rayon, woolen, and other goods		Hon-machi, Taihoku
Taiwan Choma Boshoku K. K.		Juniko, Daian, Taihoku Prov.
LAUNDRY EQUIPMENT		
Sekken Hanbai K. K. wholesale dealers in soap	(J)	43 Honmachi, 1-chome, Taihoku
Sekken Genryo K. K., soap	(J)	7 Hokumon-cho, Taihoku
LEATHER MANUFACTURERS		
Keisho Shoten	(F)	57 Taihei-cho, 2-chome, Taihoku
Koshin Shoten	(F)	76 Taihei-cho, 2-chome, Taihoku
Nogawa Shoten	(J)	10 Yamato-cho, 4-chome, Taihoku
San Ei Shoko	(F)	1 Hon-cho, 3-chome, Taihoku
Sumioka Shoten	(J)	55 Eiraki-cho, 2-chome, Taihoku
Taiwan Seikaku K. K	(J)	400 Miyamae-cho, Taihoku
Yamato Shoko	(J)	44 Shinki-cho, 2-chome, Taihoku
Yoshimoto Shokai	(J)	1 Midori-cho, 2-chome, Taihoku
LIQUORS AND BEVERAGES		
Takasago Beer Kabushiki Kaisha	(J)	154 Jo-Hito, Taihoku
Japan Carbonic Acid Co., Ltd.	(J)	Takao
Liquor Dealers' Association		Ko, Saiju, Director, Giran, Taihoku Prov.
MARINE PRODUCTS (*most of these firms have cold storage facilities*)		
Hayashi Kane Shoten, fish and shellfish	(J)	53 Hama-cho, Keelung
Jun Bee Kaisanbu, marine products exporter		47 Asahi-machi, 1-chome, Keelung
Lee Kee & Co., marine products exporter	(F)	29 Fukutoku-machi, 1-chome, Keelung
Mikawa Shoko		5 Asahi-machi, 1-chome, Keelung
Taihoku Chuo Shijo K. K	(J)	5 Kotoboki-cho, 5-chome, Taihoku
Shin Senri Shoko, exporters		43 Asahi-machi, 1-chome, Keelung
Sie Zu Kee and Co., exporters		79 Tamada-cho, 2-chome, Keelung
Taiwan Kairiku Bussan K. K., equipment		39 Asahi-machi, 2-chome, Keelung
Taiwan Suisana Hanbai K. K., equipment		5 Asahi-machi, 3-chome, Keelung
Takao Uo-Ichi K. K., equipment		10 Shin-Hama-cho, 2-chome, Takao
Nippon Suisan K. K., equipment	(J)	53 Hama-cho, Keelung
Taiwan Coral Export Assoc.		Taihoku
Takao Chuo Oroshi-Shijo K. K.	(J)	3 Kitano, 3-chome, Takao
MACHINERY (*manufacture and repair*)		
Taiwan Nogu Seizo K. K	(J)	3 Iri-minato-cho, 5-chome, Takao
Taiwan Iron Foundry Co., Ltd.	(J)	14 Irifune-cho, 5-chome, Takao
Ohba Iron Works	(J)	7 Entei-cho, 1-chome, Takao
Keelung Dock K. K	(J)	1 Taisho-machi, Keelung
Ishii Tekkosho		118, 119 Horikawa-cho, Keelung
Kotaka Tekkosho		2 Kensei-cho, 4-chome, Taihoku
Maeda Tekkosho		In front of Hatto Station, near Keelung
Moritani Shokai		40 Hon-machi, 1-chome, Taihoku
Taihoku Tekkosho		241, 242 Miyamaye-cho, Taihoku
Taiwan Denki Chukosho		Matsuyama, Taihoku
Takasago Chuzo K. K		12 Taihei-cho, 7-chome, Taihoku
Toyo Tekkosho		95,96, 98 Dairyuto, Taihoku
MERCHANDISE (GENERAL)		
Mitsubishi Shoji K. K	(J)	32 Hori-cho, 3-chome, Takao; 5 Hon-machi, 4-chome, Taihoku
Hayashi Hyakka Ten, Ltd	(J)	18 Suehiro-cho, 2-chome, Tainan
Kikumoto Shoko, Ltd	(J)	244 Taihei-cho, 3-chome, Taihoku; 18 Sakae-cho, 3-chome, Taihoku
MINING MANAGEMENT, EQUIPMENT AND PERSONNEL		
Taiyo Mining Company	(F)	19 Kotobuki-cho, 2-chome, Keelung
Eiho Coal Mining Co	(F)	Taihoku
Taiwan Mining Association	(F)	Taihoku
Keelung Coal Company	(F)	19 Kotobuki-cho, Keelung; 82 Takasago-cho, 2-chome, Taihoku
Akashi Kogyo K. K	(J)	3 Asahi-cho, 2-chome, Taihoku
Keelung Tanko K. K	(F)	12 Asahi-cho, 3-chome, Keelung
Taiwan Tangyo K. K	(J)	Unno Bldg., Sakae-machi, 1-chome, Taihoku
Taiwan Kogyo K. K	(J)	Kinkaseki, Suiho-cho, Keelung-gun, Taihoku Prov.
Japan Oil Co	(J)	Byoritsui, Shinchiku Prov.
Taiwan Gold Producing Co., Ltd.		21 Kabayama-cho, Taihoku
Taiyo Kogyo K. K	(J)	19 Kotobuki-cho, 2-chome, Keelung; Taikei, Shinchiku Prov.
Nippon Aluminum K. K	(J)	Gishiko, Takao; Karenko
Toho Kinzoku Seiren K. K	(J)	Karenko
MOVING PICTURE THEATRES		
Kokusai Eiga Kabushiki Kaisha	(J)	11 Tomon-cho, Taihoku
OIL		
Rising Sun Petroleum Co., Royal Dutch Shell subsidiary, British control		Minato-cho, Taihoku
Standard Vacuum Oil Company		1 Akashi-cho, 2-chome, Taihoku
Nippon Petroleum Co., Ltd		Byoritsu-gai, Shinchiku Province
PAPER AND FIBER BOARD		
Taiwan Paper Mfg. Co., Ltd		Shichisei-gun, Taihoku
Taiwan Kogyo K. K	(J)	Gokatsu-sho, Rato-gun, Taihoku Province
Taiwan Tsuso Development Co., Ltd.		512 Seimon, Shinchiku Prov.

Taiwan Pulp Industry Co., Ltd.		Taito, Taiko-gun, Taichu Prov.
Artex Manufacturing Co., Insulating materials, paper board		35 Kabayama-cho, Taihoku
Taiwan Kinsenhatsu Tsuso Mfg. Co.		395 Nanmon-gai, Shinchiku Prov.
PRINTING PRESSES AND EQUIPMENT (*English, Chinese, and Japanese*)		
Taiwan Nichi Nichi Shimpo Sha	(J)	32 Sakae-machi, 4-chome, Taihoku
Taiwan Nippo Sha	(J)	234 Hon-machi, 3-chome, Tainan
Higashi Taiwan Shimpo Sha	(J)	Karenko
Taiwan Shin Mimpo Newspaper Co.	(F)	8 Suehiro-cho, 5-chome, Taihoku
Taiwan Shimbun Sha	(J)	5 Meiji-cho, 1-chome, Taichu City
Taiwan Offset Insatsu K. K.	(J)	363 Miyamae-cho, Taihoku
Taihoku Printing Co		1 Yamato-cho, 3-chome, Taihoku
PINEAPPLES		
Chinsei Shoten, canned pineapple merchants	(F)	16 Yamashita-cho, 1-chome, Takao
Shinko Seikasha, canned pineapples		17 Yamashita-cho, 1-chome, Takao
Taiwan Consolidated Pineapple Co., central offices of 77 canneries	(J)	1 Horie-cho, 5-chome, Takao
Taiwan Pineapple Canners' Association		Horie-cho, Takao
Yamaguchi Kudamono-ten, canned pineapples	(J)	5 Entei-cho, 1-chome, Takao
SALT		
Ujurin Salt Manufacturing Co., primarily industrial salt	(J)	Okayama-sho, Okayama-gun, Takao Province; Chin, Keisen, Managing Director, 338 Reigairyo, Takao
Taiwan Seien K. K	(J)	Nakano, Yurei, Pres., Anpin-machi, Tainan City
SAWMILLS		
TAIHOKU PROVINCE		
Shi Go Hatsu Shoko	(F)	1 Sotenbi Tamsui
Tenryu Zaimoku Kaisha	(J)	Shintomi-cho, Taihoku
Uyematsui Seizai Kojo	(J)	7 Hokumon-cho, Taihoku
Chin Yei Yu Seizai Kojo	(F)	Minato-cho, Taihoku
Kishida Seizai Sho	(J)	Fukutoku-cho, Keelung
Ko Nichi Yeki Seizai Sho	(F)	Motozono-cho, Taihoku
Miura Seizai Kojo	(J)	Suyehiro-cho, Taihoku
Kyowa Seizai Sho	(F)	Rato
Ro Sei Seizai Kojo	(F)	Tsukiji-cho, Taihoku
Sandai Gumi Seizai Kojo	(F)	Hama-cho, Taihoku
Shudai Seizai Kojo	(F)	Izumi-cho, Taihoku
Sunata Seizai Sho	(J)	Rato
Ei Ko Seizai Sho	(F)	313 Chikurin, Rato
Taiwan Seizai Kabushiki Kaisha	(F)	172 Rato
Heiwa Seizai Sho	(F)	301 Chikurin, Rato
Yamato Shoko Seizai Sho	(J)	313 Chikurin, Rato
Wako Seizai Kojo	(F)	301 Chikurin, Rato
Yamamoto Seizai Sho	(J)	Sansei-cho, Rato
Yamaju Shoten Seizai Kojo	(J)	Kotobuki-cho, Taihoku
Wa-ryu Shokai	(F)	15 Fukutoku-cho, 3-chome, Keelung
Shin Kichi Hatsu Shoko	(F)	8 Asahi-cho, 1-chome, Keelung
Ro Gi Hatsui Shoko	(F)	25 Angaiya, Tansui
Kyo Ei Shoko	(F)	20 Taihei-cho, 6-chome, Taihoku
Ri Ei Ryu Shoko	(F)	4 Izumi-cho, 1-chome, Taihoku
Sho Ki Shoko	(F)	29 Minato-cho, 2-chome, Taihoku
Gi Ri Shoko	(F)	43 Minato-cho, 3-chome, Taihoku
Jun Tai Shoko	(F)	12 Tsukiji-cho, 4-chome, Taihoku
Shin Ei Jun Shoko	(F)	6 Tsukiji-cho, 4-chome, Taihoku
Kyo Hatsu Shoko	(F)	45 Taihei-cho, 6-chome, Taihoku
San Ko Shoko	(F)	96 Taihei-cho, 7-chome, Taihoku
Horai Seizai Sho	(F)	124 Horai-cho, Taihoku
Ko-A Seizai Sho	(F)	Taihei-cho, 6-chome, Taihoku
San Ko Seizai Shokai	(F)	75 Horai-cho, Taihoku
Suzuki Seizai Sho	(J)	24 Horikawa-cho, Keelung
Wa Sho Seizai Sho	(F)	37 Horikawa-cho, Keelung
Ro Sei Hatsui Ki Ki	(F)	13 Hama-cho, 5-chome, Taihoku
SHINCHIKU PROVINCE		
Cho Hatsui Sei Seizai Sho	(F)	77 Yobai, Chureki-gun
Ho Jun Hatsui Shoko	(F)	102 Tomon-cho, 2-chome, Shinchiku
Sei Gi Seizai Sho	(F)	32 Chikuto-gai, Shinchiku
Go Hatsui Shoko	(F)	6 Tomon-cho, 1-chome, Shinchiku
Showa Zaimoku Kabushiki Kaisha	(F)	234 Seimon-cho, 1-chome, Shinchiku
Taiwan Mokusai Kabushiki Kaisha	(F)	1/126 Burin, Toyen
TAICHU PROVINCE		
Kyo Ei Shoko	(F)	195 Toyohara, Taichu Province
Ryu Ki Sho Shoko	(F)	163 Toyohara, Taichu Province
Ho Tai Shoko	(F)	59 Toyohara, Taichu Province
Imai Zaimoku Bu Toyohara Kojo	(F)	44 Toyohara, Taichu Province
To Ko Shoko	(F)	4 Hatsune-cho, 4-chome, Taichu
To Sei Shokai	(F)	14 Hatsune-cho, 3-chome, Taichu
Kyo Wa Shoko	(F)	8 Tachibana-cho, 1-chome, Taichu
Matsuyama Shoko	(F)	4 Yanagi-cho, 4-chome, Taichu
Omori Shoko	(F)	2 Hatsune-cho, 1-chome, Taichu
San Chin Shoko	(F)	18 Shintomi-cho, 4-chome, Taichu
Kin Fuku Ko Shokai	(F)	7/73 Seimon-cho, Shoka, Taichu Province
To Ei Shokai	(F)	44 Hokumon-gai, Shoka, Taichu Province
Shin to Shin Shoko	(F)	399 Seimon, Shoka, Taichu Province
Gin Nichi Shun Shoko	(F)	257 Hokumon-cho, Shoka, Taichu Province
TAINAN PROVINCE		
Gi Ho Shoko	(F)	1 Sakaye-machi, 1-chome, Kagi, Tainan Province
Nanko Seizai Koshi	(F)	163 Irifune-cho, 2-chome, Tainan
Jun Hatsu Shoko Kabushiki Kaisha	(F)	1 Kurogane-cho, Tainan
Cho Shun Shoko	(F)	10 Sakaye-machi, 2-chome, Kagi, Tainan Province
Taiwan Government Saw Mill	(J)	Kagi, Tainan Province
Yei Shin Ki Seizai Kojo	(F)	Minato-cho, Tainan
Mori Zaimoku Ten	(J)	4 Sakae-machi, Kagi, Tainan Province
Sho Hatsu Seizai Kojo	(F)	72 Minato-cho, 2-chome, Tainan
Jun Tai Zaimoku Shoko	(F)	66 Seimon-cho, Tainan
Den Eki Shoko	(F)	59 Seimon-cho, 2-chome, Tainan
Dai Oku Shoko	(F)	222 Minato-cho, 2-chome, Tainan
Ei Shin Ki Shoko	(F)	225 Minato-cho, 2-chome, Tainan
Go Go Hatsu Shoko	(F)	68 Seimon-cho, 5-chome, Tainan
Do Gan Koshi	(F)	44 Seimon-cho, 2-chome, Tainan
TAKAO PROVINCE		
Shi Go Hatsu Shiten	(F)	2 Ta-machi, 4-chome, Takao
Fuku Rin Shoko	(F)	7 Irifune-cho, 4-chome, Takao
Wa Ryu Zaimoku Takao Shiten	(F)	331 Mayekane-cho, Takao
Shin Ko Shoko	(F)	13 Entei-cho, 1-chome, Takao
Ei Shin Ki Shiten	(F)	4 Shin-hama-cho, 2-chome, Takao
Kin Ken Go Ki Shoko	(F)	36 Horiye-cho, 4-chome, Takao
Fuku Shin Shoko	(F)	20 Minato-cho, 4-chome, Takao
Chin Ko Shoko	(F)	23 Minato-cho, 4-chome, Takao
Chin Sen Shoko	(F)	10 Shin-hama-cho, 2-chome, Takao
Takarabe Seizai Kojo	(J)	17 Minato-cho, 5-chome, Takao
KARENKO PROVINCE		
Morishige Zaimoku Kabushiki Kaisha	(J)	1/250 Inesemi-cho, Karenko
Zaimoku Kabushiki Kaisha	(F)	21 Kurokane-cho, Karenko
TAITO PROVINCE		
Oh Ren Zaimoku Shoten Seizai Hanbai Sho	(F)	19 Minami, Taito
SHIPPING AND STEVEDORING EQUIPMENT AND AGENCIES		
Taiwan Forwarding Agencies Assoc.	(F)	Taihoku
Kinkai Yusen Kaisha, Ltd	(J)	8 Meiji-machi, 1-chome, Keelung
Asahi-Gumi	(J)	51 Asahi-machi, 1-chome, Keelung
Kaiun Gumi		37 Fukutoku-cho, 1-chome, Keelung
Keelung-kwan Unso Honten		5 Meiji-machi, 1-chome, Keelung
Kokusai Tsu-un Kaisha, Ltd.	(J)	26 Meiji-machi, 1-chome, Keelung
Kokusai Unyu Gumi		4–5 Shin-Hama-cho, 3-chome, Takao
Kokusai Tsu-un Kaisha, Ltd.	(J)	Hokumon-cho, Taihoku
Kokusai Unyu Kaisha		13 Meiji-machi, 1-chome, Keelung
Kyoei Unyu Gumi		46 Shin-Hama-cho, 1-chome, Takao
Mitsui Bussan Kaisha, Takao Branch	(J)	51 Shin-Hama-cho, 1-chome, Takao
Murao Kisen K. K	(J)	12 Isshin-cho, 2-chome, Keelung
Naitai Tsu-un Goshi Kaisha, labor contractors, etc.	(J)	1 Giju-cho, 6-chome, Keelung
Nanboku Shosen Kaisha		1 Kigo-cho, 5-chome, Takao
Nippon Yusen Kaisha	(J)	51 Shin-Hama-cho, 1-chome, Takao
Osaka Shosen Kaisha	(J)	8 Meiji-cho, 1-chome, Keelung
Osaka Shosen Kaisha	(J)	Hokumon-cho, Taihoku
Osaka Shosen Kaisha	(J)	4 Shin-Hama-cho, 3-chome, Takao
Sakura Gumi K. K	(J)	51 Asahi-machi, 1-chome, Keelung
Sanyu Gumi		Takao
Taiyu Kisen Shoji		36 Fukutoku-machi, 1-chome, Keelung
Taiwan Unyu K. K	(J)	13 Meiji-cho, 1-chome, Keelung
Taiki Kisen K. K		73 Fukutoku-machi, 1-chome, Keelung
Yamashita Kisen Kaisha	(J)	1 Sakae-cho, 1-chome, Takao
Yamashita Kisen Kaisha	(J)	5 Hon-machi, 4-chome, Taihoku
Nitto Shosen Gumi, forwarding, labor contracting		5 Meiji-machi, 1-chome, Keelung
Taiwan Soko Kaisha, general warehousing, shipping, stevedoring		1 Shin-Hama-cho, 1-chome, Takao
Taiwan Te-Konimotsui Unyu K. K., forwarding and stevedoring		Branches in Taihoku, Taichu, Tainan, Takao, and other cities
Yamayo Unso K. K		5 Meiji-machi, 1-chome, Keelung
SUGAR (*refiners and manufacturers*)		5 Meiji-machi, 1-chome, Keelung
Rin Hongen Sugar Mfg. Co	(F)	Taihoku
Shinko Seito K. K	(J)	Tairyo-sho, Hozan-gun, Takao Prov. 338 Reigairyo, Takao
Rokki Seito K. K	(J)	Rokki-sho, Heito-gun, Takao-Province
Taito Seito K. K	(J)	Baran, Taito-gai, Taito Prov.
Taiwan Seito K. K	(J)	Takezono-cho, Heito-shi (873 Kirai), Takao Prov. (head office); 41, Midori-cho, 5-chome, Taihoku
Dai-Nippon Seito K. K	(J)	Showa Bldg., Marunouchi, Tokyo (head office); branch: Kobi-gai, Tainan Prov.

Table 72. Directory of Supply and Service Organizations.—Continued.

Meiji Seito K. K	(J)	Mato-gai, Sobun-gun, Tainan Prov. (head office)
Goshi Kaisha Sangyo Koshi Gensei-Nojo Seito-Jo	(J)	Jirin-sho, Hokuto-gun, Taichu Prov.
Ensuiko Seito K. K	(J)	Shinei-gai, Shinei-gun, Tainan Prov.
SUGAR EXPORTERS		
Mitsui Bussan Kaisha, Ltd	(J)	51 Shin-Hama-cho, 1-chome, Takao
Mitsubishi Shoji Kaisha, Ltd.	(J)	32 Horie-cho, 3-chome, Takao
Showa Shokai	(J)	15 Shin-Hama-cho, 3-chome, Takao (Taiwan office)
TEA (*warehousing and transportation*)		
Taihoku Tea Dealers Association	(F)	15 Minato-machi, 3-chome, Taihoku
Taihoku Tea Merchants' Guild	(F)	89 Taihei-cho, 2-chome, Taihoku
Carter-Macy Tea and Coffee Co.		24 Eiraku-cho, 1-chome, Taihoku
Chin-Etsuki	(F)	61 Nisshin-cho, 2-chome, Taihoku
Formosa Tea Cooperative Sales Guild, Ltd.	(F)	1 Taihei-cho, 3-chome, Taihoku
Kinki Tea Manufacturing Co.	(F)	15 Minato-machi, 3-chome, Taihoku
Giwa Chako K. K	(F)	70–82 Eiraku-cho, 2-chome, Taihoku
Jardine-Matheson & Co., Ltd.		25 Minato-cho, 2-chome, Taihoku
Kin Mo Chako K. K	(F)	86 Taihei-cho, 3-chome, Taihoku
Nitto Takushoku-Norin K. K.	(J)	Tsukiji-machi, Taihoku
Shinki Chako Goshi Kaisha	(F)	47 Eiraku-cho, 1-chome, Taihoku
Shin Shun Chako	(F)	66 Eiraku-cho, 3-chome, Taihoku
Kinki Seicha K. K		17 Minato-cho, 3-chome, Taihoku

Note: In addition to the warehousing facilities of these companies, the Mitsui and Mitsubishi Companies have extensive warehouses in Minato-cho, Taihoku, and at factories scattered through the country.

TRADE AND BUSINESS ASSOCIATIONS		
Bar Association of Taiwan		Sai, Shikikoku, Director, 92 Taihei-cho, 2-chome, Taihoku
Taihoku Kitaku Restaurants Guild		186 Nissin-cho, 2-chome, Taihoku City
Taiwan Commercial Co.		25 Eiraku-cho, 2-chome, Taihoku City
Taiyei Industrial Company		Rin, Yucho, President, Taihoku City
Asahi Industrial Company		Rin, Yuko, President, Taihoku City
Taiyu Products (Bussan) Co.		Rin, Yusho, President, Taihoku City
Keelung Commercial & Industrial Credit Association		Han, Hokun, Managing Director, Keelung, Taihoku Prov.
Taiwan Forestry Association		Ko, Saijo, Director, Giran-gai, Taihoku Prov.
Liquor Dealers' Association of Taiwan		Ko, Saijo, Director, Giran-gai, Taihoku Prov.
Karenko Commercial & Industrial Association		Kyo, Sobin, Vice-President, 34 Kasuga-Dori, Karenko-gai
Eastern Credit Association		Kyo, Sobin, Managing Director, Karenko-gai
Sango Industrial Company		Rin, Kaido, Representative, Taichu City
Teisho Colonization Company		Rin, Retsudo, President, Taichu City
Taichu Commercial & Industrial Association		Ko, Chosei, President, 5 Oimatsu-cho, 1-chome, Taichu City
Hokuto Business Association		Rin, Hakuyo, M. D. D., Pres., Hokuto-gai, Taichu Prov.
Fuji Irrigation Guild		Kyu, Unko, President, Dora-sho, Byoritsu-gun, Shinchiku Prov.
Shinchiku Commercial & Industrial Association		Tei, Tamei, Director, 33 Hokumon, Shinchiku City
Toen Commercial & Industrial Association		Ko, Gyokusho, Advisor, Toen-gai, Shinchiku Prov.
Taiwan Agricultural & Forestry Joint Stock Company		Ko, Kenshin, Director, Taien-gai, Shinchiku Prov.
South District Traders' Association		49 Shin-Hama-cho, 1-chome, Takao City
TRADE AND FINANCE CORPORATIONS		
Taiwan Development Co., Ltd., development of land and natural resources—overseas trade	(J)	8 Hokumon-cho, Taihoku
Taiwan Tochi-Tatemono K. K., land and real estate	(J)	1 Hokumon-cho, 1-chome, Taihoku City
Taiwan Kogyo-Shintaku Co., Ltd., real estate and trust	(J)	182 Shimo-Keifu-cho, 1-chome, Taihoku City
Taiwan Kangyo-Mujin Co., Ltd.	(J)	1 Hon-machi, 3-chome, Taihoku City
Taiwan Beikohu-Daiko K. K.	(J)	22 Eiraku-cho, 1-chome, Taihoku City
Taiwan Beikoku Ishitsu-sho Trade Association	(J)	22 Eiraku-cho, 1-chome, Taihoku City
Taiyu Bussan Kaisha		Rin, Yusho, President, 25 Eiraku-cho, 1-chome, Taihoku City
Taiwan Agricultural and Forestry Joint Stock Co.	(J)	O, Zuishun, President, 42 Taihei-cho, 2-chome, Taihoku City
Rin Hongen Industrial Joint Stock Company		Rin, Hakuju, President, 86 Maruyama-cho, Taihoku City
Asahi Industrial Company	(J)	Rin, Yuko, President, 4 Onari-cho, 1-chome, Taihoku City
Toko Credit Association		Cho, Seiko, Managing Director, 89 Taihei-cho, 3-chome, Taihoku City
Giran Credit Association		Ko, Saiju, President, Giran-gai, Taihoku Prov.
Rin-Hongen-Iki Kogyo K. K		Rin, Soju, President, 289 Itabashi-gai, Kaisan-gun, Taihoku Prov.
Taiyei Industrial Co.	(J)	Rin, Yucho, President, Taihoku City
Kiirun Commercial & Industrial Credit Association		Han, Hokun, Managing Director, 6 Fukutoku-cho, 1-chome, Keelung City
Shinchiku Credit Association		Tei, Tamei, Permanent Secretary, 33 Hokumon, Shinchiku City
Tei Chinki Industrial Development Joint Stock Company		Tei, Shimpo, President, Hokumon, Shinchiku City
Nippon Takushoku K. K		Rin, Yucho, Representative Director, Chureki-gai, Chureki-gun, Shinchiku Prov.
Taiwan Agricultural and Forestry Joint Stock Co.		Ko, Kenshim, President, 43 Getsubi, Taien-gai, Shinchiku Prov.
Taien Cooperative Credit Association		Ko, Kenshin, President, Taien-gai Shinchiku Prov.
Taito Trust Co., Ltd., trust and finance		4 Sakae-cho, 1-chome, Taichu City
Teisho Colonization Co.		Chin, Kin, Managing Director
Teisho Takushoku K. K., development of land		Rin, Retsudo, President, 10 Kusonoki-cho, 4-chome, Taichu City
Doshi Credit Association		Rin, Retsudo, President, 6 Tachibana-cho, 4-chome, Taichu City
Sango Industrial Co.		Kan, Tokuchi, Superintendent, Tomon, Shoka City
Soton Credit Association		Rin, Kendo, President, 195 Muhosho, Daiton-gun, Taichu Province
Keiko Industrial Company		Ko, Karen, Managing Director, Soton-sho, Nanto-gun, Taichu Province
Taichu Industrial Company		Yo, Shumboku, Director, Keiko-sho, Inrin-gun, Taichu Province
Chin Chuwa Bussan K. K., dealers in farm products, real estate, and financing		Cho, Kwandei, President, 235 Shimoyokoyama, Daiga-sho, Toyohara-gun, Taichu Province
Heito Trust Joint Stock Company		Chin, Keinan, President, 139 Reiga-Ryo, Takao City
Taiwan Nambu Mutual Air Financial Co., Ltd.		Ri, Kaizan, President, Mantan-sho, Toko-gun, Takao Province
Eastern Credit Association		Shinzo, Kuiryama, No. 11 of 42, Tamachi, Tainan City
TRANSPORTATION		Kyo, Sobin, Director, 34 Kasugadori, Karenko-gai
Taihoku Tetsudo K. K	(J)	Taihoku
Taichu Light Railway Co.	(J)	19 Toyohara-gai, Taichu Province
Tomoe Auto Garage	(J)	8 Yamato-machi, 2-chome, Taihoku
Tokai Jidosha Unyu K. K., automobile transport	(J)	21 Kurogane-dori, Karenko
Shokei Motorcar Co.	(F)	Keiko-sho, Inrin-gun, Taichu Province
Taihoku Province Motorcar Guild	(F)	Taihoku
Shinso Motorcar Co.	(F)	Taihoku
Kinan Automobile Co.	(F)	Kizan-gai, Kizan-gun, Takao Province
Nitto Shosen Gumi, Ltd.	(J)	1 Shin-Hama-cho, 1-chome, Takao
Toen Railway Joint Stock Co.	(F)	Toen, Shinchiku Province
Keelung Light Railway Co.	(F)	Keelung
Zuiho Light Railway Co.	(F)	19 Takasago-cho, 3-chome, Keelung
Okura Doboku K. K., railways, civil engineer works, etc.	(J)	16 Hon-machi, 4-chome, Taihoku
WAREHOUSING		
Keelung Reizo K. K.		13 Showa-cho, Keelung City
Nanyo Storage Company	(F)	Taihoku City
Taiwan Soko Kaisha	(J)	23 Meiji-machi, 1-chome, Keelung City, 15 Shin-Hama-cho, 3-chome, Takao City; 7 Izumo-cho, 1-chome, Taihoku City
Asahi Gumi, Ltd., warehousing, forwarding	(J)	Kurogane-dori, Karenko-gai
Kokusai Tsuun K. K.	(J)	Hokumon, 7-chome, Taihoku City
Nippon Shokuryo Kogyo K. K.	(J)	3 Kami-Keifu-cho, 2-chome, Taihoku City; 82 Futaba-cho, Keelung City
Osaka Shosen Kaisha Warehouses	(J)	Hokumon-cho, 7-chome, Taihoku City
Ryumon Kogyo Goshi Kaisha	(J)	41 Midori-cho, 3-chome, Taihoku City
Yamato Unso Kaisha	(J)	Taihoku City
Taihoku Chuo Shijo K. K.	(J)	5 Kotobuki-cho, 5-chome, Taihoku City
WATER (*Supply*)		
Shinchiku Water Utilization Association		Tei, Tamei, Councillor, 33 Hokumon, Shinchiku
Toyohara Water Utilization Association		Cho, Kwankei, Councillor, 235 Shimoyokoyama, Daigasho, Taichu Province.

XV.

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TAIWAN

LEGEND

TOWNS:
- FIRST IMPORTANCE
- SECOND "
- THIRD "
- FOURTH "

ROADS:
- PRIMARY
- SECONDARY

RAILROADS:
- 3' 6" GAUGE — DOUBLE TRACK / SINGLE TRACK
- 2' 6" OR 2' 0" GAUGE
- PROVINCIAL BOUNDARIES

SCALE 1:1,000,000

10 0 10 20 30 40 50 MILES

10 0 10 20 30 40 50 60 70 KILOMETERS

HEIGHTS IN METERS

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CHINA
P'U-T'IEN
Huangshih
Hushih
Lienpan
Chungmen
Pinhai
HINGWA PU
HINGHWA CHANNEL
NANJIH TAO
MEICHOW TAO
Meichowcheng
STRAIT
TAIWAN
CHANNEL
PESCADORES ISLANDS
KICHUBAI-TŌ
GYOŌ-TŌ
HĀKUSA-TŌ
MAKŌ
HŌKO-TŌ
ROVER CHANNEL
HATTAKU-TŌ
Mōan
STEEPLE CHANNEL
ŌSHIMA
PESCADORES CHANNEL
KAHEI-SHO
MENKA-SHO
KIZAN-TŌ
CHUNGCHI I.
NORTH PACIFIC OCEAN
SHŌRYŪKYŪ-TŌ
KASHŌ-TŌ
KŌTŌ-SHO
Itarai
Sekimon
Kimpōri
TAMSUI-KA
TAMSUI
Sōzan
KIIRUN (KEELUNG)
Daien
Chikui
Kanon
TŌEN
TAIHOKU
Sanshōrei
Sōkei
Sekitei
Tairikan
Chūreki
Okaseki
Shinten
Heirin
Yōbai
Kokō
Taikei
Urai
Tōi
Shōkei
SHINCHIKU
GIRAN
Chikutō
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Chikunan
Gaogan
Sansei
RATŌ
Nanshō
Dakusui
Korosha
Suo
BYŌRITSU
Chūshō
3573
MT. TSUGITAKA
3831
3797
Taikō
TAIKŌ-KEI
Kiyomizu
GOSEI
Toyohara
Tōsei
Sharoku
3043
Shikayo
TAITO-KEI
Tanshi
3349
Sensei
Ōden
TAICHŪ
Wami
Rokkō
SHŌKA
2490
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