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ECONOMIC INTELLIGENCE REPORT

THE SHIPBUILDING INDUSTRY OF COMMUNIST CHINA

CIA/RR 8

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CENTRAL INTELLIGENCE AGENCY

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THE SHIPBUILDING INDUSTRY OF COMMUNIST CHINA

Summary

The shipbuilding industry of Communist China consists largely of the construction and repair of small vessels, most of them built of wood, for both commercial and military purposes. The use of such vessels for coastwise and river traffic still plays its traditionally significant part in the domestic commerce of Communist China. The Chinese Communist Army has ordered large numbers of such vessels for use as landing craft.

There is no available evidence that large merchant ships are currently being constructed in Communist China. The shipyards at Dairen (Ta-lien), Shanghai, Tsingtao (Ch'ing-tao), Amoy (Hsia-men), and Ta-ku have had facilities for constructing large merchant ships but, partly because of the damaged condition of these facilities and partly because of the inability of Communist China to import the raw materials and finished goods required to undertake the construction of ocean-going vessels, these yards, like the smaller yards existing along the coast of China, are building only small vessels. Annual production in all shipyards is estimated at about 85,000 deadweight tons.

The shipbuilding industry of Communist China is nationalized and functions under both the Ministry of Communications and the Ministry of Heavy Industry. An estimated 1 percent of the national budget for 1951 was reportedly invested in the improvement of existing facilities at the Dairen, Shanghai, and Han-k'ou yards. Plans were reportedly made to construct a new shipway at Dairen with a capacity of 20,000 gross registered tons. There is no evidence of the conversion of other industrial facilities to shipbuilding.

The annual input requirements of materials for the shipbuilding industry of Communist China in its current type of construction consist of 30 million board feet of cut lumber, 4,570 metric tons of steel, 3,000 marine diesel engines, and substantial quantities of nails, screws, and fittings. Domestic sources can satisfy these requirements with the exception of the engines, of which over 80 percent must be imported.

Chinese shipbuilders have made no significant contributions to the technology of the trade. Personnel training programs, however, some of which are supervised by Soviet technicians, are being conducted in the principal shipbuilding centers. While the industry's labor force of 25,000 now has a low productivity rate, both the quantity and the quality

of this force can be expected to increase as a result of this training.

The shipbuilding industry, limited by its shortage of skilled workers and supply of propulsion units, is not a significant contributor to the Communist Chinese economy. It is vulnerable to economic warfare only to a small degree, since international restrictions on the importation of diesel engines, under prevailing circumstances, would not eliminate a major potential source of supply, the USSR.

I. Introduction.

1. Description of the Industry.

The shipbuilding industry of Communist China consists largely of the construction and repair of small vessels destined for use in coastwise and river trade or as military landing craft. There is no reliable evidence that large merchant ships are being constructed in Communist China. The greater part of the shipbuilding industry of Communist China is devoted to the construction of junks, which are shallow-draft wooden craft of 25 to 30 deadweight tons (DWT),* 40 to 50 feet in length. Motorized junks, which are sometimes equipped with auxiliary sails, are powered by one or two engines ranging in capacity from 25 to 50 horsepower and are capable of a speed of from 7 to 10 knots. The military landing craft include junks and other small craft used for the movement of personnel and larger vessels, of approximately 75 DWT, designed for the movement of supplies, weapons, and equipment.

2. Importance of the Industry.

China is not a maritime nation, and it is not likely to become one during the next decade. The country lacks merchant marine personnel, both technical and administrative, and the shipyards and auxiliary industries required to build ocean-going merchant ships. Since river transport has

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* The following types of tonnage are used for the measure of ships in this report: Deadweight tons (DWT): the difference in weight, in long tons, between a vessel in loaded and light condition. Displacement tons: the weight of the water, in long tons, displaced by the ship. Gross registered tons (GRT): the measure of the volume of the permanently enclosed space in a ship (1 GRT equals 100 cubic feet).

always been the cheapest means of carrying goods in China, and since the economic activities of the interior are largely dependent on this traffic, the Chinese Nationalist government in the postwar period and the present Chinese Communist regime have given high priority to the expansion of wooden ship construction and to the rehabilitation of boatyards producing this type of craft. It is in this type of construction that the importance of the industry is found.

3. History of the Industry.

The principal dockyards in China originated as naval shipbuiding yards. Very little merchant shipping was built in China until about 1938. Even then the industry was still in its initial stages of development, and such progress as there was in shipbuilding was largely the result of the government's efforts to create a navy.

After the outbreak of hostilities between the Chinese and the Japanese, the Ministry of Communications, under which the shipbuilding industry functioned, formulated a program for the construction of improved river junks and shallow-draft steamers to supplement the vital inland commerce system. Shipyards were taken over or granted loans in a number of cities, many of which were located in the interior of China. Shortages of materials and chaotic economic conditions, however, precluded any measure of success.

In 1935 the shipbuilding industry consisted essentially of dockyards located at Dairen, Shanghai, Tsingtao, Fu-chou, Amoy, and T'ang-ku. The most important shipyards capable of the construction of large ships today are the Dairen Shipbuilding and Machinery Company, the Shanghai Dockyard and Engineering Company, and the Kiangnan Dockyard and Engineering Company of Shanghai.

During the period 1926-33, only 26 vessels of 100 gross registered tons (GRT) or more, totalling 22,924 GRT, were launched in China. No production figures are available for the period 1933-38. For the years 1939-44 inclusive, construction was reported of 8 to 10 steam vessels totalling no more than 40,000 GRT and of 2,500 motorized junks. 1/*

China's merchant fleet amounted to only about 100,000 GRT at the time of the Japanese surrender in 1945, nearly one-half million tons having been lost in World War II alone. By June 1947 the merchant marine had been increased to 808,815 GRT and consisted of 1,017 seagoing vessels and 1,600 river craft of all types. 2/ The major portion of the additional tonnage was secured by salvage, by purchases, and by reparations. There is no indication of domestic construction in these years.

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In planning its postwar merchant marine, the Chinese Nationalist government intended to rehabilitate 11 shipyards at leading shipbuilding centers. The combined capacity of the 11 yards was expected to reach 130,000 DWT of new ships annually. This tonnage was expected to be augmented by construction from other widely dispersed yards located in coastal and inland cities which were not enumerated in this plan. In 1946 a plan formulated by the Ministry of Communications called for the building of 1,720,000 GRT of shipping by 1950. Of this new construction, 30 percent was allotted to inland service, 55 percent to coastal transport, and 15 percent to near-seas and oceanic trade. First priority was assigned to the building of inland and coastal types of vessels. Of a total of 604 vessels planned, contracts were let for less than half of this number -- 141 ships of 3,000 DWT each and 123 ships of 500 DWT each. 3/ Much of this new tonnage, particularly ocean-going shipping, was to be built in foreign yards, which have always provided the bulk of China's merchant fleet. Little if any actual construction in Chinese yards under the program was accomplished, because of the unstable economic and political situation which prevailed immediately after its inception.

At the present time there are 41 ships (1,000 GRT and over), totalling 102,800 GRT, of the former Chinese merchant fleet in the hands of the Chinese Communist government, as the result of capture and defections. 4/ The balance remains under Nationalist control. Most of the small tonnage fleet, aggregating several thousand GRT, is considered to have been taken over by the Communist regime.

The present total requirements for Chinese river shipping is about 200,000 GRT, while that for coastal shipping is approximately 800,000 GRT. 5/ Annual replacement of inland and coastal shipping to maintain these requirements is estimated to be about 5 percent of the total involved or 50,000 GRT.

4. Organization.

Under the Chinese Nationalist government, maritime affairs, including shipbuilding, were administered by the Ministry of Communications, and large ship construction was performed almost entirely for the government-owned China Merchants Steam Navigation Company. The trend toward nationalization had been especially pronounced in the field of transportation, and in 1946 the government planned to bring the entire shipbuilding and repair industry under government ownership and control in order to speed construction of new shipping and to hasten the ship repair program. The program failed with the acceleration of the civil war.

With the nationalization in 1950 of the huge Kiangnan Dockyard and Engineering Company of Shanghai, the Communist government has succeeded in obtaining control over virtually all private shipbuilding in China. The Shipbuilding Bureau under the supervision of the Ministry of Heavy Industry appears to be responsible for actual construction of merchant

ships. 6/* Control of this construction as well as of ship repairs is centered in the Regional Navigational Bureaus in the Ministry of Communications, but the extent of such control is not clearly defined. Authority for the most important phase of shipbuilding, naval construction, has largely been localized within the provinces, under control of the Regional Naval Bureaus acting through units designated Services and Supply Boards. 7/ These units are responsible for the procurement and distribution of materials and the requisitioning of manpower for the wooden boat program. In the important Dairen area, shipbuilding and repair activities come under the control of the Ministry of Industries of the "Northeast Peoples Government" through the Bureau of Mechanical Industries, in accordance with an agreement concluded in February 1950. 8/

II. Production.

1. Location and Capacity of Facilities.

Important facilities for the construction and repair of modern ships are found at the Manchurian port of Dairen. ** The Dairen shipyards are capable of both building and repairing vessels of 10,000 GRT. Actual output in the war years was extremely low. During the period 1942-45, only about 5 steel tugs of 50 GRT and 6 river barges of 25 GRT were constructed. In the following years, production increased considerably but still remained far below capacity. In the years 1946 through 1949 the yards completed 80 patrol craft and 25 steel barges of a total tonnage of nearly 6,000 GRT. Most of the required materials, including steel plate, finished and semifinished, all propulsion units, and navigation gear, were provided by the USSR. 9/ From 1946 through 1949, three endless-chain bucket-type dredges, various types of cranes, and rolling stock for the South Manchurian Railway were also produced by the Dairen shipyards. During the same time, repairs were made on ships of a total tonnage of 650,000 GRT, most of this tonnage being in large ships. 10/

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* For a tentative description of the control channels for shipbuilding and related industries in Communist China, see the chart following on p. 21.

** The administrative control of the port of Dairen is wholly in the hands of the Chinese Communists, whereas the actual port operation (that is, berthing, communications, etc.) is Soviet-controlled. The shipyards are entirely under Chinese Communist control. In allowing the Chinese control of administration in Dairen, the Soviet government is following explicitly the provisions of the agreement of February 1950 between Communist China and the Soviet Union. The agreement also safeguards, for the next few years at least, the controlling position of the Soviet Union in port operation. According to Article 3 of the agreement, the contracting parties have agreed that the question of Dairen must be subjected to examination after conclusion of a peace treaty with Japan.

Port Arthur and Harbin (Ha-erh-pin), with only small yards, have facilities for the construction of shallow-draft river steamers, although none is being built at the present time. Port Arthur is reportedly being utilized as a refueling and repair station for Soviet merchant ships and submarines. 11/ There has been no evidence of Soviet dismantling of shipbuilding facilities at Port Arthur after World War II, when other manufacturing industries and public utilities in the Port Arthur region were dismantled.

There are shipbuilding and repair facilities at most of the seaports of China proper, but only those at Shanghai, Tsingtao, Amoy, and Ta-ku are considered to be of sufficient importance for the construction and repair of large merchant ships. In the Shanghai area there are 6 major shipyards and 15 small establishments. In the large yards, construction of merchant ships up to 10,000 GRT is possible. The largest ship built in China since World War II was an all-welded steamer of 3,000 GRT launched at the Kiangnan Dockyard and Engineering Company of Shanghai in 1948. As a result of repeated air attacks from Formosa (Taiwan) in 1950, the Kiangnan yards were rendered inoperative for the construction of heavy merchant ships. Construction of small wooden craft was not affected, and there is some evidence that repair operations have since been resumed at Kiangnan on a limited scale. 12/ Except for light-tonnage wooden craft, however, construction activity in the Shanghai area is at a standstill.

In addition to the ports listed above, Canton (Kuang-chou), T'ang-ku, Fu-chou, Whampoa (Huang-pu), Han-k'ou, Swatow (Shan-t'ou), Tientsin (T'ien-ching), Hu-lu-tao, and Yü-lin on Hainan Island are capable of constructing large numbers of junks and landing craft.*

2. Current Production.

Orders placed by the Chinese Communist Army have resulted in a vast program of construction, conversion, outfitting, and repair of vessels designed for amphibious operations. These types embrace motorized junks, wooden vessels of 25 to 30 DWT with sheet metal sheathing, and larger landing craft averaging 75 DWT. The hulls are produced in large quantities, but deliveries of the completed craft are curtailed by difficulties in obtaining propulsion units. Great numbers of diesel engines have been ordered from the Shanghai Dockyard and Engineering Company, China's principal manufacturer, but the extent of fulfillment is unknown. A small number, approximately 150, of new diesels (100 to 225 horsepower) was seized with the capture of Shanghai. Many diesel engines have been imported via

* For the location of important shipbuilding facilities in China, see the map following p. 22.

Hong Kong and Macao from Western sources. [redacted] 50X1
the USSR is providing quantities of landing craft engines, but there is no direct evidence. 13/ The shortage of these components is illustrated by reports of wholesale conversion of automobile and truck engines to marine use. 14/

[redacted] because 50X1
of lack of materials and skilled manpower, postwar shipbuilding operations have been considerably less than those carried on there during the Japanese occupation. Ship repair activity at these yards, on the other hand, has reportedly exceeded the Japanese wartime level of 100,000 GRT annually. Repairs to Soviet vessels of all types account for the greater part of the work done. Annual capacity of all ship repair facilities at Dairen is estimated to be 200,000 GRT. 15/

Estimates of capacity and reports of deliveries indicate that the main shipbuilding centers of the China coast and inland cities construct annually about 2,240 wooden vessels, with a total tonnage of 85,100 DWT. This represents a monthly average construction of 14 motorized junks of 30 DWT and 3 large landing barges of 75 DWT at each of the 11 major construction centers. There is insufficient information to gauge the extent of construction of wooden ships in Harbin, Tientsin, and Hu-lu-tao, but it is probably less than the average of the other centers.

3. Conversions and Expansions.

Although Communist China is at present unable to undertake heavy shipbuilding, effort is being made to improve production capabilities of those yards engaged in the wooden shipbuilding program. Since July 1950 the Chinese Communist Army has reportedly invested roughly US $6 million, or an estimated 1 percent of the national budget for 1951, in the Dairen, Shanghai, and Han-k'ou shipyards. The Communist Army also has provided steel plates, lumber, and machinery. 16/ Plans for 1951 called for the production of 3,000 assault craft, with the bulk of the work centered in those three areas. From estimates of capacity and reports of output for the individual shipyards and from the evident lack of sufficient marine engines to render these craft operational, it appears unlikely that this total was reached.

[redacted] Any possible
expansion of heavy shipbuilding in Communist China will depend on the 50X1
ability of the administration to overcome the scarcity of materials, of components, of basic yard equipment, and of trained personnel. 50X1

4. Estimated Production for 1953.

Although the construction of large merchant vessels in present-day Communist China is extremely unlikely, the construction of motorized junks and other wooden vessels continues unabated. [redacted] 50X1
[redacted] the Chinese Communist Navy planned to accumulate 50X1
before the end of 1952 a sum total of 150,000 displacement tons of naval vessels, an increase of 70,000 displacement tons over the reported present tonnage of 80,000. 18/ This increase was to be in large and small landing craft.

In view of the full utilization of current capacity and the absence of further investment plans, production for 1953 will probably equal the current output of 85,000 DWT, although the inability of the Communists to produce a sufficient number of marine engines could contribute materially to a decrease in construction.

5. Technology.

The Chinese have made no significant progress in the technique of shipbuilding. They adhere to local conventional methods of working. Although various technical training programs are now under way in the principal building centers, [redacted] the shortage of trained technical personnel constitutes a serious problem for the Communists in their efforts to give real significance to the shipbuilding industry. Soviet technicians reportedly have been directing the training of shipbuilding and repair personnel at Dairen, Canton, Shanghai, and Tsingtao. 19/ 50X1

III. Input Requirements.

1. Raw Materials.

The principal raw material used in Chinese boat construction is lumber. The 1953 requirements for the construction of approximately 2,240 units are computed to be about 30 million board feet of cut lumber. The industry has been receiving the bulk of its lumber requirements from Manchuria and from the coastal provinces of Fukien and Chekiang. Before the Nationalist expulsion from the mainland in 1949, extensive use was made of lumber from Thailand and Indo-China. Douglas fir, particularly suitable for small boat construction, was imported from the US. Other raw materials are required in negligible quantities.

2. Finished Materials.

During the Japanese occupation a substantial amount of steel plate was obtained from Japan proper in addition to that supplied by

Manchurian mills for the operation of the Chinese shipyards. Japan also furnished such items as steel shapes, propeller shafts, electric motors, steering gear, and navigation equipment. Inability to procure such items is one of the paramount reasons why the Chinese shipbuilding industry has been reduced to building only wooden craft. Steel plate confiscated by Soviet authorities at Dairen at the end of the war and shipped to Vladivostok was returned to Dairen to maintain a sufficient supply for repair operations. In 1949, 4,800 metric tons of steel were returned to Dairen.

The requirements for raw steel will not exceed 4,570 metric tons for the ship construction program in 1953. The Chinese steel industry will be able to provide this amount. At the present time the Chinese are producing sheet metal to reinforce the hulls of assault craft and furnishing steel requirements for propeller shafts and a limited number of marine diesel engines of low (50) horsepower. Steel for extensive repair of Soviet shipping at Dairen reportedly is furnished by the USSR and is estimated at 20,000 metric tons annually.

The most important finished product necessary to insure the success of the wooden boat program is the marine diesel engine. Shanghai is the primary producing center, and current output is estimated at not more than 500 engines per year. 20/ Communist China has been making vigorous efforts, therefore, to procure engines from Hong Kong, Macao, Manila, and Japan. During 1950, 85 engines for landing craft were reportedly purchased in Manila, 21/ and an undetermined number of diesel units was obtained from the USSR. To render the current output of junks and landing craft operational, China needs approximately 3,000 marine diesel engines ranging in capacity from 25 to 200 horsepower. In addition, substantial quantities of nails, screws, and fittings will have to be made available to accomplish the expected production.

3. Imports.

Dependence upon uncertain supplies of raw materials and finished goods from abroad is a basic weakness of the Chinese economy. At the present time, Chinese imports appear to be intended primarily to help meet present military requirements rather than to aid the industrial development of the country. Most basic supplies needed for heavy merchant shipbuilding in the past were imported. By concentrating on the construction of small wooden vessels, however, the Chinese Communists have eliminated the need for most of these supplies. At present the critical import requirement is for marine diesel engines, as is indicated by cumulative evidence of increasing activity on the part of Chinese Communist purchasing missions.

Communist China will continue to purchase large merchant ships from abroad wherever possible. [redacted] 50X1
Soviet contributions to the Chinese merchant and naval fleets. 22/
[redacted] 50X1
[redacted] it is doubtful that the merchant marine has 50X1
received any assistance other than that provided by technical and administrative personnel.

4. Manpower.

The Chinese shipbuilding and repair industry directly or indirectly requires about 25,000 workers out of the 2,500,000 employed in the registered industries,* or about 1 percent of the Chinese nonagricultural labor force, excluding handicraft and coolie labor. This amount of labor is available, but, as in most branches of engineering in China, there is a marked deficiency of skilled workers needed for large-scale ship production and repairs. The practice of conscripting workers in various cities is widespread. Such labor is generally of low quality and unskilled, with little or no mechanical experience. The use of this conscripted labor is probably the most important single cause for the low rate of productivity in this Chinese industry. Data on the productivity of labor in China are rare and often inconclusive, but, generally speaking, output per man-hour is much lower in China than in the West. The present official work week in the shipbuilding trade is 48 hours on a one-shift basis. A considerable number of Soviet advisers, estimated as several hundred to 2,000, is engaged in planning and directing repairs in Chinese shipyards. In addition, an undetermined number of Communist Army troops is employed in the yards as an auxiliary labor force.

5. Electric Power.

Available data on Chinese shipbuilding yards do not permit segregation of electric power used in wooden ship construction from that used in other construction. On the basis of comparable US experience, however, the ratio of electric power cost to total manufacturing costs would be the lowest of all input factors. There is no evidence that the electric power requirements for wooden ship construction are not being satisfied.

* Registered industries are considered to be factories using power equipment or employing 30 or more workers.

6. Transport.

Chinese boatbuilding and ship repair are not dependent on the overburdened Chinese railroad system. Most shipbuilding and repair materials, including motors, structural pieces, and fittings, are shipborne through the ports of Dairen, Tsingtao, and Shanghai, and clandestine shipments are received through Hong Kong and Macao. Huge quantities of lumber reportedly have been floated down river to such boatbuilding centers as Canton, Han-k'ou, Amoy, and Shanghai. 23/

IV. Limitations and Vulnerabilities.

1. Limitations.

Despite China's proximity to the great commercial markets of the Far East, it does not have and never has had a merchant marine tradition like that of Japan and certain Western nations. Therefore, training in specialized maritime skills never has been established on a large scale, and the lack of technical personnel is an immediate problem. The low mechanical skill of the average shipyard worker and the unimaginativeness of Chinese industrial engineering and management have committed present shipbuilding to traditional methods of the country, with the resultant low volume of production. This limitation can be partially offset only by the simplification in designs of the standard types of ships put into production. Such simplification is at the expense of speed and seaworthiness.

Since shipyard facilities require very sizable amounts of capital, there are no prospects for the large-scale development of Chinese Communist shipbuilding and repair facilities in the near future. The critical deficiency in skilled personnel is a distinct limitation to the success of any shipbuilding program. Another factor tending to retard the expansion of the industry is the lack of an effective electric power network and of power generating facilities. In addition, poor administration, inadequate stockpiles, and lack of essential natural resources for large ship construction constitute grave limitations for the Chinese shipbuilding industry.

2. Vulnerabilities.

Given its present limited scope, the Chinese Communist shipbuilding industry is not considered to be highly vulnerable to economic warfare. Should the shortage of marine engines become more acute, the production of hulls for naval vessels probably would be curtailed. However, international restrictions on the importation of marine engines by Communist China would not necessarily produce this effect, in view of the possibility that the USSR would meet the essential minimum requirements of the

Chinese Communist shipbuilding industry.

From the point of view of transportation, the present activities of the Chinese Communist shipbuilding industry are not vulnerable either to economic warfare or to military attack, since its transportation requirements can be met by the use of natural waterways and with only the most primitive dock and storage facilities.

The larger coastal shipyards are vulnerable to direct military attack. Direct military attack probably would have no serious effect on output of the type of craft currently being constructed but would serve to eliminate the repair facilities along the Chinese coast which are presently available for use in emergency by naval vessels and merchant shipping.

APPENDIX A

SHIPYARDS AND LABOR FORCES IN COMMUNIST CHINA a/

Location	Shipyard	Labor Force
Liaoning Province		
Dairen (Ta-lien)	Dairen Dockyards	4,000
Hu-lu-tao	Hu-lu-tao Dockyards	500
Sungkiang Province		
Harbin (Ha-erh-pin)	Harbin Shipyards	500
Kiangsu Province		
Shanghai	Kiangnan Dockyard and Engineering Company	3,500
	Shanghai Dockyard and Engineering Company	800
	Kiousin Dockyard Limited	1,000
	International Drydock Company	300
Fukien Province		
Fu-chou	Government Shipyards	1,200
Amoy (Hsia-men)	Amoy Shipyards	1,500
Hopeh Province		
Tientsin (T'ien-ching)	Tientsin Shipyards	500
T'ang-ku	T'ang-ku Shipyards	250
Ta-ku	Ta-ku Shipyards	2,000

a. Estimates for labor represent the total labor force engaged in shipbuilding and repair.

Location	Shipyard	Labor Force
Kwantung Province		
Canton (Kuang-chou)	Chinese Naval Dockyard Company	1,000
Whampoa (Huang-pu)	Whampoa Shipyards	2,000
Swatow (Shan-t'ou)	Kuang Fu Yards	2,000
Shantung Province		
Tsingtao (Ch'ing-tao)	Tsingtao Shipyards	2,000
Hainan Island		
Yü-lin	Yü-lin Shipyard	200

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APPENDIX C

METHODOLOGY

Generally speaking, input requirements except for labor were derived through application of coefficients based on US inputs for comparable types of vessels. These factors were determined principally from information provided by the Maritime Administration and the Department of the Navy. Estimates for labor represent the total labor force engaged in shipbuilding and ship repair and are based on past reports of production of each shipyard as well as reports of the total labor force employed at all yards during the Japanese occupation.

The estimated production of wooden craft for 1953 is based on a complete survey of building capabilities and production reports. This estimated production when compared with that accomplished by the Japanese in the same shipyards leads to the conclusion that such production is within the capabilities of the yards.

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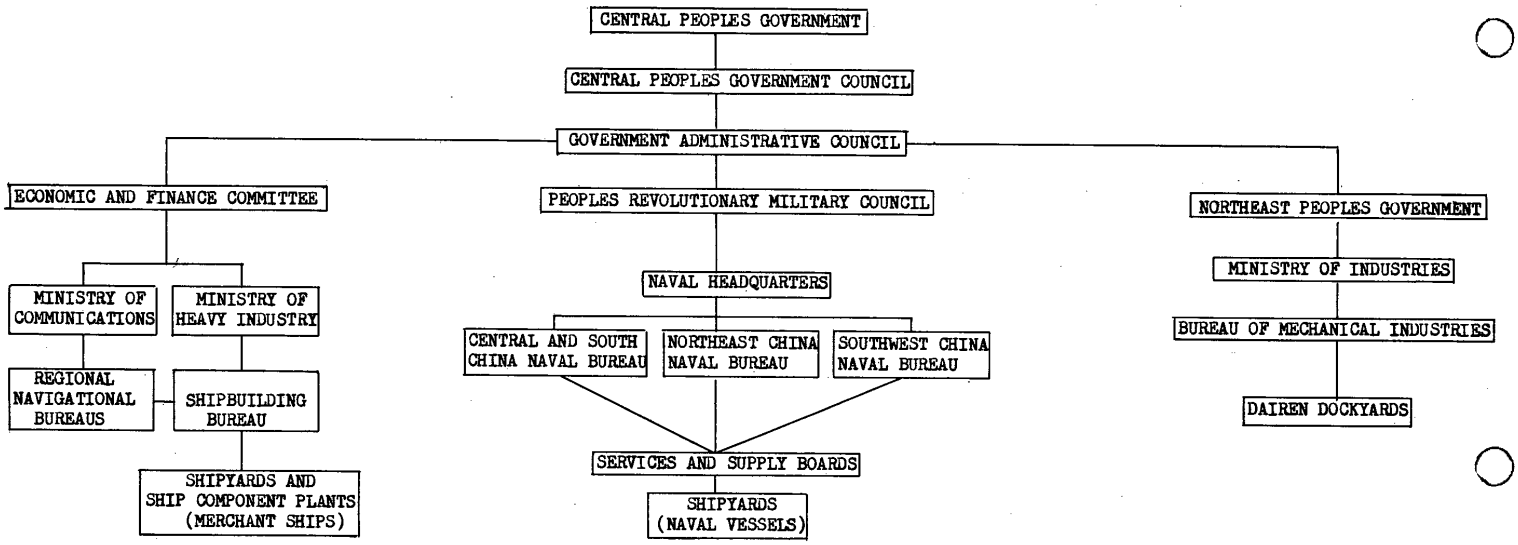
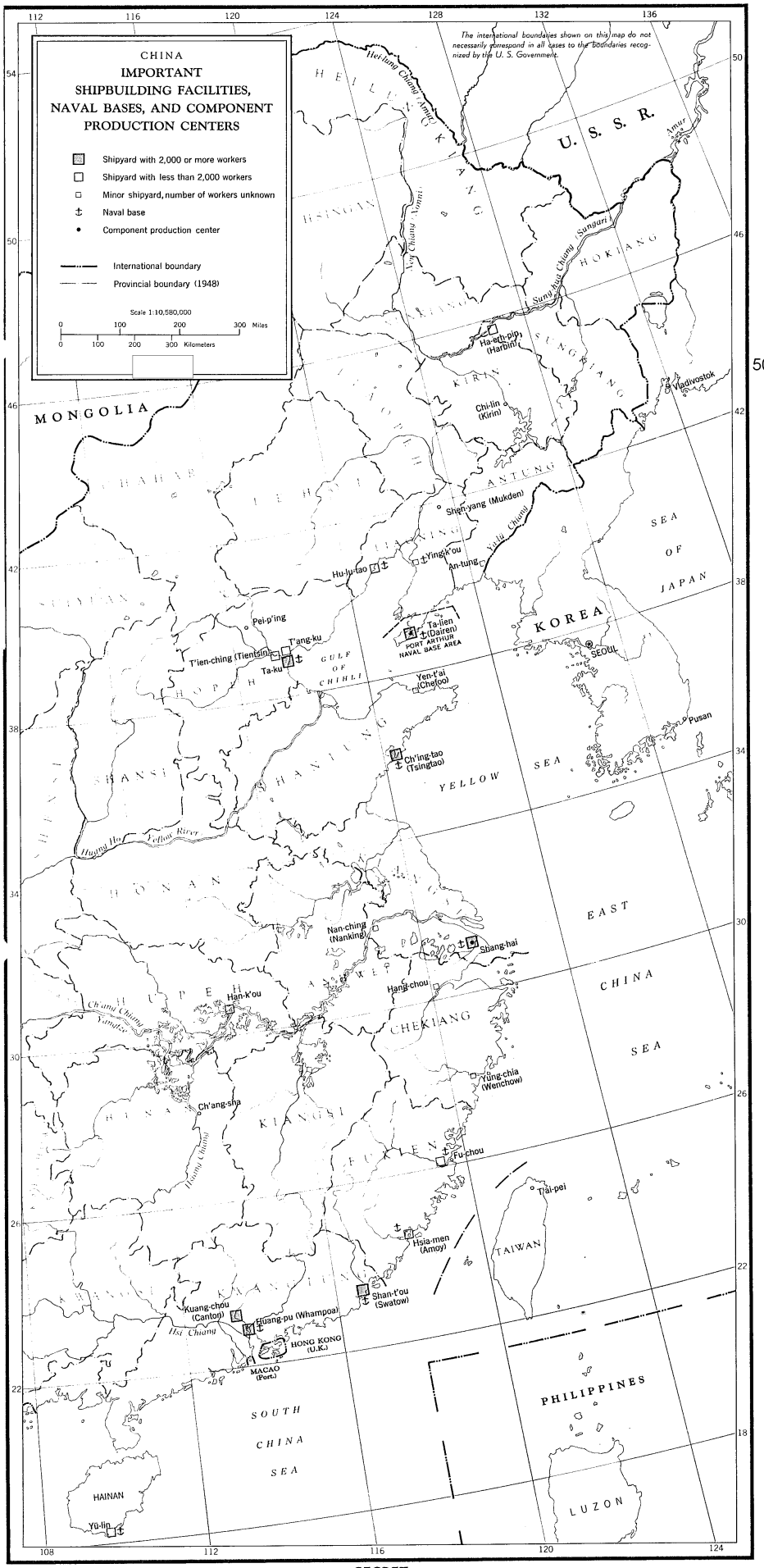
CONTROL CHANNELS FOR SHIPBUIDING AND RELATED INDUSTRIES IN COMMUNIST CHINA (TENTATIVE)





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